

(b) Substations.

*Addington.*—At Addington a considerable amount of transformer and switchgear fitting, altering, and repairing was carried out for substations, chief of which was —

- A bank of 5,000 kVA. transformers was dried out for Smith's Road.
- A bank of 5,000 kVA. 66/33 kV. transformers for Addington was dried out and erected on pads ready for connecting up.
- Work is proceeding on the drying-out of two 20,000 kVA. 66/11 kV. banks for Addington.
- A number of 66 kV. O.C.B.'s, ex Timaru and Ashburton, were reconditioned for use on the West Coast.

The switchgear and condensers have operated satisfactorily throughout.

- Oamaru.*—A new control battery was installed.
- Half-way Bush.*—New blades were fitted to all 33 kV. switches due to heating troubles.

*Dobson.*—Silt-ing-up of the cooling-water tubes to the engines was remedied by the fitting of water-jets to clear the silt. Maintenance-work has been satisfactorily carried out on the four Diesel engines.

(c) Transmission-lines.

The condition of the main transmission-lines was maintained satisfactorily, the necessary inspection and replacements having been carried out.

During the year there was one interruption of nine minutes to main supply at Addington Substation on 25th December, due to lightning striking the busbars at Hororata.

Due to insufficient road width, a section of the 11 kV. line to Sumner was removed from the causeway and rebuilt on the seaward side.

All insulators on the system were buzz-stick tested, and of a total of 112,590 tested, 623 were found to be defective.

Six poles and eleven insulators were replaced under live-line conditions, the total number of defective poles replaced being 60.

The charring treatment of poles for the North Canterbury line has been undertaken with satisfactory results.

(d) Test Department.

O.C.B. and relay maintenance was carried out wherever possible, and the work will be back to schedule in the near future.

The quarterly tests of switchgear at Addington and Timaru were conducted.

All insulators removed from transmission-lines after field tests were tested prior to their being destroyed.

Regular inspection of electrical installations supplied direct from our reticulation has been kept up to schedule.

(e) Analysis of Trouble on System.

The following table gives an analysis of troubles experienced during the year under review :—

| Reference. | Description.                                        | Number. |
|------------|-----------------------------------------------------|---------|
| 1          | 3·3, 6·6, or 11 kV. lines : Defects .. .. .         | 3       |
| 2          | 3·3, 6·6, or 11 kV. lines : External causes .. .. . | 15      |
| 3          | 33, 50, or 66 kV. lines : Defects .. .. .           | 5       |
| 4          | 33, 50, or 66 kV. lines : External causes .. .. .   | 5       |
| 5          | 110 kV. lines : Defects .. .. .                     | 8       |
| 6          | 110 kV. lines : External causes .. .. .             | ..      |
| 7          | Lightning .. .. .                                   | 5       |
| 8          | Storms : Nature of trouble not discovered .. .. .   | ..      |
| 9          | 3·3, 6·6, 11, or 22 kV. apparatus .. .. .           | 5       |
| 10         | 33, 50, or 66 kV. apparatus .. .. .                 | 3       |
| 11         | 110 kV. apparatus .. .. .                           | 3       |
| 12         | Generators or synchronous condensers .. .. .        | ..      |
| 13         | Relays .. .. .                                      | ..      |
| 14         | Control circuits or batteries .. .. .               | ..      |
| 15         | Operation : Mistakes .. .. .                        | 1       |
| 16         | Operation : Accidents .. .. .                       | ..      |
| 17         | Other causes .. .. .                                | 1       |
| 18         | Cause unknown .. .. .                               | 3       |
|            | Total .. .. .                                       | 57      |

Circuit miles of transmission line in operation at end of year : 11 kV., 92 miles 1·5 chains ; 33 kV., 65 miles 50 chains ; 66 kV., 597 miles 4 chains 110 kV., 258 miles 78 chains. Number of substations in operation at end of year : 11 kV., 24 ; 33 kV., 3 ; 66 kV., 8 ; 110 kV., 4.