

As usual, statistics of river-flow have been collected and charted. Growth of load has been somewhat tardy, and the various stations have had no difficulty in carrying the load, though the Mangahao-Waikaremoana system has had very little to spare.

A comprehensive study of existing flow records was carried out to ascertain the probability of destructive floods and serious droughts occurring in any of our supply systems. Some useful pointers have come from the studies, none of which suggest that adequate precautions have not been taken in design. The studies have, however, emphasized the fact that records over much longer periods are necessary before anything like definite probabilities can be calculated.

*Waitaki.*—Routine work has been done in connection with the Waitaki dam. Also studies of sedimentation and the control of floods during the most critical stage of the undertaking, while the river channel is being closed.

*Chateau Tongariro, National Park.*—In order to provide adequate lighting, cooking, and power for the Chateau Tongariro, and to save heavy expense in the purchase, cartage, and handling of fuel, a hydro-electric set of 100 kilowatts rated capacity was designed to be placed in the Whakapapanui Stream. The headworks of this are now complete, and work is in hand on the power-house to be in readiness for the plant, which is due early in September.

A comprehensive investigation and survey to determine the remaining power resources of the Waikato River is now in progress. There is no doubt that the Waikato has great and valuable potentialities for the development of power, but it is not yet possible to say just how they should be developed.

#### ELECTRICAL DESIGN OFFICE.

As the construction programme for the year was smaller than for several preceding years, being largely restricted to extensions to existing works and the carrying-out of new works already in course of construction, the amount of design work involved was less than that executed in the preceding year, and the staff has been correspondingly reduced.

#### LAKE COLERIDGE SYSTEM.

The extensive alterations and additions to buildings and equipment at Addington involved a considerable amount of design work during the year. The building-space in the main substation which the large transformers and their oil-circuit breakers formerly occupied is being used for the new 11,000-volt switch-gear which has been ordered for the main circuits. This switch-gear has a rupturing capacity of 500,000 kv.a. to meet the exacting service required of it when Waitaki and Waipori generating-units and other synchronous machines are connected to the system, whilst its current-carrying capacity provides for a large increase in the substation load.

The following design work was carried out for this system :—

##### *Addington Substation—*

- First section workshop, testing and office building, also specification.
- Balance of workshop, testing and office building, also specification.
- Oil-filter house, lubricating-oil store, and pump-house.
- Reinforced-concrete floor for new 11,000-volt switch-gear.
- Foundations for 30-ton turntable.
- Foundations for oil-storage tanks.
- Oil and water piping.
- Layout of power and control cables.
- 30-ton turntable, also specification.
- Oil-storage tanks, also specification.
- Layout of new 11,000-volt switch-gear.
- Phasing diagrams.

##### *Timaru Substation—*

- Layout drawing of site.
- Design for proposed new substation building.

#### MANGAHAO-WAIKAREMOANA SYSTEM.

The installation of increased transformer capacity at Masterton Substation, together with its controlling switch-gear, involved design work for foundation details.

Short-circuit calculations were carried out for the earthing-system at Mangahao Power-station. The following design was carried out for this system :—

##### *Masterton—*

- Foundations for second transformer and extensions to outdoor switch-gear and steelwork.

##### *Melling—*

- Foundations for steelwork and transformers.

##### *Stratford—*

- Layout of switch-gear and transformer for Power Board supply.
- Foundations for 110,000/11,000-volt transformers and metering cubicle.
- Foundations for turntables.
- Design and specification for 10-ft.-diameter turntable.

##### *Hawera—*

- Drawings and specifications for cottage and single men's quarters.