Communications.—Up-to-date telephone switchboards similar to those installed at Bunnythorpe and Penrose Substations were planned for Hamilton, Addington, and Arapuni. Provision for special load dispatch arrangements is being made for Hamilton and Addington.

In the North Island two further single-channel carrier systems are to be installed to provide an extra noise-free channel between Arapuni–Waihou and Penrose–Maungatapere. The Napier–Tuai single-channel carrier system was installed to improve communications in the Napier district, and planning for the communications network for the Waikato projects proceeded.

The installation of the Addington–Waitaki single-channel carrier system should bring the South Island communication network up to the required standard.

The installation of an up-to-date radio network was completed to provide a standby communication system from Addington load dispatch to the main stations in the Christchurch district.

A number of modified "walkie-talkie" sets were made available to facilitate the construction of transmission-lines in difficult country and to provide assistance in other work.

Relay Protection.—Considerable attention has been paid to loading and voltage regulation conditions for the transmission systems in various parts of both the North and South Islands. Calculations are required in connection with present operating conditions and the future planning of transmission systems.

Changing conditions have made necessary short-circuit calculations to determine the rupturing duty for oil circuit-breakers at numerous places. Other short-circuit calculations were made to determine the induced voltages where proposed power-lines will run in proximity to the communication circuits of the Post and Telegraph and New Zealand Railways Departments.

Investigations were made to determine the most suitable protection methods to be employed, in special cases, for large power transformers.

Determination of proposed relay settings and schemes for different districts were worked out and partly implemented, and an alteration to the protection at Arapuni was nearly completed.

Analysis of relay operations continued, and the action taken when incorrect operations occurred resulted in a special investigation into the operation of gas-accumulation relays used for the protection of transformers.

It was decided to conduct in the field a short-circuit test on an old type of 110 kV oil circuit-breaker. This necessitated considerable investigation to determine the best method for conducting the test and interpreting the results.

Further work was done on the D.C. network analyzer and tenders will be called for its manufacture.

(c) Transmission Section

Contracts were placed in New Zealand for the steel towers for the second 220 kV. circuits on the Whakamaru–Otahuhu and Whakamaru–Bunnythorpe lines and for the 66 kV. double circuit line Islington–Papanui, in Great Britain for the steel-cored aluminium conductors for these and other lines, and in Canada for insulators for a number of lines. The placing of a contract in Great Britain for toughened-glass insulators for the Oamaru–Dunedin 110 kV. second circuit will inaugurate the first large scale use in New Zealand of this type of insulator on main transmission-lines.

Regular inspection was continued of steel towers being manufactured by New Zealand contractors for the first 220 kV. circuits from Whakamaru to Otahuhu and to Bunnythorpe and for the 110 kV. double-circuit line from Henderson to Maungatapere. The first-mentioned contract is about 90 per cent. complete, the latter about 20 per cent. Mechanical tests to destruction were carried out on one of each of the four types of towers in the Henderson–Maungatapere contract, the results being highly satisfactory.