

Most extended loops are merely local-circuit loops with the line apparatus, such as relays, &c., on shelves in the central office. There is a large number of these shelves, with men disposed amongst them attending to balances and any other matters demanding attention. The bulk of the quad. and duplex instruments being operated in the main office are also upon shelves, the keys and sounders only being extended to the tables. In some cases all of the instruments are on the operating-tables. During a thunderstorm which came on suddenly one day it was most interesting to note the way the men attending at the shelves had to move about from one place to another to attend to the varying conditions arising from minute to minute.

Galvanometers are not used. Balance is by working signals. In quite a few cases a milliamperemeter was in circuit on a quadruplex. Quadruplex is not used through more than one repeater placed, say, four hundred miles distant. 20 m/a and 60 m/a are obtained from dynamos. Most quadruplexes are used as direct lines to cities up to four hundred miles or a little more. In bad weather it is quite usual to have to close the B side and work the A side with the full battery. Glass insulators are used. The best insulators are not obtained; they have to be imported, and become too costly, as there is a duty of 40 per cent. A duplex circuit to San Francisco working through six repeaters was listened to. The signals were good. The sender of them was using a machine key. The speed was about twenty words a minute.

The total staff was about eleven hundred, and three hundred and fifty to four hundred operators were on duty at one time. About 120,000 messages a day, including transmits, are handled in New York main office. Wires are leased at about £4 a mile, and special arrangements can be made for leasing during certain hours. Male operators work nine hours a day; female operators eight hours since a recent law to that effect was passed. Men's pay ranges from £10 to £19 a month. Women are paid £1 10s. to £1 17s. a week as distributors, and when employed as perforators or attending to keyboard-machine circuits the rate is from £2 to £2 17s. 6d. a week. Some are paid by the hour, some monthly. Men do not work quite so many hours at night as during the day. Annual leave is not granted. Yetman typewriters were not seen in use anywhere. The vibroplex and that type of key is much used by operators for sending, and gives good results if used with judgment. Fifty messages an hour are common on certain classes of circuits. This company has no system of bonuses for messages sent in excess of a certain fixed minimum. There was such a system at one time, but it was abandoned.

There is a large number of circuits worked simplex to places inside and outside the city. In some cases lamps are arranged to light on a call coming in on these circuits. The lamps are elevated and placed in a row. By this means an operator per circuit is avoided, as it is found that a large number of circuits can be attended to by a few operators. A wandering cord from the instruments is plugged in to pick up any circuit it is desired to attend to. The idea was good, but the method of giving effect to it seemed rather primitive. There were about twenty-five to thirty of these circuits on one long table.

On an elevated platform there were about sixty men and girls attending to carriers and the distribution of messages. A large number of carriers converge to this point, and most messages come here. There is also a pneumatic-tube system radiating, by which messages are despatched to and received from many parts of the building. Messages as they arrive are sorted and put into the proper carrier, which takes them to their destination. There are two travelling-belts also running. These are driven by motors on the platform, and there are spare motors to carry on with if one should break down. Messages placed on one belt are passed downstairs to the operating-room below; those placed on the other belt are carried to the other end of the platform, to be redistributed by carriers which deliver at definite positions, where male and female distributors take up the messages and convey them to their proper circuit. Some messages can be distributed without using the carrier system: that is done where found to be most suitable. No attempt is made to distribute to each instrument direct by carrier.

On the floor below there is a second central position for carriers, and pneumatic distribution, where there are about fifteen persons employed. The Barclay instruments are in this room. There are twenty-one in use, and four spare ones are kept. Two mechanics are continually employed keeping these in order and repairing the perforators, of which there are about sixty. Girls can perforate forty to fifty messages an hour, but they vary in skill, like operators. The perforator operator numbers each message in sequence, and only one message is put on one tape. The operator at the instrument times the message as it goes through the machine. There is one girl for sending and one for receiving. The girl receiving checks the words and watches for anything that may need correction. In some cases where the work is not heavy a girl perforates and feeds direct into the transmitter. Message after message is then passed along on one tape. If the receiver or transmitter goes out of order, transfer is made to another receiver or transmitter. The part working all right is not transferred with the defective part. Transmitting is then going on at one place and receiving on the same circuit at another. Tape is destroyed after two or three hours. At the beginning of each tape a few dots are sent. There must be no errors in perforated tape. If one occurs the tape must be either destroyed or the error cut out. Faults occur in the instruments that are sometimes difficult to find.

Work is done with these instruments to Chicago through one set of repeaters at Buffalo, 460 miles distant. They work direct to Boston, Philadelphia, Buffalo, Washington, distances of 250, 90, 460, 270 miles. Nine hundred messages on a circuit both ways from 8 a.m. to 6 p.m. are not unusual. Several messages were timed passing through the transmitter, and the speed was found to range from thirty-four to forty words a minute, and was about the same on all circuits. One feature of the Barclay was that, while not fast, it was going uninterruptedly, and no time was lost, so that it was possible to put through sixty to seventy messages an hour each way. As it takes four persons at each end—that is, two to prepare tape and two to attend the instruments—the work done amounts to only about thirty-five messages for each two persons. This is about