Portland cement is not always uniform; its manufacture requires much care; it is not free from risk, though its employment both in fresh and sea water, above and below water, is generally satisfactory. There have been no visible signs of expansion and increase of bulk, or unusual contraction, which is presumably owing to careful manipulation and having been used in small quantities.

The author has employed the Medina cement, made by Messrs. Francis, of London, in pointing and repairing the sea walls retaining the embankment at Bray Head, on the Dublin, Wicklow and Wexford Railway, and the sea walls of the Dublin and Kingstown Railway, when resident engineer on those lines of railway, with a greater degree of success than when Portland cement was employed. The rapid setting of the natural cement proved more advantageous, up to the level of high water, than the too slowly setting Portland or artificial cement, during the operation of tide work. It was considered better to employ both, the natural cement for pointing and lipping up to ordinary high water, and the artificial cement from that point upwards, and the result seemed to justify the practice. When the exposed surface of the base of the piers of Petite Rivière bridge becomes more abraded, or when renewal is necessary, it is contemplated to submit the Medina to a similar test beside the Portland.

There is at present an iron bridge under construction to replace the Victoria Bridge, Bear River, consisting of a swing span 160 feet in length, two fixed spans of 125 feet each, and one of 100 feet. The swing span is to revolve on a circular pier 24 feet in diameter, entirely constructed of concrete. Each pier for the fixed spans consists of two wrought iron cylinders five feet each in diameter filled with concrete, coupled together by laced channel beams and lateral bracing, and sheathed between main tubes to prevent lifting or displacement by ice floes. It is, however, the circular or concrete pier that comes more properly within the bounds of these remarks, and to this alone shall reference be made here. There is 18 feet of water at ordinary low tide in the navigable channel; spring tides rise 26 feet. The *Lignovia* are here so active that the bearing power of piles, or of timber submerged below the level of low water, is, where exposed, affected if not destroyed within six years. The supports of the old wooden structure had to be renewed twice within a period of twelve years. The new bridge is being placed immediately above the old one, and if founded on piles similarly unprotected would be no less reliable. The river bed here is characteristic for instability and increasing change caused by the rapid currents of the Bay of Fundy tides on gravel beds and loose deposits, pointing to piles as most desirable. For these reasons, as well as one no less obvious, viz., limited means, it was decided to adopt piles driven at three feet apart centers over the whole base of pier, and protect them with a circular envelope of concrete three feet in thickness. The hexagonal circuit of close piling shewn by figure No. 2, is driven merely as a mould to retain the outer wall of concrete whilst it is being erected. The piles are to be cut at the level of low water spring tides, the intervening spaces between them filled up with small stones, and the usual platform of 12" x 12" timber framed thereon, thus completing the base of the circular pier up to the level of low water. The concrete superstructure from that point upwards to finish is a frustrum of a cone having a solid vertical central pillar 4' x 4 to support the pivot, and four walls 2'-6" each in width radiating therefrom to outer circular wall or periphery, which is 2'-6" wide at top and increases downwards with a batter of 1 in 8. The four voids thus left in the body of the prism have vertical sides to within four feet of the top, where they corbel to an apex and are covered with two feet of fine concrete. The swing span which is to turn on the centres, and is made to revolve on live rollers, will be lifted on its center pivot by the usual screw device or central press, thus relieving the rollers of part of their weight. There will be during the operation of turning 118,596 lbs. superimposed on the four feet square wall or pillar of concrete, or 51½ lbs. to the square inch. Figure No. 2 gives the form and details of this pier. With respect to the three feet wall surrounding the piles under water, it will be filled up with concrete lowered in paper bags, each containing a cubic foot of fine concrete. This mode of placing concrete under water between piles, or within iron tubes where the intervening spaces are small, has been practised in Nova Scotia very successfully. The iron tubes of the Avon bridge, at Windsor, have been filled up to the level of low water in this manner. The bags cost $1.35 per hundred or 36 cents per cubic yard additional for their use. They are made of rough brown paper well stiffened with glucose, which is immediately destroyed by immersion, the residue helping to assist the induration and strength of the concrete, whilst there is very little if any of the cement lost by submergence. Rubble concrete can also with care be placed under water in alternating courses of fine concrete and stone, by lowering the stone so that they would not rest against or upon each other and lowering a course of fine concrete in bags thereon.