

track. The mode of construction was judiciously chosen, as it enabled long lengths of work to be executed at a comparatively small outlay, and provided for the port the maximum amount of early useful effect from the expenditure incurred, although necessitating, not infrequent outlays hereafter, in the upkeep and repairs of the timber work. To have provided for a permanent mode of construction, such as would have avoided the necessity for these repairs, would have increased the cost of the works to such an extent as would in all probability have precluded their adoption; and this would have been a subject for regret, seeing that the piers, with proper repairs and renewals, cannot, in my view, fail to fulfil the object for which they were intended—namely, to keep open and maintain a permanent navigable approach to the port, when associated with the improvement of the channel, to which I shall presently refer.

The effect of the piers has been to deepen the entrance from an average of 9 feet at high water of spring tides in 1873 to 13 feet in March, 1879; also to afford a fixed straight course, in lieu of the tortuous and frequently shifting track which formerly prevailed. The shingle in the channel and on the bar has been scoured down, leaving a layer of boulders on the surface: these, being matted together by barnacles, have formed a skin which has been found to be proof against the scouring action of the tides. Mr. Weber states that this boulder skin was being operated upon by a heavy rake and dynamite, with satisfactory results, but that the process was of necessity rather slow.

Mr. McGregor's Proposed Harbour.

I come now to Mr. McGregor's proposal to form a close harbour between Napier Bluff and the existing entrance. Having already referred to the inexhaustible source of the shingle supply, and quoted instances in proof of its rapid accretion when its normal travel northward is opposed by a barrier on the shore, the ground is cleared for a consideration of this subject. Mr. McGregor has put forward alternative proposals: one for a close harbour, having 55 acres of available water space for shipping, with 24 feet at low water about the position of the entrance; the alternate plan contemplating a close harbour of similar shape, having an area of 120 acres, with a depth at the entrance of 27 feet at low water. The estimated cost of the former was £160,000, and of the latter £246,000. These estimates were based on the assumption that the sheltering work, which in each case was to be practically at right angles with the shore line, starting from a point a little more than a quarter of a mile on the harbour side of the Bluff, should be formed with a substantial facing and top of cement concrete, with a hearting of loose rubble stone, similar to the breakwater at Oamaru. Since, however, the foregoing estimates were prepared, I gather that it has been found expedient to make the Oamaru section of solid concrete throughout, the rubble hearting being dispensed with. Therefore, if a similar substitution of concrete for rubble were adopted for the outer pier at Napier Bluff, the estimated cost of the works must be added to accordingly.

The question must not, however, be decided upon the point of cost, nor upon the mode of construction proposed, but upon the broad principle as to whether the entrance to any harbour run out from this shore—either as proposed by Mr. McGregor, or otherwise—would not, in the absence of backwater, become so blocked by shingle after a time as to render the works practically useless. Having carefully considered this feature of the case, I am reluctantly compelled to express an opinion that such would be the result. The shingle travelling along the coast between the Tuki Tuki and Napier Bluff would gather against the back of the protecting pier, and, turning around the curve or knuckle, would pass along the outer kant and be deposited in the entrance and under the lee of the westernmost work.

In my view it is not possible, under the conditions which prevail at this place, to maintain a permanent entrance of adequate depth across the line of shingle drift without the aid of strong currents, such as are generated by the filling and emptying of the backwater, and, seeing that such a vast tidal reservoir is available for the keeping open of the entrance, there can, in my opinion, be no question that the proper course to adopt will be to devote any funds which may be available to the improvement of the existing entrance to the harbour, rather than to embark in any separate undertaking, which, in the absence of the necessary scouring agency, would inevitably prove a failure.

If the requirements of navigation should at any time be such as to render the construction of a harbour of refuge somewhere on this part of the coast of the North Island a matter of necessity, I should in that event give a decided preference to a site on the shore at a short distance to the westward of Cape Kidnappers, or on the southern shore of Poverty Bay to the westward of Young Nick's Head, as compared with Napier Bluff. I apprehend, however, that the necessity for a harbour of this class hereabouts has not only not yet arisen, but that it is not likely to arise for a long time to come, if at all.

Recommendations.

On the accompanying drawing the works I have to propose are shown by red colour. They may be divided into three groups, viz.: 1st. Works for the improvement of the entrance immediately required. 2nd. Works for the further improvement of the entrance, to be undertaken as soon after the completion of the first instalment as may be considered expedient, having regard to the outlay required thereon. 3rd. Prospective works for increasing the internal accommodation and berthage of the port. These last-named are not put forward even for early execution, but as affording the lines upon which additional facilities of this character should be provided, if the trade of the port should hereafter call for such accommodation.

First Instalment of Proposed Works.

By referring to the drawing, it will be seen that the first instalment of the proposed works would consist of extensions of the east and west piers respectively, each for a length of 400 feet in a straight line beyond the present terminations; thus leaving the ends of the piers in the same relative positions as at present. I regard the existing overlap of the west pier by the east as being just sufficient to