

POUKAWA DRAINAGE AREA (13,567 ACRES), HAWKE'S BAY COUNTY.

The dredge pontoon has been inspected, and was found to be in fair order.

The rainfall at the site of the works was 32.27 in., which is slightly more than the average for the past seven years, which is 29.27 in.

The expenditure for the year was £111 10s. 4d., which was entailed in paying the wages of the caretaker and a few incidentals.

It is anticipated that within a few months' time it will be possible to transfer one of the dredges from other works to take up work on the Poukawa area. A dredge has already been selected for this purpose, and will be made available as indicated.

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

As during the previous year, all work has been confined solely to the diversion and the lowering of the Wairua River bed at the "Rapids." At the close of last year's operations No. 1 cut was completed by two of the machines, and the river was let through this diversion channel. Up to this time the third machine had been engaged on No. 4 cut, but very early in this period was moved from there preparatory to operating on No. 2 cut. During the present year the three machines have been engaged wholly on No. 2 cut. By means of this concentration the work has been carried forward systematically, and boiler-feed problems, access for repairs and renewals, and suchlike difficulties are lightened considerably. Unfortunately, some delay was encountered in making a fair start on this cut. This was primarily due to very necessary overhaul and strengthening (the outcome of work in hard country during the latter part of the previous year) of the excavating-machines. It took some six weeks to get the machines in good running-order again, and about the end of May they were moved over to the cut by crossing fords on the river.

No. 2 Cut.—During the previous year this cut had been stripped to an average depth of about 5 ft. over its length and breadth. Pending the arrival, on the site of the cut, of the excavating-machinery, at the commencement of this year it was found necessary to open up the cutting, driving in from the bottom lagoon, by means of barrow gangs. The machinery being in position, Nos. 13 and 14 machines excavated by means of drag-line buckets, using slings to hoist out the massive boulders. No. 14 machine, equipped as a shovel, was engaged wholly (chiefly in the river side, but also on the uphill side) in moving back the spoil-banks from the previous stripping, so as to afford necessary dumping-room. This mode of operation remained in vogue till the end of September. By this time No. 12 machine had moved over towards the river the whole of the spoil-banks on the river side, and also a good proportion of the spoil on the uphill side had been moved farther away. Nos. 13 and 14 machines had then reached a face at about peg 8c. At this chainage the face had lost its boulder formation entirely, and merged into a solid wall of rock stretching right across the cut and below the grade level. The direct consequence was that the face was shooting out far too rough to be handled by the drag-buckets. It was therefore deemed advisable to put No. 12, equipped as a shovel, in the bottom of the cut to load into skips to be hoisted out by the drag-lines.

When this latter scheme was instituted it was found necessary—owing to the reach of the 35 ft. drag-line boom being insufficient to take all the spoil on one side of the cut—to use both Nos. 13 and 14, hoisting from No. 12. The scheme was therefore further elaborated by means of fitting a 15 ft. extension to the jib of No. 14 machine, and by means of this all the spoil from No. 12 is being dumped on the river side. To perfect the scheme further, the skip that No. 14 is using has been rigged so that the driver can lower the skip to be filled by No. 12, hoist it up over the spoil-bank, and tip it—both operations being simply controlled from the driving-seat. This method, of course, frees No. 13 machine to work elsewhere. This machine has therefore been engaged—using the drag-bucket with slings for the heavy boulders—on the same cut, and ahead of the other two machines. To the end of the year No. 13 has met with very heavy going, encountering a large percentage of rock and boulders, but there is every indication that there is pug underneath once the top layer can be broken through.

At the end of the year the main face is at peg 14c, with a considerable amount of excavation done ahead of this by No. 13 machine. Between pegs 6.50c and 14c the material to be moved has been a solid wall of rock, except for a slight easing-up about peg 13c, averaging 15 ft. to 18 ft. in depth across the entire face. This solid wall of rock is likely to continue as far as peg 16.50c, and then drop into the heavy boulder formation. From the entrance of the cut in to peg 5c, on the uphill side, the wall of the cut has unfortunately slipped in badly: it is quite likely that the major portion of this slip will have to be excavated (which undertaking will not, I think, be at all difficult) before the river is turned through.

From pegs 5c to 14c the cut is being excavated about 1 ft. below the plan grade; between these chainages the rock floor of the cut has been well shattered for a depth of another 2 ft. After the water is turned through, with its attendant scouring-action, material assistance is expected (from the above provisions) in affording protection from flooding when the fourth cut is under way.

Excavating Plant.—In view of the extremely hard nature of the excavation during the latter two-thirds of the year, it is only to be expected that the wear-and-tear on the machinery has been very great. With outside assistance in getting castings, &c., and keeping our own fitting and repair shops going steadily, we have fortunately been able to keep up with the breakages and prevent any really serious breakdown of the excavating plant.

Drilling Plant.—During the latter part of the year it has been necessary to keep three, and sometimes four, of the air-compressors daily in action for drilling on the main face. In order to shoot out the face at all successfully it has been necessary to put in 12 ft. holes, both vertical and