

	Feet.
Trigonometrical determination by G. R. Hackett. (Vol. vi., Transactions New Zealand Institute, page 298, foot-note) ...	12,264
In 1877-78 C. W. Adams, while extending the standard bearings in Canterbury, got observations by an 8-inch theodolite to Mount Cook from Herbert Peak near Lyttelton; from Patiti Point, Timaru; and from Mount Horrible, near same place. Distances: 135, 85, and 75 miles. Mr. Adams computed his observations, and reported in July, 1879, that, subject to a probable error of 25 feet, the height was ...	12,375
His observations with 8-inch theodolite at Hokitika and Abut Head, from stations of standard bearings, and computed with the distance of trigonometrical survey, are respectively 12,349·7 feet and 12,345·6 feet, or a mean of ...	12,348

GEODETIC LATITUDES AND LONGITUDES.

The differences of latitude between Mount Pleasant, Lyttelton, and Abut Head, Westland, computed through the triangulation, a distance of 170 miles, is only 1"·8 discrepant from that observed astronomically. But in the very same triangulation the discrepancy between the observed and computed difference of latitudes of geodesical stations of Gawler Downs and Koiterangi is 23"; the observed difference being 52' 9" and the computed 51' 46". The astronomical observations at these four stations were taken by Mr. Adams with an 8-inch transit theodolite of stars north and south of zenith. It is possible, but very unlikely, that his determination at each station may be uncertain to 5", in which case, if the errors at the two stations—Gawler Downs and Koiterangi—did not cancel each other, there would be an accumulated error of 10"; but, as there is an error of 23", the explanation of the greater part must be assigned to the deflection of the plummet, caused by the contiguity of mountain masses and the unequal densities of the earth's crust. Koiterangi and Gawler Downs lie nearly north and south of each other. The mass of the Southern Alps intervenes between the two stations, and both are situate close to the base of the mountain range. Since Maskelyne's observations, at Schiehallion, in 1774-76, demonstrated the influence of mountains in sensibly affecting the line of gravity, there have been many other proofs of the disturbing influence of mountain masses, and of similar effects on plains from the unequal density of the earth's crust. On this subject Colonel A. R. Clarke, in his work on geodesy, published in 1880, page 288, states, "It is not very uncommon to find, as in the vicinity of Edinburgh, a deflection of gravity to the extent of 5", while in the Counties of Banff and Elgin there are cases of still larger deflections, the maximum of 10" being found at the Village of Portsoy. At the base of the Himalayas, where we should naturally expect a large attraction, it amounts to about 30", diminishing somewhat rapidly as the distance from the mountain increases."

This is a very interesting subject, and one the department would gladly investigate further by taking observations with the zenith telescope at selected stations. But, without pursuing it specially, further opportunities of comparing the differences of astronomical and geodetic latitudes will arise as the triangulation connects the initial stations of meridional circuits.

The other comparisons, so far, do not show any such abnormal discrepancies as those reported of Koiterangi and Gawler Downs. Thus, the discrepancy between the initial stations of Marlborough and Wellington triangulations is 5". Similarly, the discrepancy between the initial stations of Amuri and Buller circuits, both observed by Mr. J. W. A. Marchant, is 2"·5.

The latter comparison was obtained from the reduction of the triangulation recently completed under Mr. Browning's direction, connecting Nelson with Amuri and with the West Coast *via* Buller Valley. The preliminary computations for longitude reveal a very large error in the recognized geographical positions of Flagstaff (Buller River), Cape Foulwind Lighthouse, and the Steeples, amounting in each case to nearly 6' longitude, or about 5 statute miles. The longitudes of these points given in "New Zealand Pilot, 1875," and in *New Zealand Gazette*, year 1875, page 701, are too far east. In other words, the coast-line at these points is further west than given in the Admiralty chart and Table of Maritime Positions, and, consequently, any ship making Westport would fall in with the land five miles sooner than she ought to do, according to chart. The positions of Perpendicular Point and entrance to Grey River, on the other hand, are given too