

has always been experienced in comparing steel bands with them owing to the fact that that it is almost impossible to ascertain what the real temperature of the bands is at the time of comparison.

When the order was intrusted to Messrs. Chesterman and Sons, of Sheffield, they demurred to undertaking to supply twelve bands which would not only be in accord but also be true to the Imperial standard. This condition was waived; the bands were manufactured and duly delivered to the Agent-General, to whom the Department is much indebted for his great interest and kindly co-operation in connection with this matter. The bands were then forwarded by the Agent-General to the Standards Department, Board of Trade, to be tested and certified to. The tests were duly carried out, and the following certificate and particulars were issued by that Department:—

Dated 18th June, 1903.

THIS is to certify that twelve standard subdivided steel measures, riband form, each graduated at 66 ft. or 100 links, 150 links, and 100 ft. for the Lands and Survey Department of New Zealand (together with twelve spring balances for use therewith) have been compared with and verified by the Imperial standards in the custody of the Board of Trade, and have been stamped as correct. The ribands were tested when subjected to a pull of 15 pounds at the temperature of 62 degrees Fahrenheit, or 16.660 degrees centigrade, such temperature being measured in terms of the standard thermometers of the Board of Trade reduced to the hydrogen scale.

The errors of the twelve measures, or differences from Imperial standard at 62 degrees Fahrenheit, are shown on the back of this certificate.

H. J. CHANEY,

Superintendent of Weights and Measures.

Board of Trade, Standards Department.

The subdivisions have been found to have no error greater than  $\pm 0.015$  inch on each link (the breadth of each defining-line being nearly 0.006 inch.—H.J.C. 18th June, 1903.

The results testify to the wonderful accuracy with which Messrs. Chesterman and Sons executed the order given to them. It may be stated as regards the one important length—viz., the 66 ft. or 100 links—that the greatest discrepancy between any one of the bands and the Imperial standard is 0.013 in., and that there is splendid accord between them all. As mentioned, ten bands have been distributed to the Chief Surveyors, with full and detailed instructions as to their custody, care, and the manner in which they are to be used for comparison, and it is proposed that, as far as practicable, only one standard of length shall be used throughout the length and breadth of the colony in connection with ordinary survey operations upon Crown and private lands.

It is of interest to note that the new standard of length was compared with the 1-chain distance laid down by the late Surveyor-General upon the concrete base at the south side of the Government Buildings, Wellington, with the result that the latter is found to be 0.0105 in. longer than the new standard band No. 2, and it is therefore 0.0085 in. longer than the Imperial standard in Old Palace Yard, London.

My own  $\frac{3}{4}$  in. steel standard band, which is well known throughout New Zealand, has been found to practically agree with the new standard. Through the good offices of the Hon. G. F. Richardson (President of the Institute of New Zealand Surveyors) it has been possible to effect a comparison also with the 100 links light steel band (No. 15) obtained from New South Wales, and furnished by Mr. McDowall, the then Surveyor-General of Queensland, with the result that the said band is apparently 0.0165 in. shorter than the Imperial Standard as represented by the New Zealand standard band No. 2.

A comparison of all the twelve standard bands was made by myself, the Chief Draughtsman, and two other officers of the Department. This was carried out upon the floor of the General Government offices, and confirmed in a satisfactory manner the certificates of the Superintendent of Weights and Measures. It is very gratifying to the Department to know that as the result of these comparisons the original standard as laid down in 1876 under the directions of Mr. James McKerrow, formerly Surveyor-General, from the Elliott standard brass scale, and the standard of length subsequently laid down by Mr. S. Percy Smith, ex-Surveyor-General, are for all practical purposes in accordance with the Imperial Standard of Length.

It may also be mentioned that three special thermometers of special construction and a spring balance with each band were simultaneously supplied by the Agent-General, and that these also have been duly tested and certified to by the Standards Department, Board of Trade, London.

#### OFFICE.

The duties under this head were summarised in last year's report, and complete information will be found in the report of the Chief Draughtsman and also those of the several Chief Surveyors. From these it will be observed that the main work of the Department consists in the examination and passing of the working-plans furnished by the surveyors, and their utilisation for the purpose of opening Crown lands for sale and selection, the issue of titles, and the proclamation or