

## No. 10

## WESTLAND.

## TRIANGULATION.

In my last report I stated that I hoped to be able to return as completed, by 30th June, 1879, at least 260 square miles (166,400 acres.) I am much pleased to be in a position to report, that considerably more than this has been accomplished; 202,560 acres of major, and 89,450 acres of minor triangulation have been completed.

The whole of the Hokitika circuit, excepting a strip of land of an average width of eight miles, and comprising the most broken portion of the western slopes of the dividing range (Southern Alps) has been triangulated; and besides this a number of stations have been erected within the Okarito circuit, and the observations at five of the main stations, and two of the reference stations have been taken.

The work has been proved by closing at Wataroha base-line, which I measured at end of May, and declared to be 27,396.12 links in length.

The calculations of triangles, ruled by Kokatohi base-line, were completed on the 9th instant, and by these the Wataroha base-line should be 27,398.15 links; equal to an error of 2.4 inches per mile.

This result considering the nature of the country, the triangulation passed over, is very satisfactory, and exceeds my expectations.

I should state that distance 27,398.15 links, is derived from the calculation of a single set of the observations at station south of Bold Head, and Mount Bonar; there being not sufficient time to work it out by taking the mean of all sets taken at each station; but having worked out three independent values for the side from which the Wataroha base-line must be determined, and finding said three values so very close, I am satisfied that the result derived from the mean of all sets will only affect the decimal of the inch the triangulation is declared in error—as above.

The cost of the work amounts to 1½d. per acre for major, and 2½d. per acre for minor triangulation.

The computations of the differences of latitude, and convergency of meridian between Koiterangi (the initial station of the Hokitika circuit) and Abut Head (the initial station of the Okarito circuit) are in hand, and will be reported upon shortly.

## CIRCUIT TRAVERSE (TOPOGRAPHICAL AND TRIGONOMETRICAL SURVEYS).

Ninety-seven thousand eight hundred (97,800) acres were completed by three of the surveyors at costs varying from 1.7d. to 3½d. per acre as shown on schedule.

The “errors in closing” for the past year stands as follows:—

District Surveyor Murray's closures range from ½ link to 4½ links per mile, giving an average error of 1.56 links per mile.

District Surveyor Lord's closures ranged from 2½ to 6½ links per mile; giving an average error of 4.50 links per mile; and those of Assistant Surveyor Smyth ranged 4½ to 6 links, equal to an average error of 5 links per mile.

The mean error for all the circuit traverses for the year is 3.68 links per mile. In justice to Messrs Lord and Smyth, I desire to state that their traverses covered much rougher ground than those of Mr. Murray, and hence the great difference in closures.

## RURAL AND SUBURBAN SECTIONS.

As per schedule cost varying from 2s. 1d. to 4s. 6d. per acre. The sections surveyed by District Surveyor Lord, considered mostly of small isolated lots, which had been left unsurveyed in former years, owing to difficulty of access and great cost. Generally, the rural and suburban section surveys were carried on contemporaneously with the circuit traverses, but in the Grey district I found it necessary, in several instances, to depart from this plan, owing to the clamour for survey of isolated sections sold years ago, and hence the higher price of cost of survey per acre in that district.

## OTHER WORKS.

A very large proportion of the time of the surveyors was naturally taken up with fixing former section surveys wherever they came within easy distance of them. I have in this way succeeded in all but completing the maps of 23 blocks, which, for the greater part, contain rural and suburban sections surveyed before the present system was introduced, and I expect to be able thus to record on our block maps, during the current year, the remainder of the old surveys within the Hokitika and Grey districts.

One of the surveyors also assisted the officer employed at triangulation, (Mr. Roberts) with the erection of the stations which, in no small degree, contributed towards so great an area being completed during the past year.

## PROPOSED OPERATIONS DURING THE YEAR ENDING 30TH JUNE, 1880.

## TRIANGULATION.

The triangulation (major and minor) as far as completed, now has placed that part of Westland in such a condition that a surveyor, unless incompetent or absolutely careless, cannot possibly get into trouble with his surveys.

Trigonometrically fixed points are to be found in all the valleys; and checks and re-checks upon surveys may now be had at almost any point within the sea coast, and a line eight miles west of the top of the dividing range; and I trust that nothing will occur which will prevent this triangulation being carried down south, through Jackson's Bay circuit to Martin's Bay, where a connection with the Otago surveys could be established.

Already part of the Okarito circuit is well in hand south of Wanganui River, and I believe I can promise that at least 500 square miles, extending from Wanganui River to Karangarua River, a distance of about 50 miles, shall be completed within the year.