

REPORTS BY THE

Since the private negotiations with Natives for runs are still going on in many directions, the necessity for extending the surveys is increasing, and it is clear that, as peace returns, the whole country will come under the operation of the Native Lands Courts; and the surveys now being pushed inland from the different parts of the coast will soon meet in the interior of the Island.

It becomes then of great importance that the various trigonometrical surveys should be correctly initiated, and that they should be conducted on such principles that when they close together no inordinate error shall appear, and so that, at all events, the geodetic elements resulting from them all shall be of the same nature, so as to admit of comparison and check, and that they shall all be such that the corrections for the earth's form can be applied to them, and the quantities resulting from them be resolved into differences of latitude and longitude with some approach to correctness.

I am unaware whether the Provincial Governments, to which advances have been made, have come under any engagements as to the mode in which their triangulations are to be carried on. There are, however, a few broad principles which are essential to the nature of a geodetic work, and I apprehend that the undertaking a triangulation at all implies that these principles shall be followed. They are—

1. That a suitable base cleared, and levelled, shall be measured with a properly compared standard chain with all the necessary precautions.
2. That all primary stations shall be so constructed and marked as to be permanent.
3. That all angles shall be taken with an instrument of suitable size and quality, the readings of all verniers be actually read and recorded, and the observations be repeated so that the ultimate angle shall result from the mean of not less than six readings.
4. That no angle of a primary triangle shall be less than 30° , nor more than 100° .
5. That the direction of the meridian at the starting point be truly determined astronomically, and the observations and calculations recorded for reference.
6. That the unknown sides be calculated from the known logarithmically to seven places of decimals.
7. And, finally, that the co-ordinates of each side be similarly calculated, and the distance on the meridian and perpendiculars of the unknown apex of the triangle be obtained by the mean from the two previously known points. That these distances be applied seriatim, so that the work may result in a complete table of distances on meridian and perpendiculars from a starting point, the position of which in latitude and longitude is known.

I conceive, then, that any triangulation towards which the General Government has contributed, or may contribute, ought at least to come up to these requirements, and it appears to me important to ascertain whether they do so or not.

I have already informed you (by Memo., 9th November, 1868) that the surveys at Poverty Bay submitted to me are nothing but a compilation of a number of traverse surveys of runs or land claims. Assuming all this work to have been done for the Government, its cost is about $2\frac{1}{2}$ d. per acre—six times more than that of any triangulation I have conducted.

With regard to the Hawke's Bay triangulation, I was directed in a letter from Mr. Rolleston, 9th October, to put myself in communication with the Provincial Surveyor at Hawke's Bay, with the view of obtaining full information of the actual state of the surveys on which £1,200 had been paid. In answer to my applications information was promised, but to this day I have not received any.

For the Taranaki survey I prepared a set of detailed instructions. I have no reason to doubt that these have been acted on, but I have no information on the subject; nor have I as to the triangulation in the Province of Wellington, towards which I understand the General Government pays a subsidy.

I think that these facts show a necessity for some general inspection; but before that can be properly exercised, it must be determined whether the principles I have laid down as essential to the nature of a geodetic triangulation are admitted to be so, and whether, therefore, they ought to be insisted on before credit is allowed for any advances made for work of this nature.

If the circumstances admit of it, it would be better, with a view to future work, to go a step further, and to lay down detailed rules to secure accuracy and uniformity; but it is clear that such rules would be useless unless the observance of them be made binding on the different departments conducting surveys, and unless the results of their surveys are duly furnished to this office, and an occasional inspection exercised to secure their uniform working. In short I venture to submit that the time has come when it is essential to combine the major surveys of the North Island into a system, and that if it is not done now the utility of all the work being carried on disconnectedly will be almost destroyed for any general purpose.

I have, &c.,

THEOPH. HEALE,

Inspector of Surveys.

The Hon. the Native Minister.

No. 3.

Copy of a Letter from Mr. T. HEALE to the Hon. the NATIVE MINISTER.

SIR,—

Inspector of Surveys' Office, 17th February, 1869.

I have the honor to forward herewith the (original) maps of Poverty Bay and of East Cape, furnished by Mr. W. Graham and Mr. Winter. I have also prepared a copy of the Poverty Bay map for transmission to W. S. Atkinson, Esq., at Turanganui, as directed in Mr. Halse's letter of the 10th instant.

I am not in possession of any other maps belonging to the Government or showing European claims; but there remain in the custody of the Native Land Court, twelve maps, as per list enclosed, of Native land claims, which were forwarded to this office by the surveyors in the years 1867, 1868, along with a great number of others, all of which except these twelve were suffered to pass into the possession of Mr. Preece, as stated in my memorandum of 9th November, 1868.

I have, &c.,

THEOPH. HEALE.

The Hon. the Native Minister.