

Montreal, January 16, 1893.

Collingwood Schrieber, Esq.,
Deputy Minister and Chief Engineer
of Railways and Canals.
Ottawa, Ont.

Sir.—The examination of the new channel of the Galops rapids of the St. Lawrence was continued after my report of 19th September last, and, excepting in some minor items, it was completed as far as proposed with the closing of navigation. The plans and calculations are now finished, and I beg to report the result:—The method of conducting the examination was described in the former report but for convenience the description may be here repeated in brief. The elevation of the entire dredged bottom as it now is was ascertained by levels taken on cross section lines above twenty-five feet apart and at points usually twelve and a half feet apart on these lines, but at closer distances at the banks of the channel and other necessary places. The bottom grade line of seventeen feet below the surface of normal low water (which is when there is nine feet depth on the upper sill of the entrance lock of the Galops canal) was deduced from a profile of the water surface of the channel taken when it was very near the normal low water stage. Since the former report, and at the request of the hon. Minister of Railways and Canals an effort was made to ascertain what the bottom consists of, and whether loose or solid, by the use of such appliances as could be readily obtained and could be used with the surveying steamer. For this purpose two appliances were used. One of these consisted of a steel bar supported and guyed by tackle at the steamer's side in such way as to hold it against the current, and at the same time to allow its being moved in various directions by hand, so that the bottom could in some measure, be felt as with a common pole. The bar was two and a half inches in diameter, and its lower end was provided with a stout foot projecting six inches inside to one side. The other appliance consisted of a pair of stone grips or hinged grapples, of about four tons lifting capacity, worked by suitable tackle and steam winches. While either bar or grips were being used the steamer was moored by two anchors placed one ahead and one over one bow, with cables carried to steam winches in such way that the boat could be held still or slowly moved about at pleasure.

The chief items of general examination work are the following:—

Upper bar was cross-sectioned. A profile of the water surface was taken when there was nine feet and half an inch depth on the lock sill, for determining the bottom grade line. The bottom was swept over by the horizontal bar so as to find the areas clear for navigation at depths of 14, 15, 16 and 17 feet at low water. The character of the bottom was tried at a great many points both by bar and grips.

The space between Upper Bar and the North and Caledonia shoals was tested for navigation by sweeping it over with the horizontal bar at a depth of seventeen feet at low water.

North and Caledonia shoals were both cross-sectioned, and the termination of the excavation at the sides of the channel was determined. A profile of the water surface was taken when the water was at 8'95 to 9'15 feet on the lower sill for determining the bottom grade line. The areas clear for navigation on Caledonia shoal were found by sweeping at depths of 14, 15, 16 and 17 feet at low water.

Mr. REID (Grenville).

Island shoal. The examination work was detailed in the report of the 19th September last, but for convenience is here repeated in brief. The shoal was cross-sectioned and the sides of the excavation determined. The areas clear for navigation were found by testing to depths of 12, 13, 14, 15 and 17 feet at low water. The conditions for taking a profile of the low water surface on Island shoal were more favourable after the date of the September report than those which prevailed before, and a new profile was therefore made. This gives a grade line averaging about two inches higher than that deduced from the former profile, and also nearer by that much to Mr. Rubidge's grade line. In order to secure exactness in figures this new grade has been adopted and the excavation in Island shoal has been re-computed to agree with it, as hereafter noted.

The space between Island Shoal and Lower Bar was tested for navigable depth by sweeping it over with the horizontal bar at seventeen feet depth at low water. Lower Bar was cross-sectioned between the normal side lines of the channel. The side limits of the excavation outside the normal lines were not in all cases determined because the strength and irregularity of the current, as also the conditions of the banks made it impossible to do so without more time and more outlay for special appliances than appeared justifiable. A profile of the water surface was taken, when the depth on the lock sill was 9—1 to 9—15 feet— for determining the bottom grade.

The areas clear for navigation were found by sweeping with the horizontal bar to depths of 10½ and 12 feet at low water.

Lower bar extension was cross-sectioned throughout. A profile of the water surface for determining the bottom grade line was taken when the depth on the sill was 9'1 to 9'15 feet.

The areas clear for navigation at various depths were ascertained by sweeping with the horizontal bar at depths of 12½, 13, 14, 15, 16 and 17 feet at low water.

Quantities of Excavation.—In giving the quantities of excavation which follow there are conditions which require to be explained and noted.

1. The quantity of excavation performed is to be understood as being that which is measured by the difference between the original bottom as it was before excavation was commenced and the bottom as it is now found. There are no exact data for computing it otherwise, nor in any condition previous to the present.

2. It is to be particularly noted that the line of present bottom shown in the accompanying cross sections and from which the excavation is calculated, is its average height as ascertained by taking levels at the points indicated and drawing straight lines from point to point. This is a sufficiently correct factor for the computation of the quantity of excavations, but it must not be taken as having any relation to the navigable depth of water. The tests by the sweeping bar show that in large areas of the channel where the average depth is fully down to grade or even much below it, there are high grade points which make the depth available for navigation, or for any other present use to be very much less. These high points are in most cases more isolated rocks or stone snags, which count for nothing in cubic yards of excavation, because they only balance correspondingly deep holes, but they enormously affect the navigable depth of the channel. This suggests the desirability of some estimate of the contents or dimensions of these points alone, so