

improved channel is 170 ft., the underwater bank slopes three horizontal to one vertical, and where the quantity of excavation is large a clear berm of 40 ft. to 50 ft. is required to prevent bank caving under weight of spoil delivered on river-bank. To meet these conditions the bulk of the material has to be excavated and transported 200 ft., and the machine is designed to do this in one operation. The machine has worked ninety-six days, and during that time has excavated 18,489 cubic yards at cost of 14·82d. per cubic yard, but for part of this period the machine was working without some essential equipment, as alterations had not been completed. During the last two months of the year when working-conditions were normal the output was 11,198 cubic yards and unit cost 9·70d.

No. 24 steam dipper dredge, after completing the Waitoa Canal in the Tahuna district, was early in April, 1929, towed down the Waitoa and Piako Rivers and across the Hauraki Gulf to Waitakaruru and commenced the construction of the Pouarua Canal. This canal discharges into the Maukoro Canal, and follows the boundary of the Hauraki West Drainage Board District. For the passage of the dredge up the Maukoro Canal it was necessary to remove one span of the main highway bridge at Waitakaruru and disconnect the water-supply mains. When commencing work on the new canal the dredge could only work at high water until a temporary dam was constructed to maintain stable water-level. Trouble with boiler delayed progress of dredge, and in February it had to be laid up while six rows of boiler-stays were renewed. This delay was unfortunate, as it was essential to reach a suitable place for the construction of another temporary dam and lower water-level in the completed canal before the winter, and with this end in view two shifts worked during March. The dredge advanced 4 miles 65 chains during the year and excavated 201·631 cubic yards at unit cost of 4·47d.

No. 28 Bay City drag-line excavator is the new light machine previously mentioned. It was received and erected on the works in March and worked eighteen days reconditioning a large drain on the Kerepeehi Block. Making allowance for the fact that the machine was new the output of 1,930 cubic yards at cost of 8·85d. per cubic yard is very satisfactory, and it is apparent that for service on light construction where heavier machine could not be profitably used this plant will fill a long-felt want. This machine was purchased with equipment for both drag-line and shovel work, and consequently there are innumerable uses to which it can be utilized on the Department's works. It is provided with caterpillars and McCormick-Deering tractor engine, and can develop a speed up to four miles per hour on suitable country. If this machine has to be transferred to other works, as is anticipated, then it can be loaded on to a railway truck, the only dismantling required being the removal of the jib.

CENTRAL DISTRICT.

The formation and metalling of 3 miles 30 chains of the Ngatea-Kaihere Road commenced in December, 1928, and was completed in October, 1929. A through metal surface was provided before last winter, but, owing to bad weather in May, the work had to be discontinued for four months.

The work carried out during this financial year comprised 32 chains of formation and 1 mile 33 chains of metalling, requiring 3,519½ cubic yards of metal, which was unloaded from scows at convenient points along the river-bank and carted with the Department's teams. 2 miles 7½ chains of the Kerepeehi-Kaihere Road was resurfaced during September and October, 1,146 cubic yards of surfacing-metal being used, and the road was graded and rolled for its entire length. The Hopai Road was reconstructed for a distance of 71 chains westward from the Ngatea-Pipiroa Road intersection. The original roadway, 33 ft. wide, has been widened to 66 ft., a new drain constructed on the northern side and existing drain on southern side widened. Several culverts were extended and water-supply main lowered preparatory to metalling.

Eleven sections in the Kerepeehi Block have been disposed of and twenty-three sections are being offered for selection in May, 1930. It was decided to metal a further 3 miles 57 chains of road in this block to give access to these sections. The work was commenced in October, supplies of broken metal being obtained by scows, and at the end of the period under review some 3,940 cubic yards of metal had been received and base course laid for a distance of 2 miles 54 chains. 2 miles 14 chains of the Awaiti Canal Western Embankment Road was re-formed and also 1 mile 33 chains of the Makumaku Road.

The camp established during the previous year near the Kaihere Ferry for men engaged on relief works for unemployed was reopened in June, and about twenty men employed until September planting 319 acres with flax, of which some 242,800 plants were used. With the area planted during the previous year the total area of flax-plantations is now 887 acres. About 700 acres of this area is alluvial swamp and on this land the planted flax is flourishing, but on the balance of the area, which is peat, results so far are not so satisfactory. Further unemployment relief works were undertaken in October, and about thirty men, with headquarters at the Kaihere Camp, have been engaged on drain-construction and other works in this neighbourhood. A considerable amount of drain-construction and other work has been carried out near Ngatea and Horahia in connection with the river-widening. 14 miles 11 chains of drains were cleared in this district, 32,998 cubic yards excavated by manual labour in the construction of 11 miles 31 chains of new drains, and 17,987 cubic yards excavated in widening and improving 7 miles 9 chains of drains. A new flood-gate was constructed at Rawerawe and also one at Kerepeehi. Sheet piling is being driven across the outlet of the two-barrel flood-gate at Pipiroa to stop seepage under foundations, and all outlet structures have received periodical attention.

Minor undertakings in this district include ring-barking of willows on the river-banks; spraying blackberries on and adjoining the flax-plantations; raising stop-bank on the Waikoura Stream with wheel scoop, and fencing this embankment; cutting fascines for roadwork; and cutting, hauling, and transporting by barge white-pine logs required for piles, earthwork, and general construction.

The depot at Kerepeehi is the centre at which all fuel, stores, and construction material are received and despatched to the various works by launches and motor-lorry.

The vehicular river-ferry service across the Piako River at Kaihere has been maintained throughout the year, the income from ferry fees being very little more than is required to balance expenditure.