The following is an explanation of each diagram —

Diagram No. 1.—The triangulation, which is drawn to a scale of 30 chains to an inch, shows the result of the seventy-four rounds of bearings which have been taken at twenty-two different trig. points.

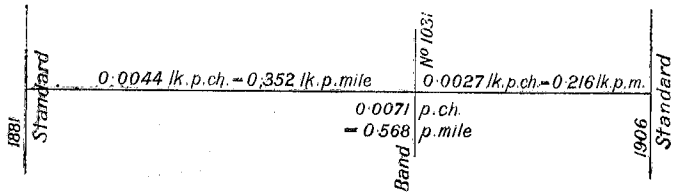
The initial bearing for triangulation is Mount Victoria (flagstaff) to Kaukau (349° 11′ 58·8″), which was determined by Messrs. McKerrow and Marchant in 1877. Their origin was Kaukau to Mount Cook, which was astronomically determined at Mount Cook by Mr. McKerrow. I have extended this meridian from Mount Victoria to North Lamp, and thence to the true meridian passing through Mount Cook to Island Bay, which was astronomically determined by Mr. C. W. Adams in 1883, and by this extension have ascertained the difference between Messrs. McKerrow and Adams's true meridian at Mount Cook to be 2·3 seconds only, and at the old Wellington Observatory (Seddon Monument at cemetery—Henry Jackson's determination) 3 seconds. Therefore the three observed meridians by Messrs. McKerrow, Adams, and Jackson are in agreement as follows :—

Mr. McKerrow's	.. ..	360° 00′ 00″. Date, 1877.
Mr. Adams's	.. ..	360° 00′ 02·3″. Date, 1883.
Mr. Jackson's	.. ..	359° 59′ 57″. Date, 1870.*

The standard of length adopted by me is that of the city standard survey of 1881, corrected by deducting 0·568 link per mile, which reduces it to the new Imperial standard. The correction of 0·568 link per mile is arrived at as follows (see F. Bk. 2487, p. 5, District Office) :—

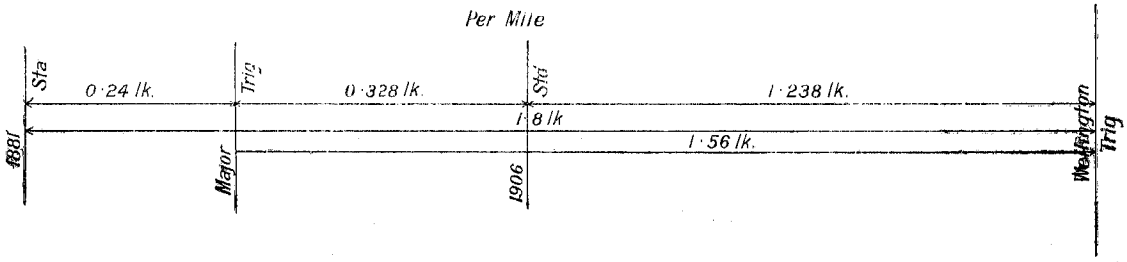
(1.) The 3-chain $\frac{1}{4}$ in. band No. 1031 used on the verification city survey in 1906 was, after a series of tests with the Imperial band, found to be 0·008 links short, which is equal to 0·0027 links per chain.

(2.) This 3-chain $\frac{1}{4}$ in. band was compared with the 1-chain $\frac{3}{4}$ in. band used for the 1881 survey and found to be longer by 0·0126 link; and by comparison with the Pirie Street base-line laid down with the 1881 band was 0·0146 link long. These, summarized, are as follows: 0·0126 link by $\frac{3}{4}$ in. band; 0·0126 link by $\frac{3}{4}$ in. band (added for weight); 0·0146 link by Pirie Street base. Mean, 0·0133 = 0·0044 of a link per chain. This is equal to 0·352 link per mile, by which the 3-chain band is longer than the 1906 Imperial standard. These results may be put in diagram form thus :—



That is, 0·0027 + 0·352 = 0·568 link, the total correction per mile to be deducted from the 1881 standard survey trig. distances to bring them into terms of the present chain-standard (Imperial).

The 1881 standard of length (city standard survey) was shorter than the adjacent triangulation by 1·8 links per mile (see Captain Hewitt on city standard survey, District Office file 10123/60). Comparison of the base adopted for the major work along the Tararua Range with the Wellington Trig.: distances show that this is 1·56 links less per mile than the major base, thus showing that the 1881 standard survey base is shorter than the major trig. base by 0·24 link per mile. All these results put in a diagram are :—



In computing my work I have accepted the lengths of my 1881 city triangulation (less 0·568 link per mile) of sides Mount Victoria – Kaiwarra, Mount Victoria – No. 1 Trig., Mount Victoria – Mount Albert, and Mount Victoria – Ohiro. These lengths were computed from the Pirie and Riddiford standard base-lines by Captain Hewitt in 1881, and are sides of polygons corrected in the usual way for seconds correction.

The instrument used, excepting for the sets taken with the 8 in. micrometer, was my 5½ in. Cooke micrometer with a 40-diameter eye-piece, which has given excellent results.

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* Mr. Thomas King, F.R.A.S., formerly time-observer, writes :—

"In reply to your note of to-day, I am sorry to say that I am unable to give you the date on which the meridian-mark for the old time-service observatory in the cemetery was placed in position on the Tinakori Range. The observatory was built in 1869, and in January, 1870, the work of the time-service was transferred to it from the small transit-house which stood on part of the ground which is now the site of the General Post Office, Customhouse Quay.

"I have heard the late Sir James Hector say that the meridian-mark was erected under his personal direction, and I gathered that the necessary observations were taken by himself or by the late Archdeacon Stock, my predecessor in charge of the observatory. The late Mr. Henry Jackson may, of course, have had something to do with the placing of this mark; but I have always understood that Mr. Jackson's astronomical work was done at the Hutt, in a small observatory erected there for longitude-determination purposes."