

## MAGNETIC OBSERVATORY, CHRISTCHURCH

Director: H. F. BAIRD

### SUMMARY OF OPERATIONS FOR THE YEAR ENDED 31st MARCH, 1943

During the year the customary observational and recording programmes have been maintained. In addition, further progress has been made with the magnetic resurvey of New Zealand; the resurvey is meeting immediate needs and will also have post-war value.

#### TERRESTRIAL MAGNETISM

The Eschenhagen, Adie, and La Cour magnetographs have been kept recording continuously at the Amberley Substation. From hourly measurements of the magnetograms and the thrice-monthly absolute observations the mean hourly values of D, H, and Z have been computed. The resulting mean values for the year 1942 are as follows:—

					Change since 1941.
Magnetic declination .. .. .	18° 42'·5				+ 6'·6
Magnetic horizontal force .. .. .	22,232·7γ				— 0·3γ
Magnetic vertical force .. .. .	—55,207·8γ				+11·7γ
Magnetic inclination .. .. .	—68° 03'·90				+ 0·2γ
N. .. .. .	21,058·1γ				—13·8γ
E. .. .. .	7,131·0γ				+40·1γ
T. .. .. .	59,516·3γ				—11·0γ

In the above table the changes in the respective elements since 1941 are given also. The most striking feature of the table is the high value for the secular change in declination. This change has been progressively increasing since 1933, the year of the last sunspot minimum. To a lesser extent a similar increase occurred during the period 1921–30 (sunspot minimum in 1923), the rate dropping back to normal rather sharply at 1931. Large earthquakes in New Zealand occurred approximately a decade after both 1921 and 1931. This may not be mere coincidence, and will be investigated after the war.

International character figures have been derived from the magnetograms and supplied quarterly to the Carnegie Institution, Washington, and the Secrétariat de l'Organisation Meteorologique Internationale, Lausanne. Similarly, "K" values, representing the three-hour range index of geomagnetic activity, have been forwarded to the International Association of Terrestrial Magnetism and Electricity at Washington.

#### MAGNETIC RESURVEY

Magnetic observations have so far been made at twenty-four stations in the North Island and twenty-three in the South Island, and are being pushed on to meet exacting demands. The observational programme was arranged so that information could be obtained in areas not covered during the first year's work, and particularly where defence demands were paramount. All the stations observed now give a better coverage of the country, resulting in more reliable values for any part of New Zealand. As far as other work would allow, analysis of all field data has been pushed ahead. Preliminary results from H and I data appear to indicate that the geographical distribution of secular change in these elements is not so marked as in declination.

The Carnegie Institution have been supplied with provisional values covering the first year's work. This information has proved to be of great value to them in their work of modernizing naval magnetic charts. Numerous inquiries from Service organizations for information regarding the magnetic elements in various parts of New Zealand have been dealt with. As a result of the extensive field programme we have been able to give them accurate data, which in some areas of important defence significance were greatly different from what had been anticipated. The Carnegie Institution, who provided the instruments required, have been most grateful for valuable information being derived by their use.

#### GENERAL

*Seismological.*—A Wood-Anderson seismometer was installed on behalf of the Dominion Observatory at the Public Works power-station at Arnold River, on the West Coast. This is functioning very satisfactorily, and the records obtained therefrom are already assisting materially in the interpretation of local earthquakes.

*Electric Potential Gradient.*—The Bendorf electrometer has recorded continuously, and the measurement and reduction of records is well forward. Further improvements have been made to the calibrating circuit. Through the courtesy of the Director of Meteorological Services, a spare Bendorf electrometer and other atmospheric electric equipment formerly in use at the Apia Observatory was transferred to us.

#### COSMIC-RAY METER

Owing to the difficulty in obtaining suitable electrical supplies in New Zealand to operate this instrument, a short break occurred in the recording programme. Records have been measured and the data forwarded as regularly as possible to the Carnegie Institution of Washington.

#### METEOROLOGICAL

The usual meteorological observations for climatological purposes have been maintained and the results forwarded monthly to the Director of Meteorological Services. Numerous inquiries from the public regarding weather statistics at Christchurch have been answered.