

These new sheds are of a steel frame and reinforced concrete type adopted as standard by the Commissioners. One is 264 ft. x 105 ft. and the other 484 ft. x 105 ft., each having a clear head room of 14 ft. The floor is designed to carry a super-imposed load of 600 pounds per sq. ft., while the location necessitated a design of foundation to withstand unusual ice shoves that might occur. The foundations for the sheds were completed in the previous year, while the balance of the piers and shed structure were finished in 1914 and equipped with railway tracks, offices, etc.

A low level quay-wall extending from the low level market basin at Berri Street eastward, was widened and strengthened and rebuilt on a 4 per cent. grade to standard high level, a rise of 12 ft. From the top of the grade the wall was continued eastward. It was extended in 1914 by the addition of cribs and a continuation of the concrete wall. Refilling behind the wall to its full height, the construction of anchor blocks, etc., were executed last year also.

During the season the dry dock site in the eastern part of the harbor was extended by the construction of about 2,500 ft. of standard crib and concrete quay-wall, having a total height of about 60 ft. The docking basin, 500 ft. x 1,000 ft., was dredged to a depth of 30 ft. at the quay-walls and to 50 ft. in that portion of it required for sinking the floating dock. The channel approach required the dredging of an entrance of about 1,000 ft. wide. Reclamation work to the extent of 30 acres was carried on for the ship yard and 6 acres for the right-of-way for harbor tracks and roadways. This practically completed a phase of the work commenced in the summer of 1910.

A wharf at Pointe-aux-Trembles for the Canada Cement Co. was undertaken in September, 1913. A portion of the dredging for the approach channel and about 400 ft. of the concrete wall to half level had been finished in 1913. The work was continued in 1914. Filling to the extent of about 250,000 cu. yds. was involved in addition to about 600 ft. of crib work and concrete quay-wall. Most of the grading and levelling was completed last year and railway tracks were laid to the wharf and to the site of an unloading plant proposed by the company.

The commissioners' harbor plant engaged in the usual work of dredging, included 5 spoon dredges and 1 elevator dredge. The work consisted of the maintenance of harbor berths, dredging to ameliorate the St. Mary's current, dredging for filling and the usual dredging required for construction work and the crib seats for wharves. The total amount done in 1914 was about 1,500,000 cu. yds., consisting chiefly of hard material, ranging from compact gravel, clay and hard pan to rock. None of the material permits of pumping.

One of the most important items of dredging, and which occupied the time of two of the Commissioners' best dredges almost entirely throughout the season, was the construction of a channel 20 ft. deep at low water, on the south-eastward side of St. Helen's Island. The extreme slope of the river from the Victoria bridge down to the lower end of the guard pier causes the St. Mary's current.

The design of the channel behind St. Helen's Island has for a purpose a discharge of a portion of the river flow through the channel on a fixed slope giving uniform current. The work of 1913 and particularly of 1914 has shown considerable effect, estimated to amount to 15 per cent., in ameliorating the St. Mary's current, even at extreme low-water stage of 1914 when it would otherwise have been at its worst.

The ground area dredged in 1914 amounted to about  $8\frac{1}{2}$  acres, all of which required the excavation of 20 ft. of material consisting of cemented clay and sand with many embedded boulders. A length of 1,000 feet was dredged for a width of 335 ft., and before the work closed the dredging was in a fair way to approaching deeper water near the head of St. Helen's Island.

Other important items of dredging consisted of dredging between St. Helen's Island and the guard pier, consisting almost entirely of large boulders. Four hundred and seventeen large boulders were removed, many requiring to be blasted before dredging.

A channel was commenced on the city side of the guard pier up to the Bickerdike pier, where the material is shale rock. The cut made was 500 ft. long by 120 ft. wide, all being dredged to a total depth of 30 ft. at low water.

The widening of the main harbor was proceeded with inside the guard pier and an additional width was obtained opposite Jacques Cartier and King Edward piers.



Fig. 3.—Operations Commencing on the Construction of the Second Addition to the Commissioners' Elevator No. 1.

The entrance channel of the dry dock basin was also widened and deepened and several portions of the ship channel opposite Longueuil and St. Helen's Island were also done by dredges belonging to the Department of Marine and Fisheries.

The drilling and blasting boat was occupied throughout the year. The number of holes drilled and blasted was 2,769, the average depth of holes being over eight feet and the quantity of dynamite used was 16,074 lbs., of 75 per cent.

The following important items of construction work and materials used will give an idea of the extent of the Commissioners' operations during the season: Cribwork built, 2,160 lin. ft.; cribwork sunk, 1,820 lin. ft.; quay walls completed, 2,518 lin. ft.; quay walls completed to half height, 1,159 lin. ft.; retaining and abutment walls completed, 1,228 lin. ft.; new track work, 4 miles; paving, 20,000 sq. yds.; dredging, by Harbor Commissioners' dredges, 1,500,000 cu. yds.; by Marine and Fisheries' dredges, 500,000 cu. yds.; refilling by derricks, 1,750,000 cu. yds.; filling obtained from city contractors, 200,000 cu. yds. Quantities of materials used were: Cement, 60,000 barrels; sand, 15,000 cu. yds.; crushed stone, 25,000 tons; rubble stone, 20,000 tons; displacers, 500