

REPORT.

THE work executed by the staff in field and office during the year ended 31st March, 1939, is set out in the various tables attached hereto and in more detailed form in the extracts from the reports of the Chief Surveyors appended.

The large increase on previous years shown in last year's report has been maintained, this year again showing some 20 per cent. increase in the work as a whole on that of last year. As was anticipated, housing surveys show a decrease, more especially in the preliminary stages. Road and railway surveys show an increase, and from the present indications a further increase may be expected this year. Control surveys, which last year had to give way to more urgent work, also shows an increase.

FIELD.

Geodetic Triangulation.—The area completed this year comprised the most difficult in New Zealand, the mountainous country in Nelson and Marlborough. Eleven of the stations are over 5,000 ft. in altitude, three of these being between 7,300 ft. and 7,800 ft. Weather conditions were expected to be difficult, and proved so, except in two of the higher stations, where favourable conditions were fortunately experienced. An additional observer was placed on the party, and as the lightkeepers were, in the circumstances, out of touch, a portable radio transmitter was installed in charge of the principal observer and the lightkeepers equipped with receiving-sets. Radio communication proved to be exceedingly valuable, and considerable time was saved, thus utilizing to the best advantage the favourable weather conditions.

The number of main stations occupied was seventeen, with a further seven comprising the base net at Culverden. Subsidiary stations to the number of fifteen were also occupied, and these will allow of third-order work being carried out without the interposition of further second order. Five additional stations have been fixed by three or more intersections, and five lighthouses were also fixed by intersection. Latitude and azimuth were observed at seven of the geodetic stations.

The triangle closes are larger than formerly, being 0.80 second, against 0.66 second last year but this may be expected under the severe conditions. Of the thirty-seven main triangles closed twenty-seven are under 1.0 second and the maximum 2.2 second. In the twenty-six triangles forming the base net twenty-three are under 2.0 second, the maximum being 3.5 second. In the subsidiary work of sixty triangles the average close is 0.98 second and the maximum 3.19 second. A base line 7 miles in length has been laid out and the net observed. The measurement is being deferred until at least two further base lines in the South Island have been located, in order that the three may be done at the same time.

During the year a new Tavistock geodetic instrument was in use and is giving good results. The Wild instrument has been reconditioned by the makers and is being returned.

Triangulation.—No second order (other than that already noted in connection with the geodetic work) has been done during the year, but areas in Auckland, Gisborne, and Hawke's Bay comprising some 284 square miles are returned under this heading.

Topographical.—By ground methods an area of $\frac{1}{2}$ square mile was contoured to 5 ft. vertical intervals in the Nelson District for the purpose of laying off a town and works site in connection with the development of the iron and steel industry at Onekaka. Other scattered areas principally for land-development purposes were surveyed in various districts.

Aerial work in Hawke's Bay was continued, and the ground control is now nearing completion.

Standard Surveys.—This work, although showing an increase over last year, is still being deferred for more urgent work. The principal item comprises some 44 miles within the City of Auckland.

Precise Levelling.—Work in the Canterbury District was continued from time to time, but owing to other more urgent work the surveyor was unable to make great progress.

Rural Surveys.—A total of 128,000 acres of rural lands were subdivided, Otago returning 72,000 acres, mostly runs. The cost per acre over the whole was 10½d., and were the run surveys omitted, 1s. 8d., which is remarkably low.

Native-land Surveys.—These still remain at a low figure, 13,671 acres. The average cost of those which passed through the Department was 2s. 4d. per acre.

Town and Suburban.—One hundred and forty-two sections, averaging 10 acres each, are returned under the heading of suburban, the average cost per section being £9 8s. Town lots (excluding those for housing which are listed separately) comprised 268 in number, costing £3 3s. per lot.

Housing.—An area of 525 acres was subdivided into 2,277 building-lots during the year, and preliminary surveys were made of a further 927 acres. The total cost of £6,125 represents the full-time services of nearly six survey parties. The cost per lot this year is £1 15s.

Roads and Railway.—Although the mileage completed this year is slightly below that of last year, it is much higher than former years. This work is in arrears, there being in sight about two years' work at the present rate of progress. The present year should, however, see this reduced to more workable proportions.

In order to preserve survey marks on roads from destruction during reconstruction, there has been done a considerable amount of work on preliminary surveys returned under the heading of "Other Work."

Inspections.—These were again insufficient to form a complete check, and with few exceptions were only instituted when office check disclosed discrepancies with prior surveys. They disclose generally good accurate work, but the ground marking is rather weak, more especially as to those marks which should form a permanent reference to the survey.