

No. 6 diversion was practically completed during the period, some 34,110 cubic yards being excavated. There still remains the rock bar at the down-stream end, and some chains of soft mud where the cut is not down to full depth.

No. 7 diversion was commenced through the year. Up to the time that No. 13 Bucyrus had to be moved to Hikurangi to carry on with the Mangawhero Stream improvement work, most of the long toe at the top end and $1\frac{1}{2}$ chains of the cut were completed, entailing the excavation of some 3,500 cubic yards. Work will be recommenced on this diversion during next summer.

In March No. 13 Bucyrus was moved from the site of the No. 6 diversion to the Mangawhero Stream, and was ready to commence excavation in April.

No. 3 Priestman dredge, after leaving the Ngararatunua Canal, worked down the river, and several shallows were removed, and widening done as far as the reach of the machine allowed. Some little distance below Lewis's Bridge the river was very constricted, and widening was carried out there, and will be required at intervals all the way down the river. Approximately 31,250 cubic yards were excavated during the year.

Mangahahuru and Mangawhero Diversions.—Good progress has been made with the Mangahahuru diversion, 137 chains having been completed during the period under review. The cut is 45 ft. wide on top, and 30 ft. wide on bottom, with an average depth of 12 ft. 6 in. The adjoining country is now immune from floods. Before the work commenced every fresh in the stream caused flooding over the main road at McLeod's Flat, but now even the largest floods do not cause it to overflow its banks. A number of small severances were created. The largest severance is to have access by a bridge, as it comprises most of the flat area of the owner's farm. Early in the year the crew of the dredge on this work were placed on a contract basis, which resulted in a great improvement in the output. For the year 114,382 cubic yards were excavated from this diversion, at an average cost of 7·2d. per cubic yard.

Towards the end of November No. 26 dipper dredge commenced the excavation of the branch canal. This is a diversion of the Mangawhero Stream, which flows through Hikurangi Township. This Mangawhero diversion was carried up as far as the stream, a distance of 63 chains, and this point was reached at the end of February. From this point a drag-line will continue the work up through the township. This cut is 32 ft. wide on top, 22 ft. wide on bottom, with an average depth of 10 ft. One large severance has been formed, necessitating access being given by a bridge. The total excavation in the Mangawhero diversion was 42,110 cubic yards, at a cost of 9d. per cubic yard.

Okarika Diversion.—The progress of this work was greatly hindered by frequent flooding of the low land through which No. 12 Bucyrus drag-line was working, but by the end of the period the machine had crossed the Otakairangi Road and reached 0 m. 76 ch., covering a distance of 67 chains during the period. This cut has an average width of 50 ft. on top, 25 ft. on bottom, and an average depth of 10 ft. The country proved to be very "rotten," there being a clay surface underlain by peat. Two bad slips occurred near 0 m. 58 ch. and 0 m. 72 ch. respectively, due to the inability of the country to hold the spoil and to withstand the vibration of the machine when digging. The total quantity of spoil excavated by No. 12 drag-line during the period was 70,425 cubic yards, at the rate of 11·8d. per cubic yard.

A contract for the excavation of 3 miles 48 chains of hand drain up the Okarika Valley was let in December, and work was commenced early in January. To date 1 mile 72 chains have been completed. The lower end of this drain is intended to dry out the country ready for machine excavation. The Okarika Valley, which divides into two main arms, is all peat country, and by continual hand draining the peat will be consolidated.

There is a considerable area of Crown land in the Okarika Valley, some of which will be suitable for farming, and the remainder for either flax-growing or farming.

Otonga Outlet.—The Otonga arm of the swamp has been thoroughly explored during the period, and the main outlet located. The draining of this arm will have to be carried out by hand for some years, as the peat will have to be consolidated before it can hold a machine. The main-drain location runs from the river at the upper end of No. 11 diversion to the main North Road at Otonga. The swamp it drains is mostly peat, in some places of great depth, though in others it is shallow, and adjoining the river the country is solid. The peat is generally very firm, and should make good soil when drained and worked up.

Where the swamp narrows as it runs up to Otonga there is a creek which was full of water, and resembled a lagoon rather than a creek. Recently an underground subsidence took place under this creek, and the water drained the lagoon by running underground, and this contributed in a small measure to the flooding of the Hikurangi Coal Co.'s mine. The mine company sealed the subsidence, and the main drain to be put in by the Department was so located that the water will be diverted away from the site of the subsidence.

A contract was let for the construction of 10·5 chains of hand drain, and this has been completed. A further 2 miles 53 chains of drain will be put in hand shortly.

Ngararatunua Canal.—The cleaning of this canal was commenced in March, and by the end of the period 160 chains had been completed.

Summary.—The following is a schedule of some of the works completed during the past year: Dredge cuts cleaned, 2 miles; drains constructed, 2 miles 30 chains; dredge cuts constructed, 3 miles 36 chains; levels taken, 134 miles 37 chains; traverses run, 64 miles 27 chains; peat soundings, 391; river cross-sections, 559; pile bridge erected, 120 ft., 1; temporary bridge erected, 84 ft., on stone and netting piers, 1; buildings, additional room on office and chaff-shed, 2; spoil excavated by floating and dry-land excavators, 312,377 cubic yards; rock excavated, 10,600 cubic yards; stiff clay and rubble excavated, 231,352 cubic yards; soft clay and peat excavated, 70,425 cubic yards.