

that it is a parallel case to Napier. The channel there is a protected channel, the coast being protected, in the first place, by the Great Barrier Reef, and Moreton Bay, from which the channel enters the river, being quite a protected bay. We refer to the evidence on this point of Captain A. H. Brown, who, speaking, with a knowledge of Brisbane Harbour, stated that from the entrance to Moreton Bay to the beginning of this channel is 60 miles by one route, and 30 miles by another, with land on one side and sandbanks on the other. There remains Colon. Mr. J. D. Holmes put this forward as a parallel case, and said in his evidence (see page 305, Notes of Evidence), "My point is that if captains of vessels navigate the entrance to the Panama Canal at Colon under the conditions that obtain there, there should be no difficulty about navigating the entrance to the Inner Harbour here. It is navigated at night as well as by day without the slightest difficulty. I cannot produce plans in Napier of this locality to submit to Commissioner A. C. Mackenzie."

We have been able to procure the plans that Mr. Holmes could not then produce, and we include as Maps G and H in Commission's Exhibit No. 3 plans of Colon Harbour and entrance, and plans of the proposed Napier Inner Harbour. In each case there is included, on a smaller scale, a general locality-plan. We call attention to the entrance channel at Colon, situated in Limon Bay, protected, firstly, by the coast-formation, and, secondly, by the West Breakwater and the East Breakwater. We call attention, secondly, to the plan of the proposed Inner Harbour at Napier, showing an utterly unprotected channel, and we propose to leave these plans and the quoted remark of Mr. J. D. Holmes without further comment.

One of the chief engineering problems related to the construction of this channel is that which requires all the conflicting facts and theories relating to the littoral drift and movements of the sea-bottom to be studied and reduced to a working theory. In this problem we have been guided by the engineering member of the Commission; and the result of his work has been incorporated in paragraph 10, "Development of Theories," where it appears under the subheading "Our Conclusions on the Question of Sand-drift." We beg leave here to refer Your Excellency again to that subheading, the contents of which enter into our consideration of the Inner Harbour problem from the engineering point of view. The contents of that subheading, "Conclusions on the Question of Sand-drift," also introduce and are related to the question of dredging the outer channel, with which we now propose to deal.

DREDGING.

We are of opinion that the Board's consulting engineers have taken too optimistic a view of the possibilities and probabilities of cutting the outer entrance channel to the Inner Harbour by means of dredging, and of maintaining it in a workable condition by dredging. Mr. J. D. Holmes says (page 301, Notes of Evidence), "We intend using the dredge outside when possible, and inside at other times. There would be no loss of time under these circumstances."

We desire to call attention to this witness's evidence on pages 300 to 304 inclusive in the Notes of Evidence, as supporting our conclusion that he has taken the most optimistic view of every portion of this problem, and refused to admit any element of doubt into his calculations. He does not agree with the conclusions of engineers of experience like Messrs. J. P. Maxwell, Cyrus Williams, and J. Blair Mason; and he stated in answer to the Chairman that the warnings of these engineers on the matter of the practicability and safety of this outer channel did not even raise a doubt in his mind. He was referred to Messrs. Cullen and Keele's warnings that the cost of maintenance dredging on this outer channel when constructed would probably be high, and that it was that which made the cost of maintenance of Inner Harbour greater than the maintenance of the Outer Harbour, and that they had provided for the worst by allowing for the continuous use of the dredge, and he stated that he did not agree with that as a policy and did not think it necessary (see page 307, Notes of Evidence). He was referred to the evidence of his father, Mr. R. W. Holmes, to the effect that when the channel was cut no maintenance dredging would be necessary for three years, and was asked if he agreed with that. His answer was (see page 301), "I would not like to express an opinion on that; it is hard to say—there are so many unknown factors." He was then asked by the Chairman, "When an engineer is advising a Harbour Board on a problem in which there are unknown factors which make it hard to say, what standard of care should be adopted in making the recommendation?" We desire to call particular attention to the answer which follows: "I think that the outer channel is absolutely safe; I do not think I have taken any risks."

We are of opinion that from the warnings given by the engineers we have referred to, and from the experience of the dredgemaster of the "Whakarire" (Mr. T. W. Martin) as to the practical difficulties experienced for a period of two months in trying to dredge at this point, and further that if he had to estimate the cost of dredging on that channel he would look upon it as a very difficult problem, and cost it accordingly (page 622, Notes of Evidence), a much more conservative estimate requires to be made in the matter of the cost of dredging this channel and keeping it open.

Our considered opinion is that whilst there is the bare possibility of all the uncertain factors working favourably and justifying Mr. Holmes's optimistic outlook, the probabilities of the case are that if the people of Hawke's Bay had been led into making this venture, including the purchase of a dredge to do this dredging, there would have been added one more to the list of expensive engineering fiascos on the coasts of the Dominion.

For a full detailed report on the whole question of dredging in relation to the Inner Harbour we beg leave to refer to a separate report of the engineering member of the Board, Mr. A. C. Mackenzie, appearing as Table F in the appendix. We hereby adopt that as part of our report.

With regard to the Breakwater Harbour, our conclusion, broadly stated, is that this scheme offers to the Napier Harbour Board district a feasible method of providing a reasonably good harbour for the accommodation of overseas vessels. This harbour will have its limitations; it will not be a first-class