

MEASUREMENT OF THE WAITEMATA BASE-LINE, AUCKLAND DISTRICT.

[BY J. LANGMUIR, Inspector of Surveys.]

Geographical Position of Base.—The easterly end of the line, trig. station, Waitemata, is in latitude $36^{\circ} 49'$ S. and longitude $174^{\circ} 38'$ E. (approximately). Starting from the new secondary trig. station, Waitemata, the line runs on a bearing of $293^{\circ} 3'$ (approximately) to the original minor trig. station C, situated about one mile south by west from the Kumeu Railway-station, on the Auckland to Helensville line. The particular reason for selecting a base in this locality was that it appeared in a high degree desirable that a base should be measured, if possible, somewhere in the single polygon, where the triangulations from the north and south converged to meet on the Auckland Isthmus. The search for a line was carried out by myself personally, and owing to the somewhat irregular nature of the country was a little difficult to locate, but, though not as long as one might wish, is the best obtainable, and on the whole lies in a very satisfactory position for extension from to the principal lines of the triangulation.

Fig. 1 shows the base net of triangles. It is almost necessary that the angles of this net and principal polygon should be observed as soon as possible. Permanent signals in totara, 17 ft. high, have been erected at both ends of the line, and signals of the same size in jarrah have also been erected at trigs. P and Pukeatua, the central station of the polygon. The line is broken up into five sections by the intermediate marks (a), (e), II, and III. Points (a) and (e) are marked by 3 in. by 3 in. totara pegs countersunk about 1 ft. in the ground. Point II is a stone block, and point III is a large trig. tube, both finely centred and set in concrete. Point I, on the Main North Road, is also marked by a stone block set in concrete. These stone blocks are centred with brass tubes.

Standard of Length.—The provisional standard of length for this line is the same as that adopted for the Matamata base—viz., the Imperial standard steel tape No. 3, deposited in the Auckland District Survey Office.

The measurements were started on the 27th June, 1911, and completed on the 29th August. The intermediate time was not all taken up with the measurements, as a good deal of it was occupied in the preparation of parts of the line, and some wet and stormy weather also occurred. The air-temperatures during the measurements ranged from 47° to 68° F \pm hr.

The least probable error in any section is in Section No. 5, where it amounts to ± 0.00197 , or 1 in 3,559,841. The greatest probable error in a section is in Section No. 1, where it is ± 0.00491 , or 1 in 1,768,760. The probable error in the whole line is ± 0.007705 , or 1 in 5,423,851.

The reduction to sea-level has been computed for each measurement.

When laying down comparators with the Head Office Imperial standard steel tape No. 1, six Centigrade thermometers reading to tenths of a degree are used for recording temperatures.

The following tables and illustrations are attached to this report :—

Table No. 1: Results of measurements.

Fig. No. 1: Diagram showing the base net of triangles.

Fig. No. 2: Plan and section of base.

Also a tracing, on a scale of 10 chains to an inch, giving all the detail mean measurements along the line.