

mouth of the Mangere—a small creek with a deeply-cut bed, which should be followed up so far as it would serve to take the place of cutting. There is a flat, with some large swamps in it, extending for a mile or two back from the river on this side, and about 200ft. above it. A small ridge west of this flat forms the watershed between the Waikato and the Puniu, and the saddle is only 300ft. above the former river. From the saddle some careful laying-out will be required for two miles, in order to locate the line among some gullies at the head of the Wairaka Creek, which can afterwards be followed without difficulty from 152 miles to its junction with the Puniu at about 157½ miles. There are some small swamps to cross, but they can easily be drained. The southern side of the valley is, on the whole, the better one. Below the junction with the Puniu I should prefer to keep on the northern side, but a few crossings are unavoidable. This river has a shingle-bed, and flows with a moderate fall through a fine open valley well adapted for a line, and the soil is a rich loam. The line would leave the bank of the river near 167 miles, and, rising for about three miles through some undulating downs, would reach the Te Awamutu terminus at 170 miles.

With regard to the capabilities of the country generally for supporting a line passing through it, I am afraid I cannot speak favourably. For the first sixteen miles the line passes through good agricultural country, but it is already fairly well served with roads leading to the railway to Napier. I think it probable that a branch line so far would be a success. For the next ten miles the country is so broken that only a small proportion of it can be considered agricultural land, and beyond this to 66 miles the line passes for forty miles through very rough country, which is coated frequently with pumice, and will apparently only bear very thin stocking. The line will open up about 120,000 acres of similar country belonging to the Crown in Hawke's Bay. For the next eighty miles the line passes through purely pumice country, which is so sterile that sheep will not thrive on it, and it is doubtful whether it is capable of being put to any profitable use. Afterwards for ten miles the country would take grass with surface-sowing, and the last fifteen miles of line run through good agricultural country.

In examining the Maori country between Taupo and Te Awamutu, and west of Lake Taupo, I found that the work occupied twice as much time as it should have done, owing to the dilatory habits of the Natives and the difficulty of moving about anywhere without constant long talks with them. The country west of the Waikato being unsurveyed, I was obliged to employ Maoris as guides. Although several times ordered to go back, I managed to prosecute my work without any active resistance, and found that the letters with which I was provided from the Hon. Mr Bryce to the different chiefs were always received with great respect.

With regard to a possible combination of the Waikato line with a central route from the Wanganui District, I found, on travelling inland round the west side of Lake Taupo, that the country between the Hurakia Range and the lake consists of high flats, terminating in precipitous cliffs from 100ft. to 300ft. high; and the country is intersected with enormous ravines, the creek-beds in which are about 600ft. below the average level of the country, and consequently no practicable line could be got for railway purposes. Along the eastern side of the lake, however, a capital beach line could be constructed at moderate cost, partly by low embankment through shallow swamps, and partly in shallow water under the pumice cliffs, but nowhere meeting with any great difficulty. A good line could be got down the Upper Waikato River from Lake Rotoaira, which is at a level of 1,900ft., and round the southern shore of this lake, to join with any practicable line from the south.

In order to fix my position by compass bearings I had to ascend several hills which were hitherto *tapu*, and had not been ascended by any European—notably the remarkable hill called "Titiraupenga," the northern summit of the Hurakia Range its height is 3,450ft.

I have calculated all the levels given herein from barometrical observations carefully taken, and, in most cases, checked by repeated observations, and they were all corrected by simultaneous observations taken at stations of well-ascertained levels. Wherever possible the levels were referred to the calculated heights of trig. stations.

In concluding my report, I am glad to have the opportunity of thanking Mr Horace Baker, Chief Surveyor of Hawke's Bay, for his kind assistance, as well as the several station-owners along the line of my route. My thanks are also due to Major Scannell, in command of the Armed Constabulary at Taupo, and to the two Maori chiefs, Hitiri Paerata and Rewi, or Manga, of the Ngatimaniapoto.

An approximate estimate of the cost of this line of railway, including formation, rails, rolling-stock, and stations, amounts to £1,200,000. The cost of land is not included in this estimate.

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The Engineer-in-Chief, Wellington.

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