

TIDAL PREDICTION.

From the harmonic tidal constants the tides for Wellington and Auckland have been predicted, using the method described in the Tidal Survey Reports for 1910-11 and 1911-12. The predictions give the times and heights of high and low water throughout the year. The time used is New Zealand civil mean time for the meridian, 11 h. 30 m. east of Greenwich; and the heights are referred to the Admiralty datum of each port.

The tidal predictions are supplied to the British Admiralty, and are published in the Admiralty Tide-tables; and to the Marine Department, and published in the New Zealand Nautical Almanac and Tide-tables.

Checks of Prediction.—As in former years, checks are constantly applied to the predicted times and heights of high and low water by comparison with the latest available tide-gauge records, and in every case where such a test has been applied the results have been most satisfactory and of a high order of accuracy.

GENERAL.

Further investigations into improved methods of harmonic analysis have been made from time to time, and it is expected that material economies in this highly complicated mathematical analysis will result.

Much overtime has been taken up, in conjunction with Mr. W. S. La Trobe, M.A., Director of the Technical College, Wellington, in designing a new tide-predicting machine. Until the invention is protected by patents it is not proposed to describe details here. The machine would appear to be a great improvement on all existing ones, and its employment would lead to highly increased economy.

Messrs. T. G. Gillespie, J. J. Hay, and E. J. Williams have assisted in the calculations of the tidal survey in a satisfactory manner. Their work has been of an exacting and technical nature, involving great care to guard against errors, and has been carried out accurately.

APPENDIX V.

THE MAGNETIC OBSERVATORY AND THE MAGNETIC SURVEY.

MAGNETIC OBSERVATORY.

DURING the year the regular observational work of the Observatory has been thoroughly carried out, and, in addition, with the aid of temporary assistants, a large amount of work has been done towards getting the great quantity of data accumulated by past observations into form for publication. For part of the year the Observatory had the able assistance of Mr. E. N. Webb, and for the last few months of the year the services of Mr. H. S. Richards were obtained. With the willing assistance of these gentlemen and of Mr. Maben the major portion of the magnetograms remaining unmeasured from past years has been measured, and the computation of hourly values from them has been well advanced.

For the first time since the establishment of the Observatory it has been found possible to publish the vector diagrams for the immediately preceding year. The tables of hourly values of magnetic horizontal force and declination are also published herewith, and the approximate mean monthly curves for H and D are also given, and are very instructive.

The Milne seismograph No. 16 has been kept in continuous operation, and data of 74 earth-movements recorded are given in tabular form.

The Adie magnetographs have been kept in operation continuously, with the exception of the period 25th February to 5th March, 1913, when the cellar was in use for pendulum-swinging. This explains the absence of data for these days in the published tables. The regular absolute observations were duly made to enable base-lines to be computed. The tabular data given in the tables are not affected with temperature variations, and are absolute values.

Meteorological observations have been made twice daily throughout the year, and three times on week-days. These have been published daily for public information.

The mean annual values of magnetic elements for the year are as follows:—

Declination E.	..	..	..	..	..	16° 42-01'
Horizontal force..	..	..	..	..	..	0-224485 c.g.s. unit.
Inclination*	..	..	..	..	..	67° 58-2'
Northerly component of force	..	..	..	..	..	0-215017 c.g.s.
Easterly component	..	..	..	..	..	0-064508 c.g.s.
Vertical component	..	..	..	..	..	0-55478 c.g.s.
Total magnetic force	..	..	..	..	..	0-59848 c.g.s.

* Mean of absolute observations only.