and a space-bar by which the paper can be perforated. The depression of the keys closes a circuit when slightly moved, and magnetism does the rest. This is not unlike the method of perforating by air-pressure. There is another arrangement by which tape is perforated by the working of a Morse key in conjunction with a pole-changer, relay, and punches. The tape can be perforated at fifty or sixty words a minute. Centre holes are not cut. The forward feeding of the tape is effected by friction roller. Above the perforated tape as it passes over the roller of the transmitter are two metal brushes — one connected to the positive the other to the negative of the battery. The signals are sent, when these make contact with the roller through the perforations. From one thousand to one thousand five hundred words a minute can be transmitted. The static capacity of the circuit is necessary to the successful working of this system. The demonstration given to me was through a local circuit with resistance of 1,000 ohms representing the line. Condenser to represent the charge and discharge of the line was introduced, but no result was got when the condenser was cut out. Short lines which have not enough surface to provide the necessary capacity of themselves have condenser supplied to make up the deficiency. The signals are received on chemically prepared tape. The transmitting tape can be run through the transmitter with the finishing end first. This causes the received tape to be in the right way to begin writing up when the message is through the transmitter. Tape can be perforated at the received end and at any number of intermediate stations, or it can be received on perforated tape at one or more offices, and on chemically prepared tape at other offices. The re-perforated tape can be run through a machine and written up from a sounder at typewriter speed if desired. This perforation of the tape at the received end was seen being done on a local circuit at seventy words a minute. A most interesting feature is that the starting of the transmitter causes the tape at the receiving end to start also, and when the transmitting tape has run out a signal is automatically applied to the line. This works a relay at the receiving end, which stops the receiver by the action of a local battery.

It was said that the company expected to have a line operating from Chicago to New York quite soon, and that they were actively engaged in connection with the system in Boston.

It was in England, however, that the telegraph methods impressed one most, and, although large telegraph-offices had been seen in the States, a walk through the operating-rooms of the London Telegraph-office disclosed that there telegraphy was being conducted on a scale that was unrivalled and by methods that invited investigation.

All the circuits of the Central Telegraph-office are brought into the test-room in the basement in twenty-nine lead-covered paper cables of about three hundred wires each. The gauge of the wires varies from 40 lb. to 150 lb. a mile. They are taken to distribution-heads, where they are connected to silk-and-cotton covered cables which are led to testing-jacks and protecting-devices fitted on the main frame. The main frame will take 10,000 wires, and has now 3,150 circuits, many of them looped metallic circuits requiring two wires. Silk-and-cotton lead-covered cables extend to the instrument-rooms, and are enclosed in iron troughing. It is a feature of all the wiring that it is enclosed in iron right up to the instrument-table, and that all wires are lead-covered. There is a desiccating plant consisting of a 2-horse-power motor-driven pump, and seven cylinders for drying out the paper-insulated cables should the insulation become impaired by moisture. About one thousand secondary cells of capacities varying from 30 to 750 ampere-hours are used, and are so grouped as to give voltages of 10, 20, 24, 40, 50, 80, 100, 120, and 150. By these means current is obtained for short and long lines, local circuits, pneumatic-tube signalling-wires, bell circuits, small electric motors, and the intercommunication switch. Primary cells are not entirely dispensed with, as there are over four thousand in use, principally dry cells, used for telegraph metallic loops, as it has not been found practicable to work these from the earthed secondary cells. There are fifty-five pneumatic tubes, having a total length of about forty-nine miles and extending to various metropolitan offices. These are $2\frac{1}{4}$ in. and 3 in. in diameter, some worked by vacuum and others by pressure. The longest tube measures 4,100 yards, and the speed attained by the carrier is thirty miles an hour. Besides these street tubes there is a large system consisting of seventy $2\frac{1}{4}$ in. and 3 in. tubes used for house service in and between the several buildings. A signalling-wire and apparatus is provided for each tube, thus enabling the despatch of a carrier to be signalled and its receipt acknowledged. Several carriers can be in the street tubes at the same time following each other at definite intervals of time.

A message telegram concentrator, which is really a telephone switchboard, provides for connecting to it about eighty telephone circuits from various post-offices and exchanges throughout the city. These are used for telephoning telegrams to the Central Telegraph-office. Forty sets of telephones are employed at the Central, which are plugged through, as they become disengaged, to the calling circuits.

The Foreign Gallery contains circuits to France, Germany, Austria, Italy, Belgium, and Holland, and a portion of it is allotted to work for some of the English towns in the Midlands. There are about 224 circuits in this gallery. Over sixty of them are worked with Hughes instruments, and about the same number by sounder, duplex and simplex, single and double current being used. Eight Baudot quadruplex and twenty-six ordinary quadruplex are also made use of. The Baudot sets work to Paris and to Berlin, in the latter case through repeaters at each end of the cable, with satisfactory results. Telewriters or telautographs are employed to a limited extent. Whatever is produced at the sending end, whether it be writing or sketches, is similarly reproduced at the receiving end.

The Provincial Gallery provides for over three hundred circuits working to the principal towns in the British Islands, and is the busiest of all the galleries. There are about a hundred Wheatstone sets, duplex and simplex, forty ordinary quadruplex, sixty double-current sounder duplex, some forked repeaters, duplex repeaters, and Hughes duplex. A Murray multiplex is working to Manchester as a double duplex. A Baudot quadruple duplex works to Birmingham. The Creed type-printing apparatus is used in connection with four sets of Wheatstone duplex to