

APPENDIX I.

RECONNAISSANCE SURVEYS FOR GISBORNE-ROTORUA AND GISBORNE-OPOTIKI RAILWAYS.

REPORT ON, BY MR. J. STEWART, M.INST.C.E.

WHAREKOPAE-RUATAHUNA ROUTE.

SIR,—

Auckland, 21st July, 1899.

In pursuance of instructions embodied in your memorandum, P.W. 98/3337, of date 15th November last, I have the honour to report, for the information of the Hon. the Minister for Public Works, that I proceeded to Rotorua, and thence to the Urewera country, "to ascertain, in the first instance, if it is possible, at reasonable cost, to construct a line of railway *vid* Wharekopae, Ruatahuna, Galatea, and Kaingaroa Plains, with grades not steeper than 1 in 40 on the straight, and curves of not less radius than $7\frac{1}{2}$ chains, &c."

My interim reports during the progress of the work referred in some detail to the route I took, and some conclusions arrived at, but it will be well to embody the whole in this report.

Having some knowledge of the country for the first twenty miles from Rotorua, I spent very little time on that part, but pushed on to Galatea and the Tuhoe-land, where it was very evident that the key to the position lay.

The only valley leading from the Rangitaiki Plains, near Galatea, right up to the main divide, or backbone of the country, is that of the Whirinaki and its continuation of the Okahu. But to commence at the entrance of this valley on the plains, and work upwards through dense bush, without having first determined the most favourable point to make for in the main range, would lead to great loss of time. I therefore determined to first explore the main range and find the most favourable place for crossing, which, being accomplished, I could then work outwards towards each end.

At Ngaputahi, on the Waikaremoana Road, I met Mr. Elsdon Best, the officer then in charge of the works there, and from that gentleman I received most valuable assistance in making my way inland with my camp equipage. Mr. Best was also fortunately able to accompany me to Toreatai, the extreme eastern kainga on the route, and explain to the Ngatipotiki Natives the nature of my mission, and so establish me on a good footing with the somewhat suspicious and hitherto rather exclusive Natives of the Urewera. At Toreatai, also, I met Mr. Reilly, overseer on the stock-track works, and from him received information which proved of use in determining my course of procedure eastward of the main divide.

This main range of mountains, for the purposes of reconnaissance, may be considered as extending from Otawhau in a very irregular but generally north-east direction towards the East Cape, and including the mountains Huiarau, Maungapohatu, Te Wana, Maungatapere, and Wharekopae. From the latter point the range takes a northerly bend, and embraces the head-waters of the Waikohu, resuming its north-east direction and dropping, probably, to its lowest level at the Opotiki-Gisborne Road, beyond which it does not concern this inquiry.

Several passes, or saddles, give more or less favourable crossing-places in this line of country; all, with the exception of that at the Gisborne-Opotiki Road, are about 3,000 ft. above the sea. In the examination of the country my principal difficulty lay in the absence of any trustworthy topographical maps. No detail survey-work has ever been executed, with the exception of a little at each end, and I found the sketches of river-courses and other topographical features on the published maps nearly always positively misleading.

Having in view all circumstances, I determined on beginning the exploration in the vicinity of Maungapohatu. Toreatai was then the extreme point to which pack-horses could be taken, and I established my first working camp at Ohaeia, close to that kainga. Beyond, the stock-track through to Hangaroa and Wharekopae had been roughly cut, but was impassable for horses. This track, however, proved to be of very great service to me, as it was the means of making rapid examinations of the country in its vicinity, and I soon determined that the most favourable point at which to cross the watershed was about two miles east of Maungapohatu. The crossing-place is broad and flat, but I afterwards found that a higher ridge must be encountered between the Owahakarotu and an upper affluent of the Anini, two streams of the Hawke's Bay river system.

I decided to open out the stock-track for pack-horses as far as the Anini, and establish a fixed camp there, working onwards by a flying camp to Wharekopae. The crossing of the Anini, and getting into the head-waters of the Waimana, as the upper part of the Hangaroa is called, required much and serious consideration. About a mile and a quarter above the crossing of the Anini by the stock-track, that river is formed by the junction of the Pukukaho on the west and the Okauia on the east, both rising in very deep gorges in Te Wana. I finally decided on the following plan as the least objectionable, but it proved to be one of the most difficult problems to solve in the whole work. After crossing the Owahakarotu-Pukukaho saddle, grade down the right of the Pukukaho into the Anini, grade down that river, still on the right, until a crossing-level is reached,