

tides at the lower end of the new wharf, just below the bridge, has been ascertained to be 6 feet 9 inches, the highest tide recorded at the same point was 9 feet. In the notes furnished by Mr Atkins on completion of the special survey, in July, 1879, he mentions that the range of the highest spring tide outside the bar for the previous twelve months had been 12 feet.

I find from the Harbourmasters's daily records for the year 1877, that the greatest depth over the bar at high water of spring tides was 11 feet 6 inches, but this was found only on four days. The records also show that a depth of 11 feet and upwards was found on twenty-four days, and from 10 to 11 feet on seventy-one days, in the same year. The minimum high-water depth recorded during the same period was 6 feet. Depths ranging between 7 and 8 feet were recorded on seventy days, these last named occurring, as might be expected, at the time of neap tides. The yearly average depth on the bar at high water during the six years, 1872 to 1877, both inclusive, appears to have ranged between 8 feet in 1875, and 9 feet 9 inches in 1872.

Throughout the whole length of its tidal compartment the Waitara is greatly encumbered by deposits of shingle, brought down from the back country in times of heavy flood. At the entrance, *i.e.*, immediately within the line of high water on the coast, there is, on the right or eastern bank, a considerable spit of sand and shingle intermixed. This spit causes an inconvenient bend in the navigable track of vessels when entering or leaving the river. There is also an isolated bank of shingle, about 400 yards long, and averaging about 60 yards wide, situated half a mile below the bridge. This bank has the effect of dividing the river's course into two branches, thereby robbing both the tidal and fresh-water streams of much of their useful scouring effect at this part of the river.

When making my inspection, the Harbourmaster (Mr Cameron), called my attention to what he regards as the advantage the entrance of the Waitara derives from the Airedale Reef, which lies about three-quarters of a mile on the north-east of it, and from another reef of about the same size on the south-west. With the wind from north-east or from south-west, these reefs will doubtless have the effect of mitigating, to some extent, the force of the sea at the immediate entrance, but, having regard to the fact that the heaviest seas always tend to break directly on to the shore, or just to the westward of north (magnetic), I think the value of these reefs is somewhat overrated, and that this will be more clearly seen by reference to Drawing No. 1, which shows the position of the reefs with regard to the entrance.

There can be no doubt that, as Mr. Cameron stated to me, the Waitara entrance is one which vessels very easily get away from, or, speaking nautically, is one which has a good "loose"; this is unquestionably a great advantage, as is also the fact, mentioned to me by the Harbourmaster, that the holding ground outside the entrance is unusually good.

It appears, from information obtained at the time of my inspection, that there is a growing trade out of the port, even in its present natural or unimproved condition, in respect of cattle and sheep which are rapidly fattened in the rich pasture lands of the surrounding district; and it was further stated that this trade, as well as that in agricultural produce generally, would become very considerably increased if the harbour were improved.

Works of Improvement.

As is usually the case in dealing with harbours of this kind, the works of improvement may here be advantageously classed under two heads, *viz.*: (*a.*) Works adapted for the removal or improvement of the bar which impedes the ingress to and egress from the port; and (*b.*) Works for the amelioration both as regards depth of water and alignment of the navigable channel within, together with the provision of berthage and quay accommodation for loading and discharging vessels engaged in the sea-borne traffic.

These works I shall now proceed to describe in the order above indicated, merely premising that, after much careful consideration, I have satisfied myself that smaller or less comprehensive works cannot be expected to secure permanently the depths shown in red on the section, which are by no means greater than would be called for if the port is to be made available at all times for steamers of the size properly suitable for, and generally engaged in, the coasting traffic of New Zealand.

If, as is probable, the present or immediately prospective trade will not warrant the expenditure for the works hereinafter described under both heads, it may nevertheless be a matter for consideration whether the outlay necessary for executing those under the second head (*b.*) would not only be reasonable, but fairly demanded by the requirements of the case.

External Works.

A reference to the drawings, and especially to No. 2, will show that the southern breakwater or training pier would commence at a point on the shore marked *A*, about one hundred yards westward of the wreck of the s.s. "Patterson," and, running therefrom in a north by west direction, would gradually curve around westward until it pointed N.N.W. at its seaward termination, marked *B*, the total length of this arm from *A* to *B* being 1,600 feet.

The northern external work would commence at the point *C*, on the north-eastern shore, at about 500 feet from the centre of the channel, and, running therefrom in a N.W. by W.