about three hundred feet wide on the top, one hundred feet wide in the river-bed, and two hundred and thirty-five feet deep. This would also have to be crossed by a viaduct. The banks are very steep, on one side nearly perpendicular; marl below and gravel above.

After crossing the Rangitikei another steep grade of about 1 in 22 would have to be made to arrive at the original line. This line carries about the same level for the next three miles, and then falls gradually a couple of hundred feet; but I do not think it would be possible to grade gradually up, as high points run out to the river, ending in bluffs. On this account it was necessary to keep well back from the river. The country along the alternative line from Feilding for some twenty miles is exceedingly good both as regards soil and timber, but beyond this point, in the Otamakapua Block, the soil is not good, and the timber is small and of no commercial value. In point of distance the alternative line is longer by about three miles, but the distance from Wellington would be shortened by nearly the distance between Feilding and Marton.

In conclusion, I may add that the line starting from Marton follows nearly a natural river grade, while the alternative line crosses the features of the country.

I have, &c.,
JOHN ROCHFORT.

No. 3.

The INSPECTING ENGINEER to the ENGINEER-IN-CHIEF, Wellington.

SIR,— Wellington, 10th May, 1884.

I have the honour to report that, accompanying the Hon. the Minister for Public Works, I have travelled generally over this route explored by Mr. Rochfort. At the same time, owing to the proposed line not being set out, and to the shortness of time available, the exact line has not been followed, and some portions of the country to be gone through have only been seen from a considerable distance. Sufficient information has, however, been obtained, with the assistance of Mr. Rochfort's preliminary exploration plan and section, to report on the feasibility of this route.

Starting from Marton the line runs in the valley of the Pourewa, past Hunterville, through easy country for twenty-four miles, and then in the main valley of the Rangitikei, in which the moderately easy slopes of the hills will allow of the selection of a fairly light line, except at the 29th mile, where there will be a short tunnel, and at the 30th mile, where the deep depression of the Makohine Stream will have to be crossed by a high trestle viaduct. At the 44th mile the line crosses by a short tunnel into the Hautapu Valley, which it follows to the 83rd mile. The easy slopes of this valley allow of light work and easy grades, except at a few places of short lengths. The subsoil in the Pourewa, Rangitikei, and lower part of the Hautapu Valley consists of *papa*, in the upper part of the Hautapu Valley of limestone. In the 86th mile the line attains the highest point south of Ruapehu, viz., 2,589 feet. From the Tuhirangi trig. station the country to the south and south-west of Ruapehu could be clearly seen, and appeared to present an undulating tableland, sloping to the west, where, as shown by Mr. Rochfort, a suitable selection of grade and alignment can be made. From 95 miles to 121 miles the line runs through bush, and had to be inspected from Tuhirangi, and from Waimarino, situated at 124 miles. At 126 miles the highest point on the route, viz., 2,646ft., is reached, from where the line descends in the valleys of the Piopiotea and Wakapapa to the Wanganui River, at about 150 miles, These valleys could be clearly seen from the Puketapu Range, and appear to offer facilities for choosing suitable grades with moderate work. The Wanganui will have to be crossed, about one mile above Taumaranui, by a truss-bridge 5 chains long; the river-bed is covered with gravel, with rock probably underlying. Above Taumaranui the line enters the valley of the Ongaruhe, which river it crosses at 165 miles, and runs along the right bank to 184 miles. This valley is singularly suited for easy grades and light work, the total rise being only 185ft. in twenty-seven miles. At 189 miles the line goes up the valley of the Ohinemoa, and crosses the watershed between the Wanganui and Mokau at an elevation of 1,220ft. Here the works will be heavy, consisting of a tunnel of about 40 chains length, with moderate grades. The subsoil appears to be limestone or hardened pumice. After crossing this watershed the line passes through a swamp several miles long, through which, however, horses are taken; then through undulating country until the Mokau is crossed, at 201 miles; then through a saddle in the watershed between the Mokau and Waikato (Waipa), by a tunnel two chains long, into the valleys of the Waititi, Mangaokewa, Mangapu, and Waipa, and across the country described in a former report to Te Awamutu. From the Mokau to Te Awamutu a number of small bridges will have to be made over the creeks named, and others: the country is easy, and light grades can be obtained. In conclusion, it appears, considering the length, the height to which the line rises, and the now inaccessible country which it will open up, that this line will be comparatively easy to construct, to maintain, and to work, as it will cost less per mile than the average of the railways in the North Island, and can be made with easier grades and curves.

I have, &c.,
C. B. KNORPP,
Inspecting Engineer.

The Engineer-in-Chief, Wellington.