

applies to other sizes of towers. Considerable difficulty and expense was incurred in building special foundations in the swamps on parts of the route.

Bombay-Waikino 50 kv. Wood-pole Line.—This line has been under construction by contract throughout the year, the position at the end of the year being as follows: 597 poles erected out of a total of 607; 584 poles wired out of a total of 607; two towers out of five erected. The five towers are at crossings of the Waitakaruru Canal one, Piako River two, and Waihou River two. These were necessary to provide clearance for navigation, and in the case of the Waihou River special foundations (piles and concrete) were necessary owing to the soft ground.

Arapuni-Horahora Section of Arapuni-Penrose 110 kv. Pole Line.—This line has been constructed and put into service in stages as required: (1) Hamilton-Penrose, completed 1925; (2) Hamilton-Horahora, including two miles of temporary wood-pole line to complete the connection from Horahora; (3) the Arapuni-Horahora section has been completed during the year except for erecting and wiring of two 40 ft. strain towers.

Survey Ngongotaha-Opotiki Line (50 kv.).—The survey of this line was commenced during the year, the general route decided on, and the pole positions pegged on thirty-four miles out of a total length of about sixty miles. The line is due for completion in June, 1928.

Substations.

Penrose (110 kv. to 22 kv. and 22 kv. to 50 kv.).—Construction work has been in progress throughout the year, comprising excavating for synchronous condensers, construction of blacksmith's shop, construction of new oil-store and conversion of old oil-store into a machine-shop, fitting up tanks and piping of oil-store, construction of garage, construction of foundations for 50 kv. transformers, erection of switch-gear for temporary supply to Waitemata line, construction of drying-oven for large transformers, and drying-out of 22/50 kv. transformers, and assembly and erection of the 110 kv. switch-gear and structure. A garage building was erected during the year.

Bombay (110 kv. to 50 kv. and 50 kv. to 11 kv.).—Transformers (110 kv. to 50 kv.) arrived for this substation during the year, and are at present stored in the Auckland Harbour Board sheds and at Penrose. The temporary 50 kv./11 kv. substation has continued in operation throughout the year, supplying the Franklin Power Board.

Hamilton No. 2 (110 kv. to 50 kv.).—The site for this substation has been selected, and the incoming and outgoing 110 kv. lines arranged to fit in with it.

Hamilton No. 1 (50 kv.).—A new bank of transformers (three 500 kv.a.) was ordered to provide for growth of load. Additional switch-gear was installed to provide for supplying Hamilton Borough over their new underground feeders. These two feeders take the place of one overhead circuit on the Department's poles. This circuit was taken over from the borough by the Department, and is now used by the Central Power Board, giving them three outgoing circuits. The Central Power Board metering was rearranged to provide for these three circuits. The new Hamilton feeders were put in service on the 20th and 28th January, 1927. A new 50 kv.a. transformer for local service was installed.

Hangatiki (50 kv. to 11 kv.).—This substation was completed and put in service during the year, supplying the Waitomo Power Board. It consists of three 250 kv.a. single-phase transformers with a spare, together with the necessary 50 kv. switch-gear (outdoor) and 11 kv. switch-gear (indoor, ironclad type), with one house for the operator-lineman.

Takapuna (50 kv. to 11 kv.).—This substation was put in service during the year, supplying the Waitemata Power Board. It consists of two 1,000 kv.a. three-phase transformers, with provision for extension, with outdoor 50 kv. switch-gear, and indoor 11 kv. switch-gear in concrete cells, and with one house for the operator, and oil-store. Owing to delay in arrival of the 50,000 v. steelwork and switch-gear, temporary connections had to be put in to give supply to Henderson (Waitemata) 50 kv. to 11 kv.

Henderson (50 kv. to 11 kv.).—This substation was put in service during the year, supplying the Waitemata Power Board at a point about three miles north of Henderson. It is similar to Takapuna, except that there is one 1,000 kv.a. transformer instead of two, and the 50 kv. switch-gear is arranged to provide for supply to a line to North Auckland. Owing to delay in arrival of the 50,000 v. steelwork and switch-gear, temporary connections had to be put in to give supply.

Mamaku (50 kv. to 11 kv.).—Provision had been made for erection of a small substation at Mamaku during the year, of 150 kv.a. capacity. Owing to delay in arrival of the transformer, the substation only was completed by 31st March, 1927.

Waihou (50 kv. to 11 kv.).—An additional transformer-bank was installed, increasing the capacity to 1,500 kv.a. This was put in service on the 19th May, 1926. A new total-supply metering-panel was installed. A small store building was erected. Check metering-panels were installed by the Power Board.

Te Awamutu (50 kv. to 11 kv.).—The temporary connections to supply the Waitomo Power Board at 11,000 v. were removed, and the necessary connections made and air-break switches installed to supply the line through to Hangatiki at 50 kv. This was put in service on the 24th February, 1927.

Ngongotaha (50 kv. to 6.6 kv.).—A new 50 kv.a. local-service transformer was installed, and has since been re-erected by the Tourist Department, Rotorua, nearer the centre of the load in Ngongotaha. A small store building was erected.

General.—Small battery-charging rectifiers were provided at all important substations, principally for the transmission-line breakdown equipment; also, frequency meters were installed at Horahora, Penrose, Waikino, and Claudelands.

Future Substation Work.—Arrangements are well advanced for completion of Penrose, Bombay, and Hamilton 110 kv. substations; for the erection of new 50 kv. substations near Rangataiki and