

There is also contained in the toll-room one single-channel carrier terminal—one of the latest developments in long-distance telephony—and a two-position operators' desk for use in recording subscribers' requests for toll service. In addition, there is a two-position operators' desk for giving "time" and other information to subscribers. There is also installed in this room a supervisory desk from which the toll service is supervised by the officer in charge.

In the basement are situated the power and battery rooms. In the power-room are the main power-panels and the storage battery, which feed power to the whole of the automatic system. The power plant for charging the battery consists of a 29-horse-power 400-volt motor-generator capable of delivering current up to 300 amperes. In addition, an emergency power plant is provided, consisting of a generator similar to the main generator, but driven by a petrol-engine, instead of by an electric motor connected to the electric mains. The function of this set is to supply charging-current to the storage battery in the event of the failure of the city power-supply, and its provision ensures reliability and continuity in the operation of the exchange. The storage battery consists of two sets of twenty-five cells, having a rated capacity of 1,800 ampere-hours. The total weight of this battery is approximately 22 tons, and it contains 1,600 gallons of electrolyte. The function of this huge storage battery is to supply electric current at 48 volts to operate the automatic exchange apparatus and also to supply current to every subscriber's telephone for speaking purposes. Incidentally, it might be mentioned that this battery and the one at St. Albans replace a complement of approximately 25,000 primary batteries formerly used in subscribers' telephones.

Similar plant and equipment for 2,000 individual lines is installed at the St. Albans Exchange.

Some idea of the magnitude as well as the intricacy of the work involved in installing an automatic exchange without disturbing the existing service may be gleaned from the fact that the wiring and switch apparatus installed at the Central Exchange and at St. Albans necessitated the making of five and a half million soldered joints, the use of 5,950 condensers, 40,269 electro-magnetic relays, 12,816 motor-magnets, 3,974 timing-switches, and 4,647 selecting-machines. After the apparatus had been installed thousands of tests had to be made to ensure that each individual part performed its proper function. To make provision for the connection of but one subscriber to one other subscriber in the exchange involves the operation of approximately two hundred interrelated circuits, containing eleven condensers, forty-five electro-magnetic relays, ten timing-switches, six selecting-machines, fifteen motor-magnets, and 150 soldered connections.

As may be imagined, a considerable amount of equipment is necessary outside the exchange itself to provide telephone communication for a city the size of Christchurch. Over 11,000 new automatic telephones were installed and brought into use at the cut-over. In addition, approximately 600 magneto telephones were in use, making a total of 11,770 telephones. Of this number 8,060 were main telephones, 1,304 were connected with local intercommunicating systems (chiefly of the interphone type) in subscribers' premises, 2,298 were ordinary extension telephones in subscribers' premises, while 108 comprised the automatic coin-in-the-slot telephones in the public-call offices installed throughout the city and suburbs.

At the time of the cut-over there were 110 miles of single-duct line, in which was enclosed 153 miles of underground cable, containing 65,212 miles of wire. In addition, there were 91 miles of aerial cable, containing 9,017 miles of wire, and 13,237 miles of open wire. The total length of wire under all headings was 87,466 miles. The pole-lines used in connection with the aerial plant totalled over 2,300 miles in length, and comprised approximately 92,000 poles.

Over 18,000 new directories were distributed to subscribers at the cut-over, their weight in the aggregate being approximately $6\frac{1}{2}$ tons.

In order to provide for the growth expected to follow the introduction of automatic methods at Christchurch, equipment for a further 2,000 lines has been provided and its installation put in hand since the cut-over. It is anticipated that the installation of this extension will be completed in a few months' time, when the Department will be in a position for some time to come to meet the demands for telephone service in Christchurch.

MIRAMAR (WELLINGTON) AUTOMATIC EXCHANGE.

To meet the growth and to serve more economically subscribers in the Miramar and adjacent areas, an automatic-telephone exchange was established at Miramar in January, 1928, as a part of the Wellington metropolitan system. Equipment has been provided for 1,000 individual lines and 100 four-party lines. At first this exchange was operated as a satellite to the Wellington South Exchange, but on the 1st February, 1930, it was cut over to operate as a branch exchange working in conjunction with the central automatic exchange in Stout Street. At the time of the cut-over there were 400 subscribers connected to the Miramar Exchange, which number had increased by the 31st March to 1,084.

HASTINGS EXCHANGE: CONVERSION TO AUTOMATIC WORKING.

With the conversion of the Christchurch Exchange to full automatic working there was released 2,300 lines of Strowger automatic equipment previously used as an auxiliary to the manual system. It was decided that this equipment, after being reconditioned and overhauled, should be utilized