

8. STONE FOR OAMARU HARBOUR WORKS.

(By P. G. MORGAN, Director.)

GENERAL STATEMENT.

From the 11th to the 14th May I was in the Oamaru district inspecting possible sites for quarries from which stone suitable for harbour-works could be obtained. A report on this subject had previously been made by Dr. J. Allan Thomson,* and from correspondence with the Harbour Board I understood that all the Board required was an inspection of two proposed quarries—one on the coast near the breakwater, and one at Enfield, on the Ngapara railway-line, a few miles from Oamaru. I found, however, that it was desirable to examine other localities, and regret that the time at my disposal did not enable me to obtain data for an exhaustive report.

As regards the present Harbour Board quarry and adjacent coast-line near the breakwater, I had no difficulty in deciding that the 12-ton blocks required for the proposed extension of the breakwater cannot be obtained in that locality.

At Enfield dolerite dykes or masses have been quarried to some extent for roadmaking material. So far as hardness and resistance to marine erosion are concerned, the rock is suitable for harbour purposes. Appearances indicate that blocks weighing several tons can be obtained without difficulty, but there will be considerable waste material, and the character of the jointing is such as to make me doubtful as to the likelihood of single stones weighing 10 or 12 tons being won in large number. Positive statements, however, cannot be made until either several trial drifts have been made some distance into the rock or a quarry opened at a lower level than the existing one near the railway-station. Since the expense of doing so will be considerable, and the financial resources of the Harbour Board are limited, I must hesitate before giving advice that may result in nearly useless expenditure, and in any case is more properly in the province of a skilled quarryman. In addition to trial openings, further geological examination, in order to determine the extent of the dolerite mass, is desirable.

At the Borough quarries in the valley of Oamaru Creek a fine-grained dolerite similar to that at Enfield is being quarried for roadmaking purposes. In the lower quarry the rock is so jointed that blocks over 4 or 5 tons cannot be obtained. The prospect of larger blocks being won at the upper quarry now being worked appears to be somewhat better.

Mr. Alexander McKay, formerly Government Geologist, informs me that suitable stone for a breakwater is probably to be found in the Kakanui valley, some distance west of the railway. The rock here is a solid basalt or dolerite, overlain by loess (the yellow wind-blown clay of the Oamaru district).

Some of the grit and fine conglomerate boulders near Ngapara are of large size, and well adapted for the construction of a breakwater. As stated by Dr. Thomson, solid rock does not extend far into the hill-slopes, and practically only the material in sight is available.

Large blocks can be easily obtained from the limestone of the Oamaru district, both at the various building-stone quarries and near Ngapara, Tokorahi, &c. The stone obtainable from the quarries is soft, and will corrode somewhat rapidly under the action of sea-water, but owing to facilities for quarrying being available I am inclined to agree with Dr. Thomson in recommending that a trial of it be made at the breakwater.

The limestone near Tokorahi and Ngapara contains hard crystalline bands, interbedded with softer layers similar in most respects to Oamaru building-stone. At first sight some of the Ngapara stone appears to be suitable for the breakwater, but closer inspection leads to the conclusion that there is little difference in durability between this stone and that of the Oamaru quarries. Hence, unless further examination gives ground for a change of opinion, the expense of a trial, much less that of opening out a quarry, is not warranted.

RECOMMENDATIONS.

In making the recommendations numbered 1 to 3 that follow, I wish it to be understood that these are made with hesitation, and that it is desirable that they should be considered by some authority on quarrying and on harbour-works before being put into practice. My recommendations are,—

- (1.) To make a trial of Oamaru building-stone for the breakwater by constructing, say, a length of 60 ft. or 70 ft. with this material. The largest blocks conveniently obtainable should be used.
- (2.) To endeavour to obtain suitable blocks of stone at the upper Borough quarry in the valley of Oamaru Creek.
- (3.) In the event of Oamaru stone being deemed unsuitable by any competent authority, and large blocks unobtainable at the Borough quarry or elsewhere, to open out the Enfield quarry at a lower level. It is necessary, however, that suitable arrangements be made to sell small material as road-metal, otherwise the cost per ton of large blocks will be excessive.

CONCLUSION.

I am not at all satisfied that sufficient exploration for possible stone-quarries has been made, and therefore further geological examination of the country near Oamaru is desirable. This should be a careful piece of work, and extend over the whole district. Quite apart from the present question, there are powerful reasons why a detailed geological survey of the Oamaru district should be made.