

7. *Water-storage*.—The rainfall records taken at the power-house show the fall has been well maintained. It is, however, upon the snowfall on the hills rather than the rain that the lake-supply depends. The lake-level during the year under review fell lower (2 ft. 9 in. below normal) and rose less rapidly than during the previous year, but in December reached a height of 1,668.6 ft., or 1 ft. above normal. The lake-levels since commencement of operations are shown in the curves attached.

The average consumption of water during the year ended 31st March, 1917, was about 80 cusecs; during the year ended 31st March, 1918, 90 cusecs; and during that ended 31st March, 1919, 100 cusecs.

8. *Snowstorms*.—On Sunday, 30th June, a heavy fall of snow occurred throughout Canterbury. At the power-house a depth of 2 ft. was recorded, and the district from Coalgate and Hororata to the power-house was for several days impassable.

At 2.50 a.m. on Monday, 1st July, the south transmission-line failed, and at 7 a.m. on the same day the north line failed, services being completely interrupted till 4.27 p.m. that day, when the south line was again put into service. Supply from the tramway plant was available during this interruption. At 7.18 on the Monday evening, the north telephone-line being already out of service, the south telephone-line and the public telephone-line both failed, completely cutting off communication with the power-house.

At 10.40 a.m. on Tuesday morning, 2nd July, the south power-line failed, the north power-line being still out of service. All power and all communication with the power-house was thus cut off. No material damage was done to the power-lines, but both of the transmission-line telephones as well as the public line were extensively damaged. Without communication with the power-house it was impossible to put power on the lines. Strenuous endeavours were made to reach the power-house, but for three days without success. Finally, Boris Daniel, a youth employed at the substation, reached the point on skis, and there met a party from the power-house consisting of Messrs. Blackwood, Swaney, and Peach, who had with great difficulty made their way through on horseback. Communication was then established by using one of the power circuits as a telephone-line. Several insulators were replaced, and service on the south line restored at 10 p.m. on Thursday, 4th July, after a complete interruption of service of fifty-nine hours. During this period a partial service was maintained by the Tramway Board's steam plant, and all essential industries kept going.

Three weeks later, on Sunday, 21st July, a second severe snowfall was experienced, on this occasion chiefly in the city and suburbs. No total interruption to supply took place, but very considerable trouble was experienced with all the local 11,000-volt feeders.

These two experiences gave rise to many suggestions, but the circumstances were altogether unprecedented and unlikely to recur. No serious omissions or inherent weaknesses were disclosed, and in spite of the very serious nature and extent of the "shutdown," public confidence in the reliability of the supply has not apparently suffered. The main difficulties were those of communication and transport over deep snow too soft to bear. Both of these difficulties have been provided for in case of a recurrence.

9. *The Epidemic*.—In November, 1918, the settlement at the power-house, in common with the whole Dominion, suffered severely from the influenza epidemic. Situated within easy reach of the city by car in the case of sickness or emergency, no special provision for dealing with sickness had been previously required. The disease in its worst form appeared in the village at a time when the city epidemic was at its height and medical or nursing aid was almost unobtainable. The settlement suffered with exceptional severity. Among fifty adults and thirty children there were forty cases of influenza, seven being of the pneumonic type. On the 22nd November, during the first days of the epidemic, when the trouble was spreading rapidly, Mr. McKeown, the Department's car-driver, succumbed to double pneumonia and was buried near the village, the plot having since been set apart and suitably railed off. The epidemic also seriously affected the staff in Christchurch, involving the loss of a valuable officer in Mr. W. H. Brook, who since the commencement of the works had carried out the duties of distribution foreman. The plant was kept running with a minimum of staff and a fortunate freedom from operating trouble.

10. *Electric-storage-battery Vehicles*.—The combined circumstances of cheap hydro-electric power and level country ensured the development of this use of electrical energy in the Christchurch district. The number of vehicles continues to increase, the total now being thirty-three. Several private charging-stations have been installed, and the City Council has completed the erection and equipment of a charging-garage capable of accommodating fifty vehicles. In addition to the usual commercial vehicle, there are now several private cars of this type in the city. This class of business, taking power only at night, is not affected by shortage of power, and is capable of very much further expansion.

11. *Special Industrial Developments*.—Of the special industrial developments associated with a supply of cheap hydro-electric power which have taken place during the year, the position is as follows:—

- (a.) Iron oxide for paint, prepared electro-chemically from waste sheet iron such as empty tins, &c.: This industry has now been established on a commercial basis, and the paint is being successfully marketed.
- (b.) The electrolytic manufacture of oxygen gas has proved a definite commercial success. The oxygen is produced by direct electrolysis from water, the hydrogen so far not being utilized, but processes are under contemplation for using this gas in connection with the recovery of lower-grade oils and in soap-manufacture.
- (c.) Steel-smelting: The ferro-concrete building for the works is nearing completion, and the bulk of the electrical equipment has been delivered. The installation of this 6-ton 1,200 kw. Heroult steel furnace by a New Zealand company is an enterprise of considerable magnitude and interest, and marks an important step in the country's industrial and electrical development.