

practicable, the forces brought into action by the floating ice as described were of a formidable nature, and could only be effectively counteracted by a structure of a most solid and massive kind.

All the information which has been collected since I made my first report, has only tended to confirm the impressions by which I was then guided.

For the sake of clearness and simplicity, the consideration of the design may be divided into four parts: *first*, the approaches; *secondly*, the foundations; *thirdly*, the upper masonry; and *fourthly*, the superstructure or roadway.

The approaches, extending in length to 700 feet on the south or St. Lambert side, and 1300 feet on the Point St. Charles side, consist of solid embankments, formed of large masses of stone heaped up and faced on the sloping sides with rubble masonry. The up-stream side of these embankments is formed into a hollow shelving slope, the upper portion of which is a circular curve of sixty feet radius, and the lower portion or foot of the slope has a straight incline of three to one, while the down-stream side, which is not exposed to the direct action of the floating ice, has a slope of one to one. These embankments are being constructed in a very solid and durable manner, and from their extending along that portion of the river only, where the depth at summer level is not more than two feet six inches, the navigation is not interrupted, and a great protection is by their means afforded to the city from the effect of the shoves of ice which are known to be so detrimental to its frontage.

For further details on this subject I beg to refer you to the report made by Mr. Ross, and myself, on the 6th of June, 1853, to the Honourable the Board of Railway Commissioners, Quebec.

Advantage has also been taken of the shallow depth of water in constructing the abutments, which are each 242 feet in length, and consist of masonry of the same description as that on the piers, which I am about to describe, and from their being erected in such a small depth of water their foundations do not require any extraordinary means for their construction.

The foundations, as you are aware, are fortunately on solid rock, in no place at a great depth below the summer level of the water in the river.

Various methods of constructing the foundations suggested themselves, and were carefully considered; but without deciding upon any particular method of proceeding, it was assumed that the diving-bell, or such modifications of it on a larger scale, as have been recently employed with great success in situations not very dissimilar, would be the most expedient. The contractors, however, or rather the superintendent, Mr. Hodges, in conjunction with Mr. Ross, after much consideration on the spot, devised another system of laying the foundations, which was by means of floating "coffer-dams," so contrived that the usual difficulty in applying coffer-dams for rock foundations would be, it was hoped, in a great measure obviated. When in Montreal, I examined a model of this contrivance, and quite approved of its application, without feeling certain that it would materially reduce the expense of construction below that of the system