

Flat, and a distributary race has been cut for a distance of 30 chains. A considerable amount of water was used by the Ida Valley settlers during the irrigation season.

MANUHERIKIA—ALEXANDRA—CLYDE SCHEME.

The intake tunnel has been driven a total distance of about 17 chains during the year, the distance between the headings being now about $7\frac{3}{4}$ chains. Suitable labour has been scarce, and progress consequently slow. Difficulty has also been experienced with the power plant, which was only a makeshift, and eventually, the power plant having been destroyed by fire, it was decided to discontinue the use of air-drills altogether. Very little work has been done in race-construction. Survey and plan work has been continued throughout the year.

BENMORE RUNS.

At the request of the Lands Department a race is being constructed to irrigate certain sections in the Benmore Runs. The work comprises $4\frac{3}{4}$ miles of water-races, with fluming, &c., and is practically completed.

Progress on this and other irrigation works has been hampered to some extent by the very severe weather experienced during the last month or two.

WAIHOU AND OHINEMURI RIVERS IMPROVEMENT.

This work has been continued throughout the year as rapidly as present conditions permit, but before satisfactory progress can be made additional dredging and other plant must be obtained, and this is impossible until after the war.

Dredging.—The excavation of the Ngararahi Cut was completed throughout to a width of 80 ft. and a depth of 12 ft., the length of the cut being 63 chains. The dredge was then thoroughly overhauled and set to work in the Ohinemuri River, pumping sand and mining silt to form the Paeroa—Thorp's Bend stop-bank, the length of bank completed being 45 chains, of an average height of 8 ft., the width on top being 20 ft., and the side slopes 3 to 1. After removing some shoals which were obstructing navigation on the Waihou River, the dredge proceeded with the widening of the Ngararahi Cut to 108 ft., working from the lower end. This work was suspended in May last, and the dredge commenced pumping material to form the Puke—Ngahina stop-bank.

Paeroa—Thorp's Bend Stop-bank.—This is practically a continuation of the Paeroa stop-bank, and is designed to protect the Town of Paeroa and suburban lands from the river-floods. In addition to the length constructed by the dredge, about 12 chains have been completed by petty contract, the remainder, to link up with existing work at Paeroa Railway Bridge, being now in hand. The construction of this bank in a populated area has involved a great deal of negotiation and correspondence with private owners over access roads, tramways, gates, and approaches to houses. Temporary roads and bridges were required, and much incidental work which is not apparent when the whole is completed.

Upper Waihou Stop-banks (Left Bank).—A length of 2 miles 50 chains has been under construction, and is approaching completion. The work has been greatly hampered by an abnormally wet season and consequent floods in the river. Three large flood-gates have been constructed on this section.

Manning's Flood-gate, Mangaiti.—This work, which is designed to protect against floods an area of 200 acres, was completed during March last.

Ngahina Wharves and Goods-sheds.—These works, which were built by the Department to meet the requirements of the district, already require extension, and a contract has been let accordingly, but little progress has yet been made. An office has been built for the wharf staff, as well as some minor works done.

Tirohia-Rotokohu Drainage.—This is a special drainage area included in the Waihou and Ohinemuri Rivers district. A very considerable amount of survey-work was carried out, and a drainage scheme was outlined. Co-operative parties commenced the excavation of drains in February, 1918, and so far nearly 3 miles of surface drains have been cut, but the work is greatly hampered by the frequent flooding of the area by the river, while the large quantity of buried timber makes excavation difficult. Some of the work to be done in this block is quite unsuitable for ordinary hand labour, and an attempt was made to import an excavating-machine, but the price was prohibitive and delivery uncertain. An endeavour is now being made to devise some appliance that can be manufactured locally.

Waihou—Awaiti Canal.—At the request of several local authorities surveys were made and a report, with plans and estimates, was prepared in connection with a proposal to construct a navigation canal connecting the Waihou and Piako Rivers. This will be an undertaking of some magnitude, the cost of the canal by the least expensive route being estimated at about £22,000, but it would be fully justified by the saving to the settlers along the Piako and its tributaries in the carriage of their dairy and other produce to the factory and railway at Paeroa. At present the launches have to descend the Piako to its mouth and proceed across open water at the head of the gulf, then ascend the Waihou to the factory or other place of delivery. This canal is not a part of the Waihou and Ohinemuri Rivers scheme, but is closely related thereto.

Tidal Records.—For the purposes of the rivers-improvement scheme it is necessary to obtain very full and accurate information regarding the tidal flow in the lower reaches of the rivers. For this purpose four automatic tide-gauges are being established, and connected with each other and with the general survey-work by a series of precise levels referred to permanent bench-marks. This levelling is now being carried out.

Surveys.—In addition to that mentioned incidentally in the foregoing paragraphs, a great deal of survey-work has been carried out. The Tirohia—Ngarahi stop-bank (right bank) has been set out and levelled, and cross-sections have been taken for a length of $4\frac{1}{2}$ miles. A land-