

Mokau, generally easily accessible, well watered, abounding in timber, with outcrops of brown coal, and having within it from three to four hundred thousand acres of good, open agricultural land, consisting of limestone, volcanic, and alluvial soils. Over this valuable and extensive area the Native population is estimated at only four thousand.

In the Middle Island Mr. A. D. Wilson is engaged in extending the triangulation of the Wairau Valley to a close on the Nelson triangulation. Previous to entering on this work, he completed a major triangulation across Cook Strait. The principal stations on the opposite side of the Strait, although upwards of fifty miles apart, were very successfully observed by a 6-inch theodolite to heliotrope signals. The diagram of the triangles (see Appendix) shows a satisfactory close on the Wellington triangulation, the greatest discrepancy on a common side being $\cdot 7$ link per mile, and the least $\cdot 06$ per mile. In the largest triangle, after correcting for the spherical excess, the error in the summation of the angles was only $1''\cdot 6$. This triangulation across the Strait binds the surveys of the two Islands together thoroughly, so that all the geodesic computations for latitude and longitude of points in New Zealand can now be referred to the one initial standard station at the Survey Observatory, Mount Cook, Wellington. An incidental result of this connection across the Strait is that the latitude and longitude of the lighthouses on the Brothers, on Cape Campbell, and the light on Pencarrow Head can now be given accurately.

Mr. F. S. Smith completed the extension of triangulation from Amuri District, Nelson, across the dividing range to a close on Mr. G. F. Roberts's triangles in the Teremakau, Westland. The difference between the two surveys on the common side was $1\cdot 5$ links on $32826\cdot 5$ links, or $\cdot 36$ link per mile; difference of altitudes, 3ft.; difference of bearing between computed and observed convergence, $1''\cdot 46$; distance between the measured bases of the two triangulations, 120 miles. It is but due to Messrs. Smith and Roberts to state that they are two most skilful and indefatigable surveyors, with whom correct work is a passion. Mr. Smith's topographical maps abound with information as to the altitudes of mountain peaks, passes, and valleys, the geological formations, the varieties of timber and natural vegetation, the best routes for futures lines of communication, and give a very accurate representation of the country surveyed.

The closures of Mr. P. E. Cheal on Te Aroha, of Mr. R. T. Sadd on the triangulation of Messrs. Ellison and Carkeek in Nelson District, and the connection of Mayor Island with the main land, Tauranga District, by Mr. E. C. Goldsmith, are worthy of notice and commendation.

GEODESIC.

Longitude.—The arrangements referred to in last year's report for finding the difference of longitude between Sydney and Wellington having been completed, time signals were successfully exchanged through the cable on four nights in December, 1883, between Mr. Russell, at the Observatory, Sydney, and Mr. Adams, at the Survey Observatory, Mount Cook, Wellington. A report by Mr. Adams, in the Appendix, gives full details of his observations at Mount Cook, also the results of observations at Sydney, furnished by Mr. Russell.

	H.	M.	S.
The difference of longitude between Sydney and Mount Cook is			
found to be	1	34	16·98
Telegraphic difference, Greenwich and Sydney	10	4	48·47
Longitude of Survey Observatory, Mount Cook	11	39	05·45

But, as Mr. Russell is not quite satisfied with the telegraphic longitude of the Sydney Observatory, he would for the present, and until the differences of longitude between Sydney and the other Australian Observatories are revised, prefer to abide by the longitude derived from his observations of moon culminations, viz. :—

	H.	M.	S.
From moon culminations at Sydney Observatory, by Mr. Russell			
(see "Sydney Observatory Astronomical Results, 1877-78,"			
pp. 16-17)	10	4	50·81
The longitude of Mount Cook on this basis will be	11	39	7·79