

have been working double shifts. As is always the case where much machinery is in use, a considerable amount of repair work is necessary. In the majority of cases we are able to effect repairs on the works, but at times parts have to be sent away to the larger foundries, and owing to the inaccessibility of the works this necessitates a good deal of time. Advantage is always taken of such delays to overhaul the plants, thus reducing lost time to a minimum.

During the year under review a total of 224,740 cubic yards of spoil has been excavated at a total cost of £4,252 19s. 4d., and an average cost of 4·54d. per cubic yard. This includes all charges—wages, supplies, repairs, &c.—and must be considered very satisfactory.

The work for the year, with the exception of that on the Tarawera River, has been through very difficult and disappointing country from a dredging point of view, consequently the progress made has not been quite as I would have liked. The trouble on the Kopeopeo outfall has been surface and submerged timber, and on the Omeheu work timber and sand. This latter work, lying as it did through waterlogged country, promised to be excellent dredging, but turned out to be the most difficult piece of excavation we had to deal with so far. Layers of fine sandy silt were met with throughout, and on top of this we met an exceptional amount of heavy timber-roots, mostly below water-level. These difficulties are much more than compensated by the results being attained.

In order to reduce maintenance costs later on it would be advisable to dredge the mouths of a number of the smaller outlet drains, especially where the fall is small and the country low-lying. Allowing for this, and before the scheme can be said to be complete, there is still some three years' work ahead of the dredgers.

RANGITAIKI RIVER DIVERSION AND IMPROVEMENTS.

As mentioned above, the success of the river-diversion has been quite up to expectations. The flood problem, which is the key to the whole situation, has not yet been wholly overcome; still, it is so far solved that floods are not now the same source of worry and anxiety as of old. The river is slowly but surely scouring its bed, and will continue to improve for several years to come. Assisted by the snagging of willows and general opening-up of the congested portions of the bed, this scour will leave the channel in state fit to carry all but exceptionally heavy floods. As stated previously, a certain amount of stop-banking will be required on the low-lying banks between Reid's and Kokohinau before the river can be considered safe. So far the mouth of the diversion on the sea-coast has not shown any tendency to wander.

TARAWERA RIVER DREDGING.

The conditions at the mouth of this river—*i.e.*, at its junction with the old Rangitaiki River—are much as they were at the inception of the works. A lowering of over 1 ft. was brought about when the Rangitaiki waters were diverted, but, as was only to be expected, this gain has now been overcome by the silting and consequent reduction of water-space in the Matata Harbour. The works in that vicinity are now well advanced, and the necessity of the diversion of the river out to sea at the junction is being felt. This would bring about a considerable improvement in the conditions of the lower Tarawera country, and it is hoped to have this work taken in hand, and is contingent upon certain important arrangements being first made and considered.

The Hammond bucket dredge which is at work on this river has during the year excavated a total of 72,530 cubic yards. A distance of four miles and a quarter of this river has now been straightened and put in good order generally. It will gradually scour its bed sufficiently low to prevent overflow and to a large extent cut out the seepage which is such a source of worry in the adjacent low-lying country. The dredge is now being transferred up-stream to the vicinity of the Hallett Estate, where a general straightening of the river is urgently wanted.

The position in the upper Tarawera is quite satisfactory. Some little trouble was experienced in getting the river to "take" through a cut-off just north of the main road. This was really a work for the dredge, but as it lay out of their reach the surface vegetation was stripped by hand and the river turned in to scour its own course. The country proved difficult to scour, and the river showed a tendency to keep to the old winding bed. By erecting and maintaining a groyne across the old channel the river has been successfully pushed into the new course.

AWAITI AND OMEHEU STREAMS DREDGING.

This has been a most disappointing work. The sandy silt deposits and the large quantity of timber met made excavation difficult and progress slow. In September this work was considered to be sufficiently far advanced to warrant the continuing of it in the meanwhile with scoop teams and hand labour, and transferring the dredge to urgent work on the Awakaponga outfall. Labour difficulties and wet weather delayed this Omeheu work to a large extent, but it is now well under way, and every effort is being made to push on with it. The work is a most important one, and affects a large area which is now being much developed. On completion of other urgent works, when a dredge can be spared, this dredging will be continued up-stream as far as considered necessary to ensure freedom from floods.

KOPEOPEO OUTFALL.

This work was commenced near the end of last year, and is now well in hand and progressing satisfactorily. The dredging has not been the best, as the country so far is comparatively hard and contains a fair amount of timber. Dredging, particularly to a settler located ahead of a dredge, is necessarily a slow operation, but with this work, as with the others, every effort is being made to push on with it and give the long-looked-for relief to the country beyond. Two shifts have been worked throughout the summer months on this dredge, which during the year has excavated a total of 77,420 cubic yards.

In order to hasten the work along, the water in this cut is being kept at top level by a dam and spillway at the mouth. The excavation is made deep enough to float the plant, and balance left to be taken out when the dredge is coming back.