In order to arrive at a definite conclusion 115 consecutive closures were extracted from the computations comprising completely closed traverses, traverses between trig. points, and traverses between fixed points (by prior adjustments). These ranged in length from $1\frac{1}{2}$ miles to 15 miles, but on account of their small number (9) those over $11\frac{1}{4}$ miles have not been included in what follows. The remaining 106 closures were arranged in overlapping groups in order of length of circuit and the mean length and closing error in each group obtained.

These names were then placed in observation equations of the form

$$Ad^B - \Delta = 0$$

" d " being the length of circuit in hundreds of chains, and Δ the closing error, the co-efficient A and index B to be obtained by solution. The solution of these equations gave as the mean closing error in links—

$$\cdot 24 d^{\cdot 84} \text{ (d being in hundreds of chains), or}$$
$$\cdot 20 d^{\cdot 84} \text{ (d being in miles)—}$$

a closing error of 1 in 40,000 in a circuit of 1 mile and slightly higher in larger circuits.

From the size of the index ·84 it may be inferred that it is more nearly correct to weight inversely as the length rather than inversely as the square root of the length for the purpose of adjustment.

For the purpose of determining the maximum permissible error in a circuit under similar conditions, the largest errors in each group of closures as arranged were taken and for each of them a similar observational equation was formed as for the mean error above. The solution of these gave as the maximum closing error—

$$\cdot 42 d^{\cdot 88} \text{ (d in hundreds of chains) or}$$
$$\cdot 34 d^{\cdot 88} \text{ (d in miles).}$$

On plotting the actual errors against those given by the formula it was found that only 5 per cent. were in excess and in those cases the excess was slight.

The similarity of the indices ·84 and ·88 is to be expected as in any one series of this nature the mean and maximum curves may be expected to be similar in slope.

It is intended as further traverse nets come up for adjustment to make a more complete analysis of a much larger number of closures and also to investigate the theoretical errors of traverses made under similar conditions.

Tidal Survey.

Tide-tables for the year 1937 for the seven standard ports (Auckland, New Plymouth, Wellington, Lyttelton, Dunedin, Bluff, and Westport) for which predictions are published, were received from the Hydrographer to the Admiralty. The work of predicting the times and heights of high and low water was performed as usual by the Tidal Institute University of Liverpool from harmonic constants supplied by the Department.

Land Developmental Work.

Included in the costs of unclassified work (shown as " Other work " in the attached tables) is that of land developmental work in various districts. This work comprises special topographical surveys, the measurement of areas for scrub-clearing, ploughing, &c.

Proposed Operations, 1936–37.

Hawke's Bay Re-establishment of Surveys.—Rural standard traverses having been extended in scope there remains a further 77 miles to be undertaken during the coming year. On completion of this very little more work of this nature will be necessary as, with one exception, only minor roads remain untraversed. Adjustment of the traverses is well in hand and will continue to occupy the computing staff for some considerable time yet.

Resurveys of Crown lands will be undertaken for title purposes, this work having been deferred wherever possible until all sources of existing survey data have been investigated. As very little further data will be brought to light it is now possible to decide on the amount of resurvey required.

Geodetic Triangulation.—It is anticipated that the main net of the North Island will be sufficiently well advanced to enable the final computations being put in hand. This will necessitate at least seven Laplace stations being occupied and observed for latitude, longitude, and azimuth.

Second Order Triangulation.—Work on this is being done concurrently with the geodetic triangulation so far as the central portion of the Mount Eden circuit is concerned and this will be continued during the coming year.

Standard Surveys.—Rural standard surveys in Auckland, Gisborne, Taranaki, Wellington, Canterbury, and Otago are being put in hand, and the existing work in the cities of Auckland, Christchurch, and Dunedin are being extended.

Precise Levelling.—Work of this nature based on the Lyttelton Tidal Station has been authorized. This work will link up several extensive levelling surveys already completed on assumed datums.

Topographical Survey.—In collaboration with the Defence Department an area of 1,000 square miles in Hawke's Bay is to be surveyed and mapped on a scale of 1 mile to an inch. The Air Services are to supply this Department with aerial photographs which will be worked up by the Arundel method of radial plotting to make the resulting map. Part of this survey should be available in manuscript maps this year.

Data is being compiled from Public Works surveys in Canterbury from which topographical maps will be enabled to be made.