

Rainfall-runoff.—The six automatic rainfall-recording instruments installed in the high country of the North Ashburton Valley were found to be defective owing to excessive friction in the working parts. In December, 1935, they were brought out and the design lightly altered. They were restarted in April, 1936, and just before the conclusion of the year an inspection was made to replace charts. A very satisfactory record was obtained from each instrument.

Rangitata Diversion Race.—During the year a survey was carried out to locate a proposed race from the Rangitata Gorge to near Ruapuna. A distance of 6 m. 51 ch. was traversed and levelled, and typical cross-sections taken.

Oxford and Malvern Counties: Stock Water-supply.—A survey was made during the year of a scheme for raising water from the Waimakariri River above the gorge bridge by means of a hydraulic turbo-pump, and for supplying stock water to Malvern and other counties from an intake situated at the gorge bridge.

HYDRO-ELECTRIC DEVELOPMENT.

ARAPUNI SCHEME.

Very good progress has been made during the year with the work of extension of the powerhouse for the installation of two additional 20,000 k.w. units in the Arapuni Station.

The foundation work has been very extensive, requiring massive concrete work. Construction work was carefully undertaken by the extensive use of well-timbered shafts, but was prosecuted with despatch.

A summary of the work carried out is as follows :—

Excavation above tailwater level, 28,680 yards.

Excavation below tailwater level, 11,400 yards, including 8,080 yards taken out of fifty-two shafts for the main foundation piers.

Excavation of tailrace, 7,800 yards.

At the end of the year the main excavation work was about 97 per cent. complete, the excavation for piers, &c., about 89 per cent. complete, and the tailrace excavation was complete.

Forty-one boreholes, totalling 1,664 ft. of 2½ in. boring, were put down to explore the foundations, and a 75 ft. tunnel, 7 ft. by 4 ft. dimensions, was excavated for the pitometer gallery.

Concrete was placed as follows :—

Foundations, 7,120 yards (including 6,020 yards for deep foundation work, of which 92·5 per cent. was completed).

Building superstructure, 400 yards in columns and walls and 120 yards in beams and slabs.

Tailrace floor, 190 yards.

Protective work on the cliff face was completed, a total of 3,535 ft. of holes being bored to take steel rods, which were grouted in position.

WAITAKI RIVER SCHEME.

At the commencement of the year covered by this report construction work at the dam and powerhouse was practically complete, only a few items requiring completion.

Several of the temporary sluices closed by temporary gates were successfully plugged and filled with concrete. The removal of temporary steel trestling and the cleaning-up and disposal of plant marked the closing stages of the work.

One item that has presented much difficulty is the closing of temporary sluices 9, 10, and 11. Here the gates which had been set in position to close the sluices and enable concreting to be carried out had overrun their positions and could not be restored. Remedial measures have been carried out under great difficulties, but I am now able to report that sluice No. 9 was successfully plugged and concreting is practically complete. At Nos. 10 and 11 the position is now under control, concreting is being carried out at No. 11, and similar procedure will be followed at No. 10 as the river stage allows.

CONSTRUCTION AND IMPROVEMENT OF ROADS AND BRIDGES.

WHANGAREI DISTRICT.

Bull's Road (Bay of Islands County).—5 m. 60 ch. was formed 16 ft. wide and metalled 9 ft. by 6 in. during the year.

Motatau to Maromaku Road (Bay of Islands County).—3 m. was metalled, and all settlers have good access to railway and dairy factory.

Opahi to McKenzie's Road (Bay of Islands County).—This road, 1 m. 49 ch. long, was metalled and bridging was completed.

Opua to Black Bridge Road (Bay of Islands County).—3 m. was metalled on this road.

Preston's Road (Bay of Islands County).—A length of 3 m. was formed 12 ft. wide, thus providing a short route from Waipapa to the railhead at Okaihau, and also facilitating the subdivision of an adjacent Government block.

Dargaville to Pukehuia Road (Hobson County).—3 m. 40 ch. was formed 16 ft. wide to serve a district which had been isolated as a result of the cessation of the cream-boat service on the Wairoa River. Metalling and bridging will follow.

Hoyle's Road (Hobson County).—2 m. 63 ch. was metalled, and all seven settlers have satisfactory access.

Mangarata to Arapohue Road (Hobson County).—5 m. 28 ch., which was widened to 16 ft. last year, was metalled, thus giving all-weather access to Pukehuia Railway-station.

Okahu Bridge, Lusk's Road (Hobson County).—A dangerous bridge was replaced by a modern structure of three 30 ft. spans in reinforced concrete.