be used in pushing on this length of line in order to obtain stone, several months must elapse before these works could afford material protection. Temporary means should therefore be at once devised to prevent further encroachment both from the river and sea.

On the shore, brushwood fascines, well tied down, would in a measure prevent the gradual melting away of the bank that now goes on at high watermark. On the bank of the river, the reserves previously proposed should be at once fenced off, and all places denuded of timber re-planted with willows. The bank across the overflow channel at Snag Falls should also be constructed at once, otherwise, before the possible completion of the proposed works, the port of entrance might be at the mouth of the Orawaite.

I have, &c.,
H. P. Higginson,
Superintending Engineer.

3rd July, 1873.

Enclosure C.

Mr. David Simpson to the Engineer-in-Chief.

Sir,— Grahamstown, June, 1873.

I have the honor to forward report and sketch plan of the navigation of the Thames and Piako Rivers, and also report and plan of flying survey of proposed railway between Shortland and the Waikato rivers.

REPORT ON NAVIGATION OF THE THAMES RIVER.

The Thames River receives the drainage of the western slope of the peninsula south of Shortland, and also the waters from a large portion of the great plain on its western bank, from Te Aroha upwards. The bar, on which there are 4 feet 6 inches at low water, lies one mile west of Grahamstown, the intermediate space being a mud-flat. The channel is thrown so far to the westward by a shell bank running off from the shore above Shortland, and only just covered at high water. Inside this bank, near Kopu, there is a good harbour, with 10 feet of water at low water, within a short distance from the shore. From Kopu the channel is good until you reach the first shore above Puriri, on which there are 2 feet 6 inches at low water (rise of tide, 7 feet). Between that point and Ohinemuri, there are three shallows with 2 feet 6 inches at low water (rise of tide 6, 5, and 4 feet), and the sandbanks are liable to shift during heavy floods. There are also between these points thirteen dangerous snags. The steamer at present plying between here and Ohinemuri draws 3 feet 6 inches, and makes the passage in about three hours, taking the tide with her. We have also a steam launch plying between here and Hikutaia, and drawing 2½ feet.

The steamer to Ohinemuri leaves the main river and goes up the Ohinemuri River to the settlement, a distance of three miles, of a tortuous course and with many dangerous snags. The Thames, for a distance of twelve miles above the junction of the Ohinemuri, is impeded by seven eel-pas and some dangerous snags. These eel-pas are composed of strong piles driven into the bed of the river and extending nearly across the stream, rendering the navigation dangerous, but not absolutely closing it, as steamers have passed them by daylight; the rise of spring tides are just perceptible up to this point. From thence upwards to the first rapids, near Te Aroha, there are many dangerous snags and several shallows or fords, but none with less water than 2 feet 6 inches during the summer.

With some difficulty we forced the boat over the first rapids, and found a tolerable channel for three miles up to the second rapids, passing several large snags, which would require removal. We were unable to force the boat up these rapids, and explored the river on foot for a further distance of sixteen miles, passing a third rapid, and found the river bed so full of snags as to be dangerous even for boats. This third rapid may be considered the end of any navigation. At this point a quantity of material has been landed for the use of Firth's run, having been brought up from Grahamstown in canoes. It must be borne in mind that at the time of our exploration the rivers were at summer level, and would be easy of navigation during winter if the snags were removed.

The Thames from Grahamstown to the first rapids, near Te Aroha, is admirably adapted for steamers of 2½ feet draft, the current not being rapid (two knots), and the bends sufficiently easy.

The proposed railway would cross the river about five miles below the first rapids, at the point where the great plain of this Province touches its western bank, and a steamer of ordinary speed would reach this point from Auckland in nine hours, or five hours from Shortland—the town of Hamilton, on the Waikato, being within thirty miles, and the road nearly level. A barge, with steam crane, would be the best means of clearing the snags, eel-pas, &c., and I estimate the cost (exclusive of the barge) at £900. This would be for the whole distance up to Mata Mata (Firth's run), and the cost to the proposed railway crossing £500.

REPORT ON NAVIGATION OF THE PIAKO RIVER.

The Piako River empties into the Firth of Thames about four miles to the westward of Shortland. The entrance is rendered difficult by immense mud-flats, the bar being of considerable extent, having only 1 foot at low water with a mean rise of 9 feet. After entering the river the stream becomes confined and tortuous, carrying 6 feet on the shallows, and a breadth varying from 2 chains to 40 feet for a distance of forty miles, where it receives its main tributary, the Waitoe. Up to this point the river winds through a low swampy country, and during heavy freshes the whole district between the Waitoe and the sea (with the exception of one or two slight elevations) is inundated. On this portion of the river there are some dangerous snags and several eel-pas. One of these is a very formidable structure; having been designed to stop the passage of any vessel during the last war, it occupies the whole breadth of the stream, with the exception of a centre passage just wide enough for our boat. Above the junction of the Waitoe the country becomes higher, and the river rapidly decreases in depth, becomes exceedingly tortuous, and so full of snags that we could not navigate it with a canoe; we