GEODETIC SURVEY.

(T. W. Preston, in charge.)

The party was employed during the year on geodetic triangulation on high mountainous country in Marlborough and Nelson and part of North Canterbury. A number of subsidiary stations were included in the scheme to facilitate breaking down into second-order lengths at a later date.

During the reconnaissance an endeavour was made to avoid the highest ranges, and select stations at lower altitudes, but this was found to be impracticable without considerable loss of strength, and eventually a scheme was adopted to give fairly complete coverage over the whole of the northern part of the Island.

Exceptionally severe weather conditions were encountered during the winter and spring of 1938, and field-work was at a standstill for a period of two months during the winter. During September and October, with snow still lying heavily on the high levels, the party was engaged in preparing the Culverden base line for measurement and in observations on the base net stations. Further snowfalls, extending until January, made the high stations still very difficult of access, but during the last three months ideal weather conditions have prevailed and good progress has been made.

Only three comparatively easy stations remain to be occupied to complete the work southwards to and including the Culverden base net, and it is expected that these will be completed early in April.

The radio equipment supplied in September last has given every satisfaction. The performance of the transmitter and the eight receivers was considerably better than that specified, and apart from minor servicing to several receivers no repairs were necessary. It is considered that the radio equipment has already paid for itself from the point of view of time saved by the whole party. It proved particularly valuable in the high mountainous country in Marlborough and Nelson, when frequently both observers and lightkeepers were camped at distances of one or two days' travel from the nearest telephone. On many stations, on account of the dangerous access, attendance at their stations at night by the lightkeepers could not be insisted on, and communication by lamp signals was not possible.

The working-conditions of the men employed have been considerably improved with the introduction of radio. A second transmitter is required, however, for the use of the second observer.

Costs are increased somewhat over last year. The increase is due in part to the necessity of employing additional men on account of the number of "two-men" stations and in part to the slower progress over much more difficult country.

Twelve second-order signals were erected during the year—six each in the Marlborough and Nelson Districts. One 25 ft. tower (of wood) and one 10 ft. stand were erected at the Culverden base terminals and subsequently dismantled.

The new geodetic Tavistock theodolite No. 38116 was brought into use in September last, and is now giving satisfactory service. It was found that several weeks elapsed before the observers became fully at home with the instrument. Owing to its weight (63 lb. in case, as against 35 lb. in case for the Wild) the Tavistock has been kept on the more accessible stations when possible.

Mr. R. P. Gough commenced duty as observer in August last, and his appointment has considerably accelerated progress.

Six new lamp reflectors and cases were purchased during the winter and were fitted out as signal lamps by chainmen, making a total of seventeen lamps, but even this number is found inadequate at times with two observers working simultaneously.

During the winter recess several chainmen were employed on repairs to equipment and construction of new equipment. Additional equipment and materials were purchased, and stores ledger cards were prepared for all items.

Triangle closures are rather higher than in previous years. During the spring and early summer exceptionally bad observing-conditions prevailed. On very few nights were the lights clear and steady. On many stations the lights were woolly and weaving throughout the whole period of the observations, and often it was found necessary to wait for better conditions even though all lights were showing. Two stations were reoccupied on account of excessive triangle closures. When the weather cleared in February and pressure became high generally, closures improved considerably.

Stations occupied—	
Geodetic	17
Base net	7
Subsidiary	15
	39
Additional stations fixed by intersection	5
Lighthouses fixed (from two directions only)	5
Astronomical stations	7
Stations requiring two visits	2
Stations reoccupied for astronomical observations	3
Stations reoccupied for reobservations	2
Triangles closed	123
Area covered (square miles)	9,060
Cost	£5,470
Cost per square mile	12s. 1d.
Cost per station occupied	£140 5s.
Permanent signals erected	12
Old signals reconditioned	1