

The work will consist of about 230 miles of races, involving 900,000 cubic yards of excavation, and there will be approximately 2,000 concrete structures for regulating the flow of water and passing traffic over the races.

The work was commenced in January, and up to date the work has been confined to the establishment of construction buildings and camp accommodation.

A camp headquarters is completed, and the following buildings have also been erected: Office, store, garage, carpenter's shop, fitting-shop, cement-shed, and forty-four married men's and ten single men's accommodation.

Machinery and material are coming to hand, and sixty men are now employed. This number will be increased to 145.

Downs Water-supply.—During the year legal and financial arrangements were finalized enabling portions of Levels, Waimate, Mackenzie, and Geraldine Counties to be brought within the scope of the Downs Water-supply Scheme, which will command 153,000 acres requiring 800 miles of pipe-lines to be laid to serve every property within the area with a domestic and stock water-supply.

Work was authorized in March last, and the erection of construction buildings and camp accommodation is well in hand. Camps have been established at Pleasant Point, and at the intake at the Tangawai River, where exploration work for the intake is in hand.

The survey of pipe-lines is in progress, and 41 miles of main line and sub-main lines have been laid out, and a contract has been prepared for the first 16 miles of main pipe-line.

Forty-seven men are employed at present, and construction plant is expected to arrive shortly. Work is expected to take three years to complete.

CANTERBURY IRRIGATION INVESTIGATIONS.

Topographical Survey.—Owing to the shortage of staff it was not possible to extend this work during the current year.

Stream-gaugings.—Continuous records were obtained from all installed stations during the year. Gauge-houses were erected and instruments installed at the following points:—

Hurunui River near Tormore.

North Ashburton River Gorge (including regulating weir).

An instrument-house was partly completed on the Ashley River near the Gorge.

Observations of the depth of ground-water were recorded regularly, and observations continued in regard to rainfall penetration.

Soil Moisture and Rainfall.—Observations of soil moisture and rainfall have been continued as follows: Ashburton County at fifteen stations, Levels County at four stations, Redcliffs Irrigation Scheme at eight stations.

Evaporation.—Records of evaporation, wind, humidity, and temperature were continued at the following stations with the following results:—

Station.	Evaporation to 30th June.	Wind Mileage.	Period.
Temuka	27.82	7364	1/7/37 to 30/6/38.
Blenheim	47.90	14474	"
Ealing	28.53	13877	"
Methven	43.80	31905	"
Pendarves	33.88	12865	"
Kirwee	40.76	32788	"

Rainfall Run-off.—The six long-period automatic rain-gauges installed in the North Ashburton River Catchment at elevations up to 6,000 ft. gave good records in all cases.

Sugar-beet Trials.—These trials were continued in collaboration with officers of the Department of Agriculture, and a report will be prepared by that Department.

MARLBOROUGH IRRIGATION INVESTIGATIONS.

Trial lines were run for a distance of 10 miles on the Wairau Plain from the confluence of the Waihopi and Wairau Rivers towards Taylor Stream, near the Blenheim Aerodrome.

Shafts were sunk in the shingle near the mouth of the Waihopi River to determine the suitability of this site for a percolation tunnel.

A stream-gauging station was completed on the Wairau River near Ferry Bridge, and a recorder was installed.

Observations were continued at thirteen soil-moisture and rainfall stations, and evaporation and wind observations were continued at Blenheim.

HYDRO-ELECTRIC DEVELOPMENT.

ARAPUNI SCHEME.

Work on the excavation of the tail-race was completed early in the year, and after tests the water was allowed to rise, the pumps withdrawn, and the needle dam demolished.