1883; and we gave it as our opinion that, if the choice must necessarily rest between these two alternatives, the new direction proposed by the Board was the better of the two. We proceeded, however, to strongly recommend that neither of these alternatives should be adopted, and that it would be far better to carry on the main breakwater in its then existing direction (that is to say, without any bend or turn at all), and to attain the desired shelter for shipping by means of a rubble mole of a much cheaper character than the main breakwater, and which we considered could quite safely be constructed under the protection of the main breakwater, when the latter became extended as we proposed. Our reasons for this recommendation were: First, that the amount of back-wash along the breakwater would be thus increased, thereby tending to postpone the date at which the shingle might reach up to the breakwater; whereas we calculated the direction of the breakwater as proposed by the Board would not tend in any way towards that object. Second, that the gathering-ground for shingle to the south would also be greatly enlarged, thus adding materially to the area of land which would be reclaimed from the sea, and tending very materially to postpone the time at which expedients for reducing the accumulation would have to be resorted to; whereas the direction of the breakwater as proposed by the Board would not, in our opinion, tend in any way towards this object either. And, third, that, even ignoring the question of shingle-accumulation, and having regard only to the question of shelter, the proposal of the Board would, we believe, be a very expensive way of attaining shelter, as it could equally well be attained by extending the breakwater in its original direction, and constructing a rubble mole of a character such as, in fact, now proposed by the Board itself. The observations which we have now made of the work as constructed have shown us that these conclusions are fully borne out by the results; as we find, as expected, that practically no back-wash whatever exists along the breakwater beyond the turn, the set along that portion of the wall being almost, if not entirely, out to sea, and there is, consequently, no increase in the forces tending to keep back the shingle-accumulation, and neither is there any increase in the gathering-ground; and it has also now become evident to everybody that a rubble mole of comparatively very cheap character can with perfect safety be constructed under the lee of the main breakwater, in such a position as will afford much better shelter than can be attained by any extension of the breakwater itself. The Board, however, did not see fit to adopt our recommendation, and, having already obtained authority for the work in even a worse direction than they proposed themselves, they adopted their own plan, and have thus expended £100,000 (and, we understand, propose in the future to expend a further sum of about £200,000) beyond the point where the breakwater turns to the north, without tending in any way to prolong the life of the work, or attaining anything in the way of shelter which could not have been attained much more cheaply by a comparatively inexpensive rubble mole; and, besides this, too, the breakwater in itself is found to be insufficient to afford the requisite shelter, and the rubble mole has consequently been found to be necessary after all, and the entrance to the port is, we believe, in a worse position, and also in a worse direction for shipping, than it would have been if the original line of breakwater had been adhered to.

The work for which approval has now been asked by the Board consists of a so-called north wall to enclose the inner portion of the proposed harbour, and the design, as supplied, for this is in the form of a mole, partly of random rubble and partly of concrete, estimated by the Board's Engineer to cost £33,864.

As regards the line proposed for this mole, we concur in it, and would recommend its approval, with the proviso that the 350ft. of opening at the entrance to the harbour should be subject to further consideration, and that the opening should be left at least 450ft. wide until it is found by experience of ships entering and leaving the port under all conditions of weather that it can safely be reduced.

As regards the details of the design, however, we do not concur, as we think that the combination of rubble- and concrete-work in the form proposed might possibly prove inconvenient and unsatisfactory, and we have therefore made some amendments in the design, which we think would be improvements. The work, as now provided for on amended drawings, is all of random-rubble work, and is somewhat higher and wider than originally proposed, the estimate as revised to correspond being £43,000; and we would recommend the revised drawings and estimate for approval accordingly.

Before finally closing our report on this subject, however, it may be desirable to say a few words as regards a question which necessarily arises in connection with any proposed extension of the Timaru Harbour works—namely, as to whether the estimated expenditure is warrantable in view of the probable ultimate results. This, of course, raises the whole question of the shingle difficulty, and the liability or otherwise of its overlapping the works sooner or later; but, having gone very fully into this phase of the question in our previous reports, dated respectively 9th August, 1881, 3rd October, 1881, and 14th July, 1883, it is unnecessary that we should allude to it herein further than to state that, from observations which we have now made in relation to those made some years ago, it is evident that an accumulation of shingle to the south of the breakwater is steadily going on, as it was inferrred some years ago that it would go on, and also that the encroachment of the sea upon the cliffs and beaches to the north beyond the point where they are protected by the breakwater is steadily proceeding, as was similarly inferred. It was calculated, however, in August, 1881, that it would be about seventeen years before the shingle from the south would reach the end of the mole as then proposed—namely, to the point where it now turns towards the north; and it was subsequently calculated, in July, 1883, that certain retarding forces which were then observed to be in operation would probably considerably prolong this period of seventeen years, so that even on the calculations then made it would still be many years before the shingle would encroach to any great extent in the immediate vicinity of the breakwater. There are also some additional causes more recently observed, such as the grinding of the shingle into sand, and the passage of a portion of this sand round the end of the breakwater, which still further tends to reduce the rate of accumulation to the south; but, notwithstanding all this, there is nothing to cause