

proper channel, the request was most readily acceded to by the Government of Victoria, and since then I have been advised by Robt. J. L. Ellery, Esq., the astronomer for that colony, that the work desired is now put in process.

VII.—OFFICE WORK.

The inspection of the various methods, pursued in the several Provincial Districts, soon placed me in a position to advise the Government as to the direction which a uniform system of survey applicable to the whole colony should take. The first of my time in office from travelling round the colony was therefore devoted to drawing-up instructions for settlement surveyors, and which were published under authority.

To the same end, specimens of maps for a uniform system have been prepared and forwarded to all practising surveyors—trigonometrical, topographical, and sectional.

Maps of the standard bearings in certain circuits have been completed, and others are in process. A projection for the colony has been designed, calculated, and the data tabulated. Forty-two circulars, giving directions in the various official and technical duties, have been issued.

A complete set of the lithographs published in each Provincial District has been obtained and arranged for reference and use.

The miscellaneous requirements of the Government Departments have been numerous, and have been attended to.

A photo-lithographic printing-office has been established in connection with the Head office, and maps of the surveys of the colony will now be reduced by McColl's process, and printed to scale.

I have, &c.,

J. T. THOMSON,

Surveyor-General.

APPENDIX I.

Mr. McKERROW to the SURVEYOR-GENERAL.

General Survey-Office, Wellington, 26th July, 1877.

SIR,—

I have the honor to report on the observations for true meridians, the extension of standard bearings therefrom, the selection of meridional circuits and survey districts, and generally on what has actually been done towards bringing the survey of the colony under a uniform system of field practice and record. As I have only had charge of these operations for seven months, and as much had already been done in various parts of the colony, which has been adopted as standard work. It will also be necessary to refer to it in this Report, so that an estimate may be made of what is yet requiring to be done.

Before doing so, it may be as well to explain that the determinations of true meridian recently made, have been chiefly from transit observations of selected pairs of circumpolar stars, differing in right ascension close on twelve hours. This method gives a very reliable and satisfactory determination and on a clear night the observation can be repeated independently many times, as numerous suitable pairs of stars can be selected from the Melbourne catalogue, and by reversing the instrument and taking pairs alternately, with face east and face west. The meridian can, with an eight-inch or ten-inch transit theodolite and a chronometer to measure the sidereal time interval, be established within a limit of ten seconds (10") of arc. The eastern and western elongations of circumpolar stars were also observed for true meridian, as well as high and low stars, selected from Nautical Almanac. In Westland, where Mr. C. W. Adams was recently observing, during much bad weather, he relied on the observation of time azimuths of Sigma Octantis for true meridian. The advantage of this method is, that on a cloudy night, the observer is not baffled by missing the instant of transit or elongation; for, availing himself of the slow motion of this close circumpolar, he can, if there be but four or five minutes of clear sky, take the azimuth of the referring lamp, and of the star, on both faces of the instrument, read the times, and the observation is complete. In this way, even on a very indifferent night, may several independent observations be taken. Although the true meridian was the prime object sought at the initial stations, the latitude was also in each case determined by observations of circum-meridional altitudes of stars north and south of zenith. No time was expended in waiting on latitude observations, but such pairs of stars as were available, between the meridian observations, were taken, and thus for each station a geographical latitude has been obtained.

In assigning the meridional circuits and survey districts, the boundaries of existing registration and provincial land districts had to be considered and care taken that there were no conflict of boundaries, but that they were co-terminous wherever they abutted on each other. In so far as these boundaries, and the natural configuration of the country would permit, the meridional circuits and survey districts have been marked off on the maps, in accordance with the dimensions laid down in the printed survey instructions.

In the *Auckland Provincial District*, the true meridian had already been established at Mount Eden, Bay of Plenty, and Poverty Bay, by Mr. Heale, in connection with the major triangulations conducted under his direction. These meridians have been accepted, as also the sides of the intervening triangles—whenever available—as the standard bearings of the survey districts into which the Provincial District is now divided for systematic record. The want of a reference trig. at each major station will render it difficult in some cases for the settlement surveyor, with his five-inch theodolite, to get a start on the true bearing. Although it will not be advisable to set specially to work to establish reference trigs., yet every effort should be made to break down the large triangles into sides of two or three miles, and so render the triangulation of practical use in checking and keeping the sectional and spotting surveys within the prescribed limits of error. The extension of standard bearing