

Bridges.—Two bridges on the Awanui River were removed to allow dredges to pass through, and re-erected on completion of the dredging. A temporary bridge at the Mangatete Road crossing on the Whangatane spillway was removed, and a permanent structure erected when the roadway had been dredged, a road-deviation and temporary bridge farther down stream carrying the traffic meanwhile. One pile bridge was erected on the Whangatane spillway to give access to property severed.

The summary of the year's operations is as follows: Dredged channels, 4 miles 12 chains; spoil excavated by dredges, 159,443 cubic yards; spoil excavated by scoops, 24,500 cubic yards; new drains constructed, 2 miles 40 chains; drains deepened and improved, 4 miles 40 chains; drains cleaned, 10 miles; stop-banks kept in repair, 8 miles; pile bridges removed and replaced, 2; pile bridges erected, 2; landing-stage erected, 1; garage erected, 1.

The dredging in hand will be completed early in the ensuing year, and the floating plants will then have carried out all the work for which they can be used in this area. The principal works remaining to be carried out in addition to completion of the Whangatane spillway are deepening and extension of existing drains, removing willows from Kaitaia River and Tarawhakaroa Stream, completion of stop-banks, and erection of flood-gates.

Works Expenditure.—The total expenditure for the year as shown in the books at Auckland Office was £15,835, the principal items being day labour, £5,362, and piecework contracts, £3,468.

The local officer in charge is Mr. T. S. McMillan.

HIKURANGI DRAINAGE AREA (50,000 ACRES), WHANGAREI COUNTY.

The weather conditions throughout the year under review have been generally favourable for the prosecution of the river-control works in hand. The excavations were totally submerged by flood-waters on one occasion only in May, when works were held up for some weeks. During the year rain fell on 172 days, the total fall being 51.47 in. June was the month of greatest precipitation, with a fall of 9.85 in. spread over twenty-two days, and March the driest, with a fall of 0.72 in. spread over five days. In January there was a total fall of 8.95 in., but otherwise the weather conditions were exceptionally good from October till the end of the financial year.

The following is a summary of the main features of the year's operations:—

Excavating-machines.—No. 12 Bucyrus machine, equipped as a shovel, was engaged throughout the whole period on the rock-excavation of No. 3 diversion, the machine taking the whole cut in one face at grade depth. No. 13 Bucyrus, with drag-line equipment, was in the early part of the year engaged in removing the slip in No. 2 diversion, and for the remainder of the year was engaged on No. 3 diversion working the automatic skip in conjunction with No. 12 shovel. No. 14 Bucyrus was for the first ten months of the period engaged on excavation work (drag-line and shovel) on Nos. 3 and 4 diversions, and for the last two months of the period has been on drag-line work with extended jib on No. 1 up-stream diversion. No. 3 Priestman has been engaged throughout the period on the excavation of the main canal outlet for the swamp area in Block IV, Purua Survey District.

Wairua River Diversion.—These diversions at the rapids at Ruatangata are the key to the works and have first call on all available plant. Diversions 1 and 2 were practically complete at the end of last year. The slip in No. 2 diversion has increased in proportions, and still continues to creep. A considerable amount of spoil was removed from the toe during the year, but further work is still necessary. Floods will, it is hoped, remove all clay and silt deposit, and the rock boulders will be removed as they are bared. The floods during May caused considerable erosion in the by-pass at the intake to diversion 2, and large quantities of debris were washed into the cut. This has been removed, and the river is now flowing through the cut. The rock-excavation in No. 3 diversion proved most difficult work, and occupied the greater portion of the year. The full length of the cut was in the basaltic lava-flow. In parts the bottom grade lay under the flow, exposing the pug substratum, thus giving most unstable foundations for the shovel-track. The river was diverted through the cut at the end of the period, but a portion of the bar at the entrance remains, and will be removed shortly. No. 4 cut is located in deeper country and out of the line of the main lava-flow. Boulders were encountered in the surface excavations, but the substratum proved to be rubble and clay with "greasy backs." The top stratum has been removed and the river diverted through the cut. Conditions for scouring are favourable—the lagoon at the lower end forming an ideal silt-depositing ground—and the winter floods will now be used in opening out the waterway. Detail surveys are now in hand in connection with the flood spillway down the old channel, where the flood-carrying capacity can be considerably increased by grading the rock bars. The whole diversion is now open to the river-flow, and some slight benefits will result from this improvement in the flood-discharge capacity, but the maximum benefits will not be felt until the final grade depths are obtained throughout. A total of 70,575 cubic yards, over 80 per cent. of which has been rock, with the remainder rubble, clay, &c., have been excavated during the year on these diversions. In addition some 28,500 cubic yards of spoil from former work has of necessity been rehandled. Charging the whole cost of the excavations against the new work the unit cost for the year is 5s. 0.12d. per cubic yard.

Up-stream Diversions.—The excavation of No. 1 diversion was commenced in February last, and is being carried out by No. 14 Bucyrus, using a $\frac{3}{4}$ yard bucket and a 50 ft. boom drag-line equipment.

Dredge Cut, Block IV, Purua Survey District.—During the year No. 3 Priestman has been engaged continuously on the excavation of the main canal through this area. The work is located in timber country, with a hard yellow clay substratum which has proved difficult of excavation. For the period under review a distance of 117 chains was completed, a total of 77,514 cubic yards of spoil being moved at a unit cost of 7.89d.