

trial proving satisfactory, contour plans were constructed and permanent location fixed for a distance of 1 mile 53 chains. This portion was pegged out, all necessary data obtained, and permanent plans made.

*Catlin's-Waimahaka (Catlin's End).*—With a view of ascertaining whether an improvement in the location already fixed could not be made at the crossing over the divide between the Catlin's and Pahapaka Rivers (over Table Hill), an extensive contour plan was made for a distance of about 7 miles. Rough alternative estimates were taken out for lines going over the summit, through the hill with a medium cutting, or through the hill with a tunnel. Of these, the first-mentioned was selected, thus avoiding the viaduct on the previously located line, and also the tunnel. This has now been pegged for a distance of 1 mile 30 chains, and all necessary data for permanent plans obtained. The work is being continued, and plans are in course of preparation.

*Orepuki-Waiiau.*—The country in the Waiiau Valley beyond Tuatapere was examined as far as the junction of the Wairaki, and a report on possible alternative routes, together with plans and rough estimates, prepared.

#### LAND-PLAN SURVEYS.

*North Auckland Railway.*—Complete land-plan surveys have been made from Wellsford, on the eastern route, 69 m. 19 ch., to Kaiwaka, 81 m. 40 ch.

*Gisborne-Rotorua.*—The land-plan survey from 26 m. to 32 m. is now practically complete, and the plans are being examined by the Chief Surveyor.

*Midland (Nelson End).*—Land-plans have been made of additional pieces of land required between 43 m. and 44 m.

*Gore-Waikaka.*—The preparation of land-plans of this railway was intrusted to a firm of private surveyors, and has now been completed.

*Catlin's-Waimahaka (Catlin's End).*—A contract for preparation of land-plans from 26 m. 65 ch. to 29 m. was let in March last to a private surveyor, who has now completed the work, subject to approval of Chief Surveyor.

*Riversdale-Switzers.*—Preparation of land-plans from 8 m. 30 ch. to 13 m. 70 ch. was intrusted to a private surveyor. Field-work is completed, but plans have not yet been delivered.

#### ROADS, BRIDGES, ETC.

*Alexander's Bluff Bridge (Motueka River).*—This bridge was completed in February, 1909.

*O'Sullivan's Bridge, Buller Road.*—Slow progress was made with this contract during the year, a great deal of the delay being caused through the non-arrival of hardwood timber. The balance of concrete-work on piers has been completed, all the trusses have been erected, and, except for the decking, the bridge is practically finished.

*Wairoa, Hawke's Bay: Road-bridge at Frasertown.*—A contract is in hand for this large bridge. For a long time it went on very unsatisfactorily, but lately, under fresh management, it has progressed better, and is likely to be finished by the end of October.

*Wataroa Bridge, South Westland.*—This bridge, which had been in hand for some time, was opened for traffic on the 12th March last.

*Wanganui Town Road-bridge.*—The scouring-out and deepening of this river rendered two cylinder piers dangerous, as they were originally only sunk to about the depth of the present river-bed. A party of men have been at work staging-up the bridge at each pier, sinking through the concrete inside these cylinders, and then excavating and sinking each cylinder some 30 ft. deeper. It has been a tedious and difficult undertaking, rendered more so by finding one cylinder badly broken below water-level; but it is now in a fair way to completion. The successful carrying-out of this work is largely due to the energy, perseverance, and resource of the officer in charge of the working-party.

*Culverden-Hammer Motor Road.*—With a view to improvement of the Culverden-Hammer Springs Road for motor-car service, the grades on both sides of the hill between the Waiiau and Hammer Rivers have been lowered from 1 in 9 to 1 in 14, and light timber bridges suitable for motor-car traffic have been built across the Hammer and Percival Rivers.

A road-deviation  $1\frac{3}{4}$  miles long has been formed, metalled, and fenced. The deviation commences about a mile beyond the Hammer River. River-protection works for this road have been completed at Hammer and Percival Rivers.

#### OTAGO CENTRAL IRRIGATION.

During July to mid-September no further survey field-work could be done owing to heavy snowfall and generally bad weather. The time, however, was occupied in plotting as far as possible the previous season's field-work. Since resuming field-work in September, 1908, trial lines for races have been surveyed as under, and rough cross-sections made:—

- (1.) Idaburn Dam towards Naseby, 11 miles.
- (2.) Idaburn Dam towards Gimmerburn, 7 miles.
- (3.) Idaburn Dam upwards to Manuherikia (intake race), 37 m. 54 ch.
- (4.) Idaburn Dam downwards to Dovedale Creek, 31 m. 37 ch.
- (5.) Dovedale Creek to Kirk's Creek,  $4\frac{1}{2}$  miles.