There are a number of poles that are sound, but the section of heart timber is considerably reduced, and it is probable that a large proportion of these will be changed during the ensuing year.

"Live line" testing was again carried out with the following results:—

66 kv. and 110 kv. Insulators:—

Number tested—	
Pin type	15,091
Suspension type	52,685
Strain type	15,968
Defective—	
Pin type	75
Suspension type	113
Strain type	104

Of the above 83,744 insulators, the percentage defective is 0·35.

33 kv. Insulators:—

Number tested—	
Pin type	4,166
Suspension type	99
Strain type	880
Defective—	
Pin type	38
Suspension type	0
Strain type	6

Of these 4,166 insulators, 1·06 per cent. were defective.

(d) Testing.

Apart from the duties imposed on this branch by the widespread construction, the usual routine maintenance was carried out on oil-circuit breakers, transformers, relays, batteries, telephones, and meters. The number of tests and investigations recorded during the year numbered 337.

This branch also has charge of the time-control apparatus, and is responsible for the accurate maintenance of the system time, which is an important factor now that so many synchronous clocks are installed throughout the country.

DESIGN OFFICE.

A. Electrical Section.

During the year the staff in the Electrical Design Office has been exceptionally busy, and was considerably augmented to cope with the necessary work associated with additions to North Island power-stations and new sub-stations in connection with extensions to the main transmission systems to supply the North Auckland District. In the South Island the activities are associated principally with the extensions to the Lake Coleridge 66 kv. transmission system to give supply to the Westland district, via Arthur's Pass. The specifications, layout and foundation drawings were prepared in connection with the installation of the 250 kw. hydro-electric generating station to supply power for construction purposes at Homer Tunnel.

B. Hydraulic Section.

Investigation of Power Resources.

During the year an examination was made of a portion of the West Coast, particularly in the Hokitika district, for possible power schemes to meet a prospective mining load. Two projects, Toaroha and Waitaha, utilizing the Toaroha and Kakapotahi rivers, have been investigated. Although neither of these schemes could be recommended at the present time, they both present favourable features which may be utilized with advantage when the West Coast is connected with the Coleridge-Waitaki system. When this is done much larger schemes than are now required could be developed at a very reasonable cost per kilowatt.

No finality has been reached in regard to Waikato River investigations, owing to the staff being diverted to the Arapuni extensions, where their time has been fully occupied.

Waikaremoana.

During the year various proposals were considered with a view to controlling the flow from Waikaremoana. To determine the exact nature of the ground a shaft was sunk, after extensive grouting operations, and a short-length tunnel driven. These works were located in such a position as would fit in with one scheme of the development. This work has now been suspended pending further consideration.

While these works were in progress, investigation, location, and design were carried out in connection with possible pipe-lines and other features of the upper development which aimed at using the 440 ft. of fall between Waikaremoana and the intake of the main development.

A detailed survey of the village at Tuai was carried out, and with this was incorporated a diversion canal to pass any water not used in the present main development into the forebay for a lower development, which at a later date may be utilized to develop a further 330 ft. fall below the present power-station.

Preparation has also been made for the penstock for the third unit in the present power-station, and tenders for this have been called.