

The 110 kv. and 50 kv. lightning-arresters were complete, the 50 kv. oil circuit-breakers assembled and the 50 kv. air-break switch-gear nearing completion. Of the 110 kv. air-break switch-gear the steelwork and all switches have been erected and bus-bars strained up. Final connections are now being made. The erection of the 110 kv. oil circuit-breakers is now in hand.

The seven 110 kv. transformers have been transported to site and placed in position on their foundation pads. Drying out of these transformers will be put in hand as soon as they can be handled by the 50-ton crane in the transformer-house. The 50 kv. transformers are also on site, being stored near the unloading-crab until they can be dried out and placed in position on their foundation pads.

Five oil-storage tanks have been erected on a pad outside the transformer-house, and oil bus-pipes and oil-level indicators connected to them. An oil-filter house has been erected, a 12 in. oil-filter press set in place, and oil-pipes run from same to the oil-storage tanks.

From the main generating-station to the outdoor station a cable-tunnel is now in course of construction, a double tunnel being run from the power-house to the 110 kv. transformers, and a single tunnel from that point to a point opposite the 50 kv. switch-gear. At the end of June the single tunnel, 129 ft. in length, and 312 ft. of double tunnel had been completed.

To provide a storage area for the subsequent lower development an earth dam is to be constructed across the Kahutangaroa Stream, which will serve as a tail-race from the station now under construction. Excavation for the earth dam has been taken down to an impervious layer of clay, 1,660 cub. yd. being removed. Concreting of the culvert through the dam is now being put in hand.

Provision has been made for the accommodation of the permanent operating staff. In addition to the two cottages erected when the temporary scheme was installed, twelve five-roomed and six three-roomed cottages have been erected. Quarters for single men containing seven bedrooms, besides conveniences, have been built. A staff hostel, containing dining-room, recreation-room, visitors' bedrooms, and cook's quarters, has also been erected. All these buildings have been connected to the permanent sewerage, drainage, and water systems.

At Wairoa the unloading-store has been completed and equipped with 30-ton and 10-ton cranes. At present stored there are the first generator and parts of the first turbine, 11 kv. switch-gear and control gear, 500 kv.a. service transformer, transformer-oil, storage battery and booster, and various small items for the main generating-station, in addition to transformers for the Wairoa Substation.

At the Gisborne and Wairoa Substations a start has been made with the concreting of foundations for transformers and switch-gear.

Timber required for the many operations connected with the scheme has been cut at the Department's sawmill. For the year ending 30th June approximately one million feet were cut, making the total since the Department took over the mill of 2½ million feet.

The temporary generating plant, which was leased to the Wairoa Electric-power Board, was taken over by the Department on the 1st January, on the expiration of the Power Board's lease. This plant has operated very satisfactorily throughout the year, coping with all demands made on it.

#### MANGAHAO.

*Mangaone Section.*—The principal work carried out on this section during the period has been the general maintenance of road-surfaces, repairs to bridges, and culvert replacement on the length of road between Shannon and the No. 3 dam, and the regulation and enlargement of the Mangaone Stream to enable it to carry the additional tail-water from the power-house without causing erosion or flooding. On the lower section of this stream, which acts as a main drain for the adjoining properties, it was found that the power-house tail-water caused a rise in water-level, resulting in the submergence of the outlets from several of the private drains where they entered the main stream. In order to remedy this difficulty, the lower channel has been straightened and deepened, 31,000 cub. yd. of material having been excavated by means of a floating dredge with successful results. In the upper portion of the stream a number of stone groynes were built and other protective measures adopted to cope with the erosion which has taken place recently. It is not considered that this erosion is wholly due to the increased flood flow, but it was, however, anticipated that there would be enlargement of the normal channel, and stability under the new conditions should be obtained very shortly.

*Mangahao Section.*—At No. 1 dam the lifting-mechanism controlling the siphon-tower port-gates and the new type of lateral gate-tighteners have been fitted and have proved fairly satisfactory. Two 60 ft. steel truss foot bridges between the towers have been erected and the temporary suspension bridge dismantled.

The shaft-control houses at Arapeti and No. 1 dams, together with the footbridges, have been painted. At No. 3 dam all construction work has been satisfactorily completed. The major portion of the concrete-work at the dam proper was carried out prior to Christmas, 12,006 cub. yd. of concrete being placed, which, in addition to that placed during last period, gave a total of 37,589 cub. yd. The rock excavation and trimming involved 28,385 cub. yd., of which 6,014 was taken out during the current period.

As it was desired to bring the dam into operation at the earliest possible date, three shifts were worked regularly until December. In order to enable the permanent gates to be placed on the diversion-tunnel it was necessary to fit temporary wooden gates, behind which the excavation and concreting of the tapered section and the installation of the permanent gates was carried out. The 4 ft. steel culvert and Johnston control-valve was fitted and concreted in the bottom of the dam, a section at the centre having been left open to take care of floods in excess of the capacity of the diversion-tunnel. After the placing of the steel culvert this section of the dam was successfully concreted without any difficulty.