

MAGNETIC OBSERVATORY, CHRISTCHURCH

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The programme of work in terrestrial magnetism, seismology, cosmic radiation, atmospheric electricity, and meteorology has been generally maintained during the year as in former years. Magnetic resurvey field-work was also continued, new stations being established in suitable locations throughout the country.

Terrestrial Magnetism.—The work of recording and tabulating the mean hourly values of the magnetic declination, horizontal force, and vertical force has been continued as usual, and absolute observations of the earth's magnetic field were obtained regularly. From the mean hourly values for all days the following mean figures for 1943 are derived:—

					Change since 1942
Magnetic declination	18° 48'·4				+ 5'·9
Magnetic horizontal force	22,222·0 γ				—10·7 γ
Magnetic vertical force	—55,203·3 γ				+ 4·5 γ
Magnetic inclination	68° 04'·37				— 0'·47
N.	21,035·6 γ				—22·5 γ
E.	7,163·9 γ				+32·9 γ
T.	59,508·2 γ				— 8·1 γ

Also given in the above table are the changes in each element since 1942. The secular change in declination, although less than last year, still remains high; that in H shows a tendency to return to the normal figure.

As usual, the international magnetic character figures for all days have been furnished quarterly to the Secretariat de l'Organisation Meteorologique Internationale, Lausanne, and the Carnegie Institution, Washington. Values of "K," the range index of geomagnetic activity, have also been transmitted to the International Association of Terrestrial Magnetism and Electricity at Washington. Since April last "K" indices have been supplied daily to the Defence Services for use in connection with the forecasting of radio conditions. Tabulated hourly values of D and H for the years 1912, 1915, 1916, and 1917 were supplied to Mineral Resources Survey, Commonwealth of Australia, for use in certain defence projects. It was found that the hourly measurements for these years had never been reduced, and this had to be done before accurate values could be supplied.

Magnetic Resurvey.—Despite delays caused by inclement weather, magnetic observations were made at 63 stations throughout New Zealand. Of these, 34 were new points established in areas which were selected as magnetically undisturbed, after collaboration with members of the Geological Survey. In some cases sites were also tested by making a reconnaissance survey with a Schmidt vertical magnetic balance. The remaining 29 stations were points observed at during the first year of the survey and which were reoccupied for secular-variation purposes and to make other needed checks. These reoccupations confirmed quite well the differing rates of secular variation with change of latitude.

Intercomparisons between the field instruments and the Amberley base station instruments have been frequent and the results are still in close agreement. Complete results of the field observations up to the end of 1943 have been forwarded to the Carnegie Institution of Washington, who are utilizing this information in the preparation of magnetic charts. A map of New Zealand showing the isogonals and lines of equal annual change in declination as at epoch 1943·5 was prepared using the results obtained at 109 of the stations occupied during the resurvey. This has been published for use by the Services.

Electric Potential Gradient.—The Bendorf electrometer has been kept in operation, and the number of hours of recording lost due to spider-webs was greatly reduced by applying a timber-treatment process to the building at regular intervals. For the purpose of obtaining more frequent checks on the constancy of the "zero," a relay was devised for automatically earthing the collecting system at frequent intervals throughout the day. As well as maintaining current measurements, further progress has been made in overcoming arrears of measurement. The Kew method of characterization of days has been adopted and all days 1940–44 grouped according to this scheme. Early this year the method was extended along lines suggested by the International Association of Terrestrial Magnetism and Electricity. The extended method has been used for 1944 values and eventually will be applied to all previous years. A new method of preparing data to be used for correlating the observed variations of potential gradient with local meteorological conditions was also instituted.

Seismological.—The seismological equipment has functioned satisfactorily and has been maintained in critical adjustment by quarterly calibrations. Preliminary measurements have been published each month with those from the Dominion Observatory. In all, some 359 seismic disturbances were recorded during the year. Owing to the failure of the master clock controlling the time-marking mechanism, it was necessary to adapt a chronometer for this purpose until new parts could be obtained from England. Repairs have been effected, and the system is again functioning satisfactorily.

Cosmic-ray Meter.—Delay in the fulfilment of supplies again caused a loss of record for a short period. Measurement of records has been maintained and results forwarded quarterly to the Carnegie Institution, Washington.

Meteorological.—The programme of meteorological observations—thrice daily on most days—was continued for climatological purposes and the results forwarded to the Director of Meteorological Services. Results were also published daily in the local newspapers. As usual, there has been much demand for meteorological data from other Departments and many sections of the community. In order to comply with the increasing number of requests for information regarding humidity and the moisture content of the air, figures derived from the thrice-daily observations for the last forty-two years were tabulated.

Equipment.—A new radio receiving-set was designed and made to improve the reception of time signals at Amberley for the purpose of checking the clocks there.