

42. Pursuant to the authority given by this Act the Board purchased a suction dredge, the "Eileen Ward," having a hopper capacity of 1,000 tons.

43. The Marine Engineer of the Dominion, Mr. R. W. Holmes, in 1909 reported to the Minister of Marine on the question of the use of dredging or of training-walls to increase the depth of water on the bar. It was his opinion that the breakwaters should be coterminous, that the entrance should be diminished from 700 ft. to 650 ft. or to possibly 600 ft., and that future extensions of the breakwaters should be carried forward simultaneously, but only if experience warranted the extensions. Mr. Holmes also recommended that the two dredges, "Rubi Seddon" and "Eileen Ward," should be kept constantly at work on the bar, and expressed his opinion that the natural scour would not be sufficient without dredging to maintain the channel. Mr. Holmes confirmed the view previously expressed by Mr. Napier Bell that systematic surveys and observations both inside the river and in the roadstead should have been regularly made for the purpose of enabling the effect of scour to be definitely settled, so that the respective efficiencies of scour and dredging might be accurately determined. Mr. Holmes, for the preservation of beacon lines upon which soundings should be taken at regular intervals, recommended that permanent concrete blocks should be established for a mile on each side of the entrance. The Board have to some extent carried out this recommendation of the Marine Engineer as to the concrete blocks. These blocks on the western side have been placed on land over which the Board had and still has no control, concerning which we refer to more fully hereafter.

44. Mr. Holmes in 1912 made a further report to the Marine Department upon the effect of dredging and the extension of the breakwaters. From evidence which Mr. Holmes gave to the Commission, the figures in his report as to the cost of the breakwater extensions were based upon data supplied to him by the Engineer to the Board, Mr. Young. Had he been supplied with correct information his calculation as to the relative values of dredging as compared with extensions of breakwaters would have been materially altered, and the advantage of proceeding with dredging rather than with extensions of the walls would have been further emphasized. Notwithstanding this he recommended that a dredge having the same pumping-capacity as the "Eileen Ward," but having a larger hopper capacity, should be obtained. Mr. Holmes specially remarked that "the reclamation of any areas between high- and low-water marks, spring tides, should be absolutely prohibited within the tidal compartment."

45. In March of the present year, 1913, Mr. C. W. Darley reported to the Marine Department, and deprecated reducing the width of entrance to less than 650 ft., and stated that the extension of the eastern breakwater beyond the western should be limited to 200 ft. or possibly 250 ft. until the result had been definitely ascertained. He also drew attention to the want of careful observations over a sufficient period of years to provide accurate information of the successive changes. He recommended economy to be obtained by reducing the width of the breakwaters, and he refers to the danger of using small stone. He advised a vigorous dredging policy independently of the breakwater-construction. Mr. Darley, in dealing with the floating basin and the proposed slip therein, recommends that the shape and alignment of the basin should be altered and a new site adopted for the slip, and he makes a suggestion for better railway access to serve the floating basin by a new line of railway to pass to the eastward of the town.

46. Mr. Holmes, in reporting in August of this year, confirms the recommendations of Mr. Darley in regard to the floating basin, but recommends an extension of the width of the entrance, and says, "It has always seemed to me that the entrance to the floating basin was too narrow to be worked with facility."

47. Dealing with matters under various headings we find :—

#### SIR JOHN COODE'S ORIGINAL SCHEME.

The scheme propounded originally has been varied in the following manner : The training-walls have not been constructed exactly on the lines suggested, with the result that a strong set of the river-current has been thrown on to the staiths and crane wharf. This has had the effect of causing a considerable scour at the wharf, and has made a somewhat difficult and on occasions a dangerous current from a navigational point of view.