

PROSPECTIVE TELEPHONE EXCHANGE INSTALLATIONS.

Several of our telephone exchanges are outgrowing their term of useful life and the capacity for which they were designed. Special attention was therefore paid to the developments now taking place in connection with such equipment, and these prospective works may now be planned with full knowledge of the best and most recent methods of meeting their specific needs.

POWER PLANT: MACHINES.

The introduction of machine switching methods both for telegraph and telephone services has resulted in the use of considerable quantities of electrical machinery to furnish the power for the electro-magnetic and signalling apparatus employed. The power plant has become a vital part of our telegraph and telephone systems, and upon its successful operation the reliability of the service given very largely depends. Power plants suitable for our purposes were discussed with electrical manufacturers, recent developments noted, and investigation made as to the extent to which reserve sets are provided to overcome emergencies due to the failure of city electrical supplies. Our practice in this respect can now be unified to a large extent, and due provision be made without the fear of unduly increasing the capital cost of the equipment.

POWER PLANT: DRY BATTERIES.

This type of power unit is largely used in telegraph and telephone practice, and to form an efficient element must invariably have a long life at a low intermittent discharge rate. Many thousands of these cells are used annually by the Department. The manufacturing processes were inspected, and arrangements made for samples of promising cells to be sent to our laboratory for test as to their suitability under New Zealand telegraph and telephone conditions. The methods adopted by the laboratories of different administrations in gauging the suitability of these cells were also noted, and the information gained under this heading will supplement that already obtained by the Department's testing section.

POWER PLANT: STORAGE BATTERIES.

The manufacture of storage batteries of different types was inspected, and the conditions surrounding the performance of these important units of telegraph and telephone power plants discussed with manufacturers and operating companies. The subject is one in which there are wide variations of practice among the electrical-engineering fraternity, and the opportunity of discussing with battery experts debatable practices was availed of as widely as possible.

Upon the latest practice in relation to such features as the following, and their effect upon life and output, useful data were collected: Battery design, general; plate separators; electrolyte and oil coatings; battery troubles—causes and remedies; treatment of defective cells; battery-room design; installation methods; charging methods.

With respect to the latter subject, telephone-exchange charging practice has recently undergone certain changes with the object of economizing battery-capacity and at the same time maintaining it in a condition to act at all hours as an emergency unit in the event of a temporary failure of outside power. The relative merits of the various methods, such as "off-load charge," "full and partial float," and "trickle charging," were investigated.

AIR-CONDITIONING PLANT.

In order to increase the life of automatic-telephone-exchange equipment, and to reduce maintenance costs due to the harmful effect of humidity and dust, some of the more important automatic installations in this country have been provided with what is known as "full air-conditioning plants." Such systems are in operation at Auckland, Hamilton, Wellington, and Dunedin. The method employed is to convey to the switch-rooms, by ducts, air which has been washed with refrigerated water, and which is then raised to a temperature in the vicinity of 65° Fahrenheit, but having a uniform relative humidity in the region of 65 per cent. Considerable benefits have been derived from the use of such plants in situations where humidity and dust were serious considerations. The time had arrived, however, when the extension of such full air-conditioning plants to smaller exchanges of the automatic type was difficult to prove in on economic grounds, by reason of the greater ratio of air-conditioning plant cost to total investment.

A study was made of the systems employed in other countries, and of the condition of telephone equipment under widely varying methods of treatment. The subject was also discussed with manufacturers with a view to seeing what modifications in design were possible in order to meet, at a lower cost than was possible for the larger installations, the less-exacting conditions found in smaller exchanges.

In taking definite measures of this kind for the treatment of the air supplied to the rooms housing its modern telephone equipment New Zealand methods have been somewhat of a pioneering character. I found that opinions as to the particular method of treatment that should be employed under different conditions were very much divided, and other administrations were interested in our installations and experience gained thereby. I am satisfied, however, that the action taken to date has been fully justified, and that with the information now available each case can be studied on its merits and a satisfactory decision reached.