

No. 31 *Light Ruston-Bucyrus Drag-line Excavator* commenced work in February, 1940, at Factory Road, and, working up-stream on the right bank of the Tarawera River, has completed 72 chains of stop-bank improvement. On this reach the ground-level is in places about 6 ft. and 3 ft. respectively below the high- and low-water levels of the river, and in the past the bank has been breached by seepage through and under it. To meet these conditions, a banquette, extending in places over 100 ft. from the water edges, has been constructed along the inland toe of main stop-bank. This 40 ft. boom excavator has constructed both stop-bank and banquette without double handling material in two operations. The machine first extends the base of the original stop-bank to form a track on which it moves to construct the banquette with material excavated from the existing stop-bank spread to the full reach of the boom. For the second operation the path of the excavator is in nearer the river and the main stop-bank is built with material removed from the bed of the stream. The machine excavated and placed 60,800 cubic yards of material in 67 chains of bank, which is a very good performance for the operating conditions.

No. 32 *Light Ruston-Bucyrus Drag-line Excavator* has been employed widening and deepening Seccombes and Edgecumbe Catchwater Drains near Te Teko. The soil in which these drains are excavated is light, coarse pumice sand, and special methods had to be adopted to prevent excessive erosion of the drain banks during construction. This retarded progress. Using a bucket of $\frac{3}{8}$ -cubic-yard capacity, this machine handled 34,600 cubic yards.

DRAINS AND FLOOD-GATES.

The drainage-work has been principally reconditioning and maintenance of ditches. One drain reconstruction undertaking requiring 66,000 cubic yards of excavation is nearing completion. This is the enlargement of the Edgecumbe Catchwater Drain, which is being carried out to provide drainage for the Putauaki Native Block.

The triple flood-gate outlet for the Orini Stream, which was completed last year, was put into commission after the stream had been diverted to a new channel connecting with the flood-gates and the old channel closed with a substantial filling.

The Department maintains 158 miles of canals and drains, and the total length of the drains constructed in the district to date is—

	Miles.	Ch.
Dredged canals	68	43
Main drains	121	36
Road drains	31	2

The work of removing the willows from the banks of the lower reaches of the Rangitaiki River was continued when a heavy tractor became available for hauling and 98 chains of river-bank was cleared during the year. The river-banks have recently been cleared of willows between Thornton and Edgecumbe. Above Edgecumbe the right bank has been cleared for a distance of 110 chains and the left bank 72 chains. This type of river improvement gives the greatest return for the expenditure, and considerable improvement in the efficiency of the river channel has been effected.

The mouth of the Rangitaiki River moves eastwards, and periodically a direct outlet to the sea has to be restored by excavating a channel through the sandspit which forms across the mouth. The last time this was done was June, 1938. Since then the eastward movement has been considerable, and advantage of the first favourable opportunity must be taken to reopen the mouth giving the river a direct approach to the sea.

TARAWERA RIVER.

The progress made during the past four years of work on the Tarawera River stop-banks will ensure that the strengthening of the right stop-bank will be completed in 1941. Similar reconstruction of the existing stop-bank on the left bank of the river and up-stream from the railway bridge is strongly recommended. Temporary repairs were carried out during the winter of 1938, when this stop-bank was breached in two places, but the whole bank is in a dangerous condition. Because the low-water level of the river is above the level of the surrounding land, a serious break in this bank might cause the river to change its course and the result might be the interruption of road and rail traffic in the district and the loss of stock.

SUMMARY.

The principal works carried during the year are summarized below :—

	Miles.	Ch.	Excavation. Cubic yd.
Drains cleaned by manual labour	7	40	..
Drains and canals cleaned with weed-cutting launch ..	15	74	..
Drains widened and deepened by manual labour ..	1	8	2,632
New drains constructed by manual labour	36 $\frac{1}{2}$	1,550
Drains and canals improved with excavators	7	1	93,000
New drains constructed with excavators	20	6,100
Stop-banks reconstructed or repaired with excavators ..	2	..	107,300
River-bank cleared of willows	1	18	..

The number of men employed on the works has varied between sixteen and twenty-five, together with a number of contractors engaged on seasonal drain-cleaning work.

	£	s.	d.
Net maintenance expenditure	8,610	5	8
Rates struck—	£	s.	d.
Special	10,648	19	1
General	7,156	2	3
Rates collected—			
Special	10,843	8	1
General	7,642	17	6

I have, &c.,

R. L. INNIS,

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The Under-Secretary for Lands, Wellington.