

STANDARD SURVEYS.

During the year the plans of the Invercargill standard survey were completed; good progress was made with the survey in the Auckland metropolitan area, and extensions to the Wellington and Christchurch standard surveys. Some eighty miles of rural standard traverse, principally in the Taranaki and Southland Districts, were completed.

The protection and maintenance of standard survey marks due to road-reconstruction and permanent surfacing has again occupied considerable time in the various districts.

FIELD INSPECTIONS.

Owing to the financial stringency, field inspections have not been carried out as often as is desirable, but where this has been done the results, with one or two exceptions, show that a high standard of work is still maintained. In one case the result of the inspection was referred to the Survey Board for action, and the Board, after inquiry, cancelled the registration of the surveyor responsible.

MAGNETIC OBSERVATORY.

The work of the Magnetic Observatory has been carried on throughout the year. Hourly values of the magnetic declination, magnetic horizontal force, and magnetic vertical force have been computed from the hourly measurements of the Eschenhagen magnetograms obtained at the Amberley Substation. The resulting mean values for the year 1930 are—

	Amberley Substation Mean Values, 1930.	Equivalent Christchurch Values.	Change since 1929.
Magnetic declination (east) ..	.. 17° 51'	17° 48'·3	+5'·9
Magnetic horizontal force ..	.. 0·22350	0·22108	—15 γ
Magnetic inclination ..	.. —67° 58'·5	—68° 18'·3	—0'·7
Northerly component ..	.. 0·21274	0·21049	—28 γ
Easterly component ..	.. 0·06851	0·06760	+30 γ
Vertical component ..	.. —0·55247	—0·55570	+5 γ
Total magnetic force ..	.. 0·59597	0·59806	—11 γ

In the summary for 1929–30 the easterly component for 1929 was accidentally given as 0·06713, instead of the correct value 0·06730; and the variation of the quantity since the previous year was given as +14, instead of the correct +31, which is in harmony with the +30 given in the above table for the amount of change of easterly component from 1929 to 1930.

The secular change in declination is seen to be still high, as has been noted during the past few years at Christchurch.

The tabulated hourly values as published are the values for the absolute magnetic station, “Peg Absolute,” at Amberley, to the immediate south of the Eschenhagen Variation House.

It is of interest to note that at the epoch of the magnetic survey of New Zealand, the middle of 1903, the magnetic declination was 16° 18' E. of north: in 1930 the mean value is 17° 48' E., the increase of declination in the twenty-seven years being 1½ degrees.

On the 17th March, 1930, Mr. Frank T. Davies, physicist to the Byrd Antarctic Expedition, with Mr. Clark, his assistant, took his absolute magnetic instruments to Amberley, and a comparison of standards was made from one day's observations. The Christchurch standard magnetometer No. 1 and the earth inductor 109 were observed with simultaneously with Mr. Davies's observations. The resulting instrumental differences were only small, and magnetogram data has been forwarded to Mr. Davies for use in publishing his results.

During the year the Milne seismograph No. 16 recorded seventy-two earthquakes, less than one-fourth of which originated in New Zealand. The list of earthquakes will be published later, and results have been communicated previously to the British Association Seismological Committee at Oxford.

I am very grateful for the fact that during the year the Department ordered an excellent set of three component Galitzin seismographs, which arrived in the following year. In a country where local destructive earthquakes occur it is wise not to concentrate all instruments at one place, and it is satisfactory that New Zealand now has two separate stations with good teleseismic equipment under the control of trained observers. It is obvious that two such stations is the least number required in such a country. As time goes on, still greater progress will be made when more instruments, particularly suited for recording shocks originating within New Zealand, become available.

In December, 1930, rugged country in the mountains at the head of Edwards Valley, near Arthur Pass, was visited, and effects produced by the earthquake of the 9th March, 1929, inspected. This somewhat inaccessible country was practically unknown until a party from a local mountaineering club traversed it and saw signs of earthquake damage. It would be easiest seen from an aeroplane. Opinions formed from the observations—and later corroborated by the Chief Surveyor for Canterbury, who made a visit to the country near Trig. N—indicate that “Arthur Pass” is somewhat of a misnomer for that earthquake. Actually the origin seems to have been in country, both unoccupied and unmapped, north of the Esk River on to the headwaters of the Poulter River.

The computations in connection with the astronomical work of the geodetic survey have been continued.

Last year an area of land at Eyrewell was under consideration and tested as a suitable site for the observatory. It was suggested that as the plantation of pine grew up the pollen might interfere with precise atmospheric electric work, and nothing further was done in the matter. Personally, I feel that the pollen and general atmospheric dust nuisance is to be feared at almost every place where such observations are being carried on nowadays.

The aerological work has been continued by the aid of pilot balloons, and daily information sent to the Director of Meteorological Services for use in forecasting.