

Race-formation.—In all, 30 m. of races had been excavated by the end of the year, the mileage being made up as follows:—

Diversion race	1 m. 18 ch.
Main race	5 m. 36 ch.
No. 1 lateral	10 ch.
No. 2 lateral and distributaries	3 m. 33 ch.
No. 3 lateral and distributaries	12 m. 67 ch.
No. 4 lateral and distributaries	5 m. 57 ch.
No. 5 lateral and distributaries	1 m. 16 ch.

A total of 102,837 cubic yards was excavated in the above races. This represents 73 per cent. of total excavation.

Structures.—A total of fifty-one structures in reinforced concrete, averaging approximately 16 cubic yards each, was completed or in hand on 30th June. This represents the bulk of the work on the main race, and includes the larger structures in the scheme.

Ashburton-Lyndhurst Irrigation Scheme.—Work was commenced on 16th March, 1936. Since that time an average of 100 men have been employed, and 4 m. 57 ch. of race constructed, requiring the excavation of approximately 20,000 cubic yards. This is about 6 per cent. of the total earthwork to complete the scheme.

No structures have been built as yet.

A main camp, with store, office, and other buildings was erected at Winchmore, 5 m. from Ashburton. A second camp to accommodate thirty married men was partly erected by the end of the period.

When completed in September, 1938, this scheme will command approximately 38,800 acres, of which 25,500 is regarded as economically irrigable.

CANTERBURY IRRIGATION INVESTIGATIONS.

Topographic Survey.—This work was continued from June, 1935, until October, 1935, by two field parties operating from Kirwee and Oxford. Work was discontinued in October in favour of other more urgent work. The area contoured during this period was 183,500 acres, arranged in counties as follows: Rangiora, 15,000; Eyre, 61,000; Tawera, 15,000; Malvern, 72,500; Paparua, 20,000: total, 183,500 acres.

Stream-gauging.—Gauging of rivers has been intermittent during the year. Regular gaugings of the Wairau have been instituted, and an automatic river-level recorder is to be installed.

Four more recorders have been set in operation in Canterbury, and a further six are on order. Of these latter, one is to be installed at Blenheim, one at Lake Heron, and one on each of the following rivers: Ashley, North Ashburton, Waiau, and Hurunui.

The date of commencement of continuous record of flow for the following rivers is as follows: Upper Opihi, 15th November, 1935; Opuha, 22nd February, 1936; South Ashburton, 7th January, 1936; Rangitata, 20th October, 1935.

Observations on depth of ground-water were continued during the year.

Weekly inspections of the tunnels for determining rainfall penetration have been continued, in addition to extra inspections during rainy periods.

Soil-moisture and Rainfall.—Observations of soil-moisture and rainfall have been continued during the year at the fifteen stations in Ashburton County, thus completing a total of twenty-five months of record. Soil-moisture has generally been consistently high during the year under review, and owing to higher rainfall during the summer of 1935–36 no abnormally low values were found such as occurred during the previous summer.

Observations have been continued also in Waimate County on the area served by the Redcliff Irrigation Scheme. As in the case of Ashburton soils, the moisture did not drop to the same extent during the past summer as it did during the previous season (1934–35), but the values obtained were on the whole lower than those recorded for Ashburton County.

Samples have been taken regularly since 1st October, 1935, at four stations in Levels County. Periods of only moderately low soil-moisture were observed during the past summer, and for the rest of the year values have been consistently high. Thirteen stations for soil-moisture observations have been established in the Blenheim district since March, 1936, samples being forwarded fortnightly. To date only normal to high values have been recorded.

Evaporation.—A record of evaporation, with wind, humidity, and temperature observations has been kept at Temuka since 19th September, 1935, and the loss from an open-water surface till 30th June amounted to 26.98 in. Another station was established in April, 1936, at the Blenheim Aerodrome, and observations are made daily.

Soil Surveys, &c.—The detailed soil survey of the Levels Plain has been carried out, and the field work and classification of soil types by mechanical analysis have been completed for the soil survey of the Redcliff area. A number of mechanical and chemical analyses has been carried out on soils from the Blenheim district by way of preliminary examination, and a report submitted thereon. Determinations have also been made of the void content and field capacity of representative soil types from Ashburton and Levels Counties, and the latter values have shown good agreement with the observed behaviour of the soils in the field following conditions of heavy rainfall. Further chemical work included the analysis of river-water and river-silts, and flocculation problems of domestic water-supply.