

tion brake, operated on deck by the crew. To lower away the dredge it is only necessary to slack the friction brake.

The hoisting cable is of  $2\frac{1}{4}$ " wire rope, and when in digging anything specially hard is encountered care has to be taken or the dredge will snap this cable-like rope. The average life of a cable in digging rock is not over a month. The dredges are of the single whip variety, no system of pulleys or blocks being used on crane to obtain power, but a single line of cable from drum to bucket. Anchor cables are of  $1\frac{3}{4}$ " wire rope, while a special engine and  $1\frac{1}{4}$ " test chain is used for swinging.

These dredges operate a four yard bucket. Their performances vary greatly, for the frequent hauling of drills from ranges for safety causes many undrilled areas of small extent, which make difficult and almost solid rock dredging. As little as 250 yards a day is sometimes got. Tests taken of the new 1904 dredge in well drilled material loaded in skips of five yards capacity shewed an output of 4,385 cubic yards in six days of twelve hours. Deducting five hours delay for repairs, this gives an actual average of 65.5 cubic yards an hour. No effort was made for a record. Her best performance was 1,000 yards (in tubs) in 12 hours. These are rock figures, the dredges never having been tried in soft material.

The excavation is loaded in dump scows or tubs, according to the purpose for which it is required. No filling can be done by dump scows in less than 7' of water. To handle skips, a large A frame steel derrick with 65' boom, capable of lifting 20 tons, was built. To carry this a special scow 120' x 36' x 11' was built, having steel trusses, etc.. Owing to its breadth and stiffness it was possible to lift to the capacity of the derrick without any pinning-up apparatus.

While this derrick was an experiment it proved most successful, being easier to handle and tow than regular speed derrick, and besides requiring no time to pin up, it provided a large space for carrying materials.

These works are now almost completed. The tenders for putting in foundations for a 2,000,000 bushel elevator are under consideration, and with the erection of this elevator Port Colborne will possess a harbour equal to the best.

The work has been done by contract under enormous difficulties. Many of the features were new, and of the experimental character, which required new devices and new methods. The weather proved a constant menace, summer and winter, time and again storms having wrecked cribs, sunk scows and drill boats, and driven the fleet into the harbour and twice below the canal locks for shelter. With the system of breakwater erected such a state of things can no longer prevail.