

which was found to be in latitude  $39^{\circ} 1' 54''$  S. The processes of determination of true meridian were by stars out of the meridian, then high and low stars, and greatest elongation of Sigma Octantis. By going over similar observations at another time the separate determinations were found to agree by  $4''$ . Mr. Heale also tested the work afterwards, agreeing in latitude by  $0'' 4$ , and in true meridian by  $3'' 8$ . All the new surveys are based on this position, but longitude has not yet been independently observed. The sectional blocks now in progress are based on this meridian line, closing mathematically on it at certain intervals, and it is Mr. Humphries' intention to set off perpendicular standard lines to govern the block section surveys east and west of it. The Moa Block is thus in hand, and, besides it, there is the resurvey of the Hundreds of Hua and Wai Wakaiho, which resurvey is necessary owing to its excessive incorrectness. Here the chainages are in error to the extent of 100 to 300 links. The work was done before Mr. Humphries' time.

The land laws of Taranaki require survey before sale. There are objections of course to all systems, and to this one it has been alleged that the surveyors were sometimes over-pressed to push the work so as to allow of land sales before all the details could be completed.

The town maps are on a scale of 2 chains to the inch, and are of various sizes, from  $4' \times 5'$  to  $2' 6''$  square. The rural plans are on a scale of 10 chains to an inch, and of various sizes likewise. These are kept mostly in racks on the office walls, and a very few are put into a small safe. The original field-books are mostly lost, and those remaining are in a bad state, from which no new maps could be plotted. The late ones are in a good state, but all are not inked. They are partly indexed, and all are indexed in relation to the working plans.

The office is extremely small—hot in summer, cold in winter—quite unfit for occupation. The roof leaks, and floor boards are open.

Crown grant index record maps are kept of rural sections, scale 20 chains to an inch. When granted the sections are coloured pink.

The notes that I made on the Taranaki office at the time are as follow:—I quite concur in the propriety of Mr. Humphries' late determination of the true meridian at Waitara, and its intended continuation to the south coast. It will thus nearly bisect the province. I also agree in the propriety of his cutting lines at right angles to the meridian at intervals where blocks are being sectionized, also of his mathematical reductions of his chain and theodolite traverses, all of which give a thoroughly trustworthy character to the work under his control. The country here is level and covered with timber. His suggestions to cover by triangulation the hilly and undulating country—east of the Waitara, extending southwards to the south coast, I also concur in, as also of his triangulating the similar country round the West Coast, but this only immediately before it is required for settlement. And in these latter surveys the standard operations by meridional circuit should precede the minor. The slopes of Mount Egmont might also, when open for sale, be triangulated under standard bearing in the same manner.

The maps in the office require to be systematized both in sizes, mode of keeping, and registry, according to the instructions contained in the General Survey Regulations about to be published. Beyond all, a healthy and habitable office should be built, attached to which should be a fire-proof safe, contained in which should be placed tin tubes for compiled maps, and shelves for folios on which working plans would be kept. The field surveyors should have better accommodation and appliances in the field fitted for their completing their maps and surveys ready for final inspection and approval by the Chief Surveyor or Field Inspector; and none of the maps should come into the office till so examined and approved of. This arrangement would save time and labour in travelling backwards and forwards from office to field and field to office on the discovery of each error at head-quarters, all of which is attended with inordinate delays and expense to the Government.

Before leaving Taranaki, Mr. Skeet, surveyor of Native lands, called to show me the nature of his duties in surveying land purchases. He informed me that the land was mostly under forest, and very rough.

A return of the Taranaki survey work is as follows:—

|                          |     |     | Acres.  |                         |
|--------------------------|-----|-----|---------|-------------------------|
| Minor triangulation ...  | ... | ... | 12,000  | Mathematically reduced. |
| Block section survey ... | ... | ... | 130,000 | Not so.                 |
| Ditto. ...               | ... | ... | 30,000  | Mathematically reduced. |
| Section surveys in hand  | ... | ... | 15,000  | In one locality.        |

#### PATEA OFFICE.

On the 21st of November I arrived at Patea by going round the coast road, and at which place I examined the District Office, under the charge of Mr. Williams. The trigonometrical work here is on the magnetic meridian, but mathematically reduced. This was derived from the Wellington survey. The traverse section surveys are checked by minor triangulation, and then these are mathematically reduced.

Mr. Williams brought to my notice the impossibility of executing the interior surveys, either by minor triangulation or by right lines, owing to the steepness of the cliffs and the denseness of the forest. He admitted at the same time that much of the interior was not worth the cost of survey, the land not being suited for settlement.

#### WANGANUI OFFICE.

On the same day, having arrived at Wanganui, I examined the District Office there, which is under the charge of Mr. Monro. Here the trigonometrical work is also on the magnetic meridian, this and the initial point being derived from the Provincial Government of Wellington's survey. Isolated blocks of section surveys have been done also on magnetic meridian, but mathematically reduced. The interior, to a breadth of about forty miles, is very rough bush, so major triangulation has been found to be the most applicable system; this also in consideration of the lands being mostly in Native hands, and Government purchases of Native lands being comparatively few. The maps in the office are of all sizes. Mr. Monro admitted that there was no immediate necessity to carry on major triangulation at present. What has been done has no referring stations for the use of section