overhauled and transferred to Edgecumbe and Waiotahi Substations. Preparations are in hand for the extension of the building at Waihou to include a workshop and crane. A new steel structure is on order, and the substation will ultimately be remodelled on the lines of Kerepeehi and Matamata Substations.

Kerepeehi (50/11 kv.).—The erection of the permanent substation equipment was commenced in April, but work was delayed owing to bad deliveries of materials. The transformers (four 750 kv.a.) were transported by rail to Thames, and by punt and launch across the Gulf and up the Piako River to Kerepeehi on the 3rd October. As supply was already being given to the Power Board through the temporary substation, the whole of the new gear was completed before changing over on the 17th December. The temporary substation was dismantled and final cleaning-up completed in January.

Grand Junction (11 kv.).—Two new 625 kv.a. 400/11,000-volt transformers were installed to complete two three-phase banks. These, together with two new 11 kv. O.C.B.s, enable both generators to supply their full-rated kilovolt-amperes into the system. The older turbine was fitted with a new rotor, and the station was made ready to take full load during July. Improvements were made to the station-lighting and various electrical overhaul work was done, the construction gang finally leaving in the middle of August.

Ngongotaha (50/11 kv.).—The outdoor 50 kv. wood-pole structure was altered and extended to provide an air-break switch and terminal structure for the extension of the 50 kv. transmission-line to Edgecumbe and Waiotahi.

Edgecumbe (50/11 kv.).— A temporary wood-pole substation structure was commenced on the 11th May with transformer and outgoing line, 50 kv. A.B.S., 750 kv.a. transformer-bank on temporary foundations, and oxide-film lightning-arrester. This was put into service on the 29th June, and supplied the local load as well as some Waiotahi load, which was fed at 11,000 volts over the 50 kv. line. To improve voltage conditions a temporary building was put up and an induction voltage-regulator installed to boost the voltage over the 50 kv. line. This was put into service in October. The construction of the permanent substation started in September, and the indoor switch-gear was put into service on the 12th December. The outdoor 50 kv. switchgear was not completed until early in June, when the transformers were moved to their permanent position and the substation finally put into operation all on permanent equipment. A graded resistance lightning-arrester from Waikino was installed, and the oxide-film arrester moved to its permanent position at Waiotahi. The transformers at this substation are from Waihou, and are connected delta-delta with a neutral earthing reactor.

Waiotahi (50/11 kv.).—Construction work was started in November. The substation is similar to Edgecumbe, but the steel structure is simpler, and has only one air-break switch mounted on it. The transformers which had been in service at Waihou were thoroughly overhauled at Hamilton No. 1, and were railed to Auckland and shipped to Opotiki, from whence they were transported nine miles by road to the substation. The substation was finally completed and put into service at 50 kv. on the 9th May, 1929.

Matamata (50/11 kv.).—This substation is required by the Thames Valley Power Board to improve voltage conditions in the Matamata area, where the load had grown too heavy to be efficiently handled from Horahora and Waihou at 11,000 volts. The old 50 kv. steel-tower line has been diverted on two new galvanized-steel angle towers, fitted with wooden top cross-arms with double-pin insulators and connected through the top of a steel structure. Construction work started in October, and was practically complete by the end of May, 1929. The substation will not be put into service until the new transformers are installed at Horahora to replace those damaged in the fire in September last.

Huntly (50/11 kv.).—This substation is being provided to give a second point of supply to the Central Power Board, whose lines, at present fed at 11,000 volts from Hamilton No. 1 Substation, are too long to serve the northern areas adequately. A start on construction was made in March, and the substation is expected to be complete by the end of July, 1929.

Henderson (50/11 kv.).—The 1,000 kv.a. three-phase transformer that was in service at Kerepeehi was overhauled and transported to Henderson, where it will be installed as soon as a new air-break switch which is now on order arrives and can be erected.

Operation and Maintenance.

Headworks and Power-station, Horahora.

Inspection after emptying the race on the 20th May showed practically no more sand had accumulated in it in two months. The amount of sand and debris in the river caused a fair amount of trouble during the year, but it interfered very little with power-supply. Fifteen new runners (out of twenty-four total) and fourteen new guide-wheel castings (out of twenty-four) require replacement, and new ones have been ordered.

The roller-train of the non-automatic gate in the weir had several rollers broken on it, probably as a result of its being blocked up with rubbish, and the gate could be operated only with a lot of difficulty for most of the year.

Screen-scraping has been necessary continuously throughout the year, as many as three men per shift being required at times.

Two failures of condenser-bushings on the Waikino line oil circuit-breaker in February and the breakdown of the local service transformer in March were the only failures of electrical apparatus during the year.

A small motor-driven pump was installed near the Pokaiwhenua Stream to enable water-supply for the transformers to be taken from that source when necessary.