

56,279 acres; Nelson, 102,674 acres; Marlborough, 7,145 acres; Westland, 14,774 acres; Canterbury, 105,440 acres; Otago, 289 acres; Southland, 7,499 acres.

Apart from the above-mentioned areas there will, in the ordinary course of events, be the urgent surveys of land acquired from time to time by the Crown under the Land for Settlements Act. These surveys receive, as I have previously indicated, immediate attention by the Department, and as soon as the purchase arrangements are completed, surveyors are despatched to prepare them without loss of time for opening to the public, all such operations being treated as urgent.

NATIVE-LAND SURVEYS.

The area of Native land surveyed during the year reached a total of 671,343 acres, in 2,755 subdivisions, which is a record for more than twenty years past. This total is made up of 653,617 acres, in 2,714 subdivisions, of Native Land Court surveys, and 17,726 acres, in 41 subdivisions, of Maori Land Board surveys.

The Native Land Court area comprises 44,600 acres, in 378 subdivisions, surveyed by the staff surveyors; 608,090 acres, in 2,314 subdivisions, by contract surveyors; and 927 acres, in 22 subdivisions, by licensed surveyors, who were paid by the applicants.

The Maori Land Board area comprises 15,792 acres, in 37 subdivisions, which was surveyed by the staff surveyors, and 1,934 acres, in 3 subdivisions, surveyed by contract surveyors.

An area of 614,997 acres represents surveys in hand and those waiting survey during the coming year. Out of this total the staff surveyors have allocated to them an area of 187,223 acres, and the contract surveyors 427,774 acres, confined almost exclusively to the districts of Auckland, Hawke's Bay, Taranaki, and Wellington.

The surveys of these lands all materially assist in furthering settlement, although nothing like to the same proportion as do our Crown lands, more particularly those specially acquired for the purpose.

TIDAL SURVEYS.

On the 13th August, 1909, a communication was forwarded from the Lords Commissioners of the Admiralty to the Under-Secretary of State, Colonial Office, on the subject of supplementing the Admiralty Time-tables, which had hitherto been restricted to British and Irish ports, by the inclusion of information respecting certain standard Indian and colonial ports. The Secretary of State, on the 21st August, 1909, addressed His Excellency the Governor on the subject, and on the 21st October, 1909, the Secretary for Marine wrote to the Surveyor-General, and also pointed out the necessity of supplying these tidal predictions for publication in the New Zealand Nautical Almanac. The then Surveyor-General, on the 28th October, 1909, replied to the Secretary for Marine stating that the Department could undertake the work provided the necessary funds were forthcoming, and pointing out that the work of predicting the tides is of a highly technical and laborious nature, involving a large amount of calculation.

This Department had hitherto made no provision either for the harmonic analysis of tidal observations nor for the prediction of tides. As, however, Mr. C. E. Adams, M.Sc., F.R.A.S., Chief Computer, was conversant with the technicalities of the work, and had indeed made a special study of it and of the higher mathematics required, the whole conduct of the tidal survey was handed over to him. Two Computers—Mr. T. G. Gillespie and Mr. J. J. Hay—were appointed, and operations were actively put in hand. There were many initial difficulties to overcome, but these were successfully handled. A complete harmonic analysis of the Wellington and Auckland tides was made, and from the harmonic tidal constants thus derived the tides for these ports were predicted for the year 1912. These tide-tables are published by the Marine Department in the New Zealand Nautical Almanac and Time-tables, and by the Admiralty in the Admiralty Tide-tables. This is the only tidal survey in Australia and New Zealand. The accurate and successful manner in which this important work has been carried out reflects the greatest credit on the officer responsible and the staff employed. Details of the year's operations will be found in Appendix V.

I may mention here that, in addition to his other duties, Mr. C. E. Adams, in connection with his position as Government Astronomer, has spent quite half of his time at astronomical work. The British Antarctic Expedition was responsible for a large portion of his work for the year, the pendulum observations for the determination of gravity both at Christchurch and Wellington by Mr. C. S. Wright requiring much additional astronomical observations of the highest accuracy for this work. Mr. Wright conducted gravity observations at Potsdam before going to the Antarctic, and his observations in the Antarctic and in New Zealand will be checked again by further observations at the base station at Potsdam on his return to Europe.