

Designs were advanced sufficiently to enable tenders to be called for transformer-banks at Mauntatapere, Bombay, Hawera, and Haywards; switchgear and steelwork for Maungatapere, Bombay, Upper Takaka, and Stoke; O.C.B.s 220 kV. air-break switches and synchronous-condenser at Haywards; E.H.T. control board for Invercargill, Stoke, and Upper Takaka; and a synchronous-condenser and metering-equipment at Stoke.

Detailed design work was well advanced for Otahuhu, Bunnythorpe, Half-way Bush, and Invercargill Substations.

Increase of transformer-capacity was planned for Kaikohe, Te Awamutu, and Huntly.

Arrangements were made for the installation of two 1,500 kVA. synchronous condensers at Kaitaia to improve voltage on the North Auckland 50 kV. system. After trouble with the existing 11 kV. switchgear at Henderson and Takapuna Substations, it was decided to modernize the equipment, and quotations were called.

Major extensions were planned at Penrose, and tenders were called for a transformer-bank, regulating-transformers, and a current-limiting reactor. Plans were advanced for part replacement of switchgear and for new metering-equipment for Auckland Electric-power Board supply.

Quotations were obtained for modification of some 11 kV. switchgear ex Hamilton to be made suitable for use at Edgecumbe and Lichfield.

Modifications and extensions to existing 11 kV. switchgear at Hawera were investigated.

At Half-way Bush arrangements were made for the temporary installation of a 15 mVA. transformer-bank until the two 20 mVA. banks on order can be installed. This enabled the Dunedin City Council to take up to 25 mVA. from the system as hydraulic conditions permitted, thereby allowing for storage in the Mahinerangi Dam to be increased.

*Communications.*—Prototype walkie-talkie type radio transceivers were made available for transmission-line construction purposes and proved very satisfactory. Base-station radios were installed and used in conjunction with mobile and walkie-talkie type transceivers. These provided adequate service for normal traffic and line-gang control during the overhaul of the Henderson-Kaitaia telephone circuit. Extensive field-work was carried out for the ultimate provision of a mobile radio service in Southland, while radio equipment ordered for emergency stations at certain South Island power-stations came to hand and is being installed.

The installation of three-channel carrier telephone systems between Khandallah-Bunnythorpe and Bunnythorpe-Claudlands was completed, and installation of a similar system between Claudlands and Penrose put in hand. This necessitated exhaustive line and terminal tests, and provision was made for the inclusion of twelve telegraph channels in the same systems. Initial work was carried out for the installation of single-channel carrier systems between Napier office - Tuai and Gore-Invercargill office.

Detailed design and layout drawings of communication equipment were prepared for a number of substations in both Islands. Supervisory control-equipment was installed for the control of Roskill Substation from Penrose Substation. Basic planning for the provision of a comprehensive telemetering system for load control was commenced and some equipment ordered.

*Protection.*—Compilation of data for protective relay installations throughout the North and South Islands was completed, and as a result, co-ordination of transmission-line relay settings for the North Island was put in hand. The South Island is to be similarly considered.