

(2.) *Ngapara*.—On the north side of the road east of Ngapara conglomerate similar to that near Peebles occurs as a horizontal band, probably about 15 ft. thick, near the top of the hills. Large blocks of rock can be obtained here, and the locality is much more accessible than that near Peebles. There is, however, uncertainty as to the amount of stone obtainable. In order to ascertain this excavations would have to be made at various points.

(3.) *Waikaura*.—At Waikaura, a quarter of a mile south-east of the railway-station (thirty-one miles from Oamaru), limonitic conglomerate outcrops at the mouth of a small creek entering the Waitaki Valley plain from the high country to the south. An accurate idea of the thickness and extension of the deposit cannot be obtained without exploration.

(4.) *Waimate Gorge (South Canterbury)*.—The gorge is excavated in greywacke, of which there is an unlimited quantity, but the rock is much jointed, and the chances of obtaining large-dimension stone in any quantity are small.

(5.) *Kakanui Gorge (Four Miles west of Windsor)*.—The schist in this locality has many bedding-planes, and is much too jointed to supply large blocks.

(6.) *Herbert and Waimotu*.—The hills (Mount Charles and others) south-east of the township are capped by dolerite. The rock is deeply weathered; no blocks over 3 or 4 tons weight were seen, and no great thickness of stone seems to exist.

The dolerite on Gale's property, between Herbert and Waimotu, was seen only as boulders, which probably came from a dyke. If so, no great amount of rock is available.

Volcanic rock outcrops in the bed of a creek 200 yards north of Waimotu Railway-station. This was seen only from the train, and is possibly worth further examination. It may be an extension of the Mount Charles dolerite.

(7.) *Oamaru Harbour Board Quarries at Cape Wanbrow*.—The two faces on the north side of Cape Wanbrow are in volcanic breccia. This stone is very irregular in quality. A small proportion of large stones up to 10 tons weight would be obtained by using large blasts, but the waste would be very great. If tipped into the sea the waste might accumulate to form a protecting apron for the breakwater, but whether this would happen depends on the ocean-currents and the direction of the breakwater. Volcanic breccia outcrops on the shore-line below the lighthouse as far round as Boatman's Harbour. Some blocks of stone up to 10 tons weight may be obtained from this locality, but the overburden is so great that the expense of opening a quarry is not warranted. The pillow-lava outcropping along the shore from Boatman's Harbour for some distance southward is of such a character as not to be likely to yield many large blocks.

(8.) *Quarries in Oamaru Creek Valley*.—The quarry facing Chelmer Street has long been disused. The rock is a soft-bedded tuff, unsuitable for harbour-work. Northward several quarries have been opened in a thick flow of basalt or dolerite which outcrops on both sides of the valley. The rock is hard and heavy, but is closely jointed wherever seen, and will yield few, if any, large blocks.

*Conclusion*.—Of the more accessible localities visited, Ngapara is the most likely, but (as previously pointed out by Dr. J. A. Thomson) the amount of stone available is not great. It may perhaps be practicable to build the main body of the breakwater with the volcanic breccia of the Harbour Board quarries, and to face the outside with large blocks of the Ngapara conglomerate.

Some consideration was given to the possible use of Waitaki limestone for the breakwater. Fragments of this stone that have been lying in the harbour for twenty years or so show softening and a certain amount of pitting, which is evidence of solution by sea-water. It is considered that such stone would be unsuitable for use in an exposed situation. Softening, solution, and erosion would probably proceed more rapidly than in the sheltered harbour-water.

*Approximate Cost of Paper*.—Preparation, not given; printing (800 copies, including maps), £47 10s.

By Authority: MARCUS F. MARKS, Government Printer, Wellington.—1921.

Price 9d.]