

APPENDIX II.

THE MAGNETIC OBSERVATORY AND THE MAGNETIC SURVEY.

DURING the year the Magnetic Observatory has been maintained in thorough working, and all the usual magnetic seismological and meteorological records have been obtained. Besides routine work, a large amount of magnetic work has been done in connection with the work of the National Antarctic Expedition led by Captain Scott, and the later Australian Antarctic Expedition led by Dr. Mawson. This work has consisted principally in the obtaining of the necessary quick-run magnetograms during the prescribed term-hours, and is still being continued. The operation of the Christchurch electric tramways has inevitably sometimes interfered with these delicate observations, and thus reduced the value of some of the records obtained, but such interference has still left a great deal of valuable record obtained during the night-hours when the tramways were not working and the artificial electric "earth current" due to current returning outside the rails did not exist.

Unless by some miracle the Christchurch Tramway Board decide to run their cars with an alternating current, and replace their present tram motors with alternating-current motors upon the completion of the Lake Coleridge electrical-supply scheme, the only absolute remedy for the tramway disturbances experienced by the Observatory will be to shift the Magnetic Observatory some thirty miles away from Christchurch; and it would be quite possible to shift the present buildings this distance to a new site selected at some ten miles distance from a railway (in view of their possible electrification) at a minimum of expense.

The question of shifting the Observatory has been considered before, but, in addition to my own opinion, the opinion of leading authorities in magnetic science, such as Dr. Chree, F.R.S., agreed that it was desirable to complete eleven years' observations at Christchurch (a "sun-spot period") before shifting the Observatory, seeing that so many years' records had already been obtained free from disturbance. The time has now arrived when it is desirable to select a fresh site.

On those occasions when the term-hours fell mostly within the hours of tramway-running the undisturbed curve of magnetic declination has been obtained by half-minute eye readings of a Kew magnetometer set up at Amberley—a place outside the range of the disturbing currents. Eye readings were also made there over a period of five hours at the time of the solar eclipse of 1911, in order to co-operate with investigations made at other observing-stations during the eclipse.

The Adie Magnetographs.—These have been kept in thorough working-order throughout the year, and the necessary absolute observations for the determination of base-line values were made. The records have been developed and annotated to date, and the measurement of these curves is approaching completion. Some minor alterations and improvements were made in the dark-room of the magnetograph-house. It is highly desirable that a portable field set of Eschenhagen self-recorders should be obtained for the Observatory, to enable a comparison to be made between diurnal variations at Christchurch and any selected situation, and for other purposes.

The magnetograms of the principal magnetic storms of the year are reproduced herewith on a scale of three-eighths of the originals. The values of ordinates on the reproductions are—

Declination curve	..	..	..	+ 1 mm. = - 3.0' of arc.
Horizontal-force curve	..	..	..	+ 1 mm. = - 0.00014 c.g.s.
Vertical-force curve	..	..	..	+ 1 mm. = - 0.00011 c.g.s. unit.

Milne Seismograph No. 16.—With this instrument records of sixty-nine earthquakes were obtained during the year. The new recording-apparatus has worked successfully. A *résumé* of the observations obtained with this seismograph and with No. 20, stationed at Wellington, in charge of Mr. G. Hogben, M.A., has been presented to the New Zealand Institute for publication in the Transactions of the Institute. Some important seismograms are reproduced herewith.

Magnetic Survey.—In July, 1911, a magnetic observer of the Carnegie Institution, Mr. E. Kidson, paid a visit to New Zealand on holiday leave from Australia. Mr. Kidson was visiting Nelson, and kindly reoccupied two of the Nelson stations. His checked official results are not yet available, but they will be valuable for the determination of the amount of secular change at Nelson.

Antarctic.—The recent return of part of Captain Scott's expedition to New Zealand is especially important from the fact that Dr. Simpson, the magnetician to the expedition, brought back with him a complete set of twelve months' magnetograms obtained at Winter Quarters, including term-hour quick runs. I believe these to be the best and most important set of magnetic records ever obtained by a polar expedition. They are being forwarded to Dr. Charles Chree, F.R.S., of Kew Observatory, for discussion. Since Dr. Simpson's departure from the Antarctic the magnetic work of the expedition is being equally well performed by Mr. Wright, who is also running his magnetographs during the term-hours now being observed by the Mawson Expedition on the other side of the magnetic pole. Very valuable results may thus be expected to be secured by the co-ordination of the work of Mr. Wright and Mr. Webb, magnetic observer to Dr. Mawson's expedition, and of the work of co-operating observatories.

Meteorological Observations.—These have been taken daily throughout the year at 9.30 a.m. and 5 p.m., and at noon on six days of the week. The observations include the temperature, pressure, and humidity of the air, the direction and velocity of its motion, the amount of cloud and rainfall, and the daily changes of temperature and pressure. Monthly abstracts have been forwarded to the Dominion Meteorological Office, and a daily summary has been published for the information of the public. The total rainfall for the year, 1st January to 31st December, 1911, was 29.853 in.