

Having ascertained these particulars, I considered them of so serious a nature, as affecting the construction of the work proposed, that I deemed it advisable to submit them for your consideration at once, and returned to Hokitika on the 16th March, discharging the hands.

I have the honor to forward the following plans, &c. :—

- No. 1. Detailed Survey of Pass. 6 chains to an inch.
- No. 2. Section of Pass on traverse lines. 6 chains to an inch.
- No. 3. Section on line No. 2. 6 chains to an inch.
- No. 4. Part section on line No. 1. 6 chains to an inch.
- „ Reconnaissance Survey of Pass and adjacent valleys. 1 mile to inch.
- „ Section of same.
- „ Section of Mount Harman Range.
- „ Section of Mount Axis to Twin Peak Saddle.
- No. 5. Data (tabulated) connected with survey.

Awaiting further instructions,

I have, &c.,
JNO. S. BROWNING.

No. 2.

REPORT ON RAILWAY LINE FROM NEWCASTLE, SOUTHWARDS.

The ENGINEER-IN-CHIEF to the Hon. the MINISTER for PUBLIC WORKS.

SIR,—

Public Works Office, Wellington, 30th June, 1874.

I have the honor to submit the following report on a journey made from Auckland to Wanganui, in March, with the view of ascertaining as far as possible, "The direction which the line of railway shall take after crossing the Waikato River."

Mr. James Mackay kindly accompanied me as far as Taupo, and Captain Turner, District Engineer, as far as Rakatipauna, where he left me to make an independent reconnaissance towards Napier, on which he has reported, and a copy of his report is attached.

The right direction for a railway to connect the north and south ends of the North Island, is well defined as far southwards from Auckland as Newcastle, where the Waipa River falls into the Waikato, and a railway to this point is now under construction.

From Newcastle southwards two lines are available, one ascending the Waikato, the other the Waipa.

My line of march followed the Waikato River to Lake Taupo, by the route selected by Messrs. Mackay and Edgar for a railway, and thence to the head of the Waikato, at the foot of Ruapehu; then down the Wangaehu and Turakina Valleys to the coast.

LINE *via* WAIKATO RIVER. (LINE A.)

The line from Newcastle follows the Valley of the Waikato pretty closely to Taupo, except where, to avoid a bend in the river, a short cut has been taken, ascending the Little Waipa or the Pokaiwhenua Rivers as may, under survey, prove to be more favourable, and again descending to the Waikato through the Whakamaru Range, either by Turner's or Mackay's Pass. The advisability of making this short cut is perhaps doubtful, as heavy gradients will be required, and some heavy work. The saving in distance is not easily ascertained, on account of the inaccuracy of the maps of the country; but it would probably be about ten miles.

Once back in the Waikato Valley, no difficulties of any moment occur up to Lake Taupo. The line then follows the east shore of the lake, close to the water. Protective works will be required for about two miles, but generally the line will not be expensive. At the south end of the lake a swamp near Tokano will be crossed, and the valley of the Southern Waikato will then be followed to its head. This valley is broad and even, but its inclination averages about 1 in 65 for 28 to 30 miles, and it is not likely that a railway line could be got with lighter gradients than 1 in 40. At the summit the level above the sea is about 3,500 feet, and there would be considerable trouble with snow in winter. From the summit the line would follow the Wangaehu Valley to near Rakatipauna.

Up to this point the direction of the line is fixed by the formation of the country; that is, if the Waikato River is followed at all, it must be followed to its source, and the Wangaehu Valley then followed for a few miles; but from near Rakatipauna southwards there would appear, from the accounts I received from the Maoris, to be a choice of lines, all unfortunately very difficult.

The country lying between the West Coast and the plains at the foot of Ruapehu is a wild mountainous region, densely wooded, through which the Rivers Wanganui, Wangaehu, Turakina, Rangitikei, and Manawatu break in a succession of gorges. A line following any one of these rivers would be very expensive. A glance at the map will show that the line *via* the Turakina River would give the shortest length of railway to be made in order to join the railway from Manawatu to Wanganui, and this would probably be also the cheapest, although it would be very costly indeed. A line from Rakatipauna, by way of the Hautapu, Orowa, and Pohangina Rivers, would be the shortest between Auckland and Wellington; and from information I have received from persons acquainted with those parts of the country which have been explored at all, I believe it will be found to be practicable.

The total length of the line from Newcastle to the junction with the Manawatu and Wanganui Railway at Turakina would be about 220 miles, of which forty miles would be very costly and the rest not above the average cost of New Zealand lines. If carried to Manawatu *via* the Pohangina, the length to be constructed would be ten miles longer, but a saving of about twenty-five miles in the total distance to Wellington would be made.

A very great drawback to this line is the height of the summit, 3,500 feet above sea level, over which the whole of the through traffic would have to be carried.