

forty or fifty miles distant. There they branch in different directions. The telephone long-distance circuits are mostly composited and the telegraph leased to newspapers and others. Conversation is good, and remarkably free from cross-talk and Morse disturbances. There is a slight thud-like noise on some circuits, but it is not disturbing or irritating.

To Milwaukee (100 miles distant) there is an underground cable. The cable has 120 pairs for a considerable distance at each end and sixty pairs go the whole distance: these are No. 14 and 16 B and S. Loading-coils are used. The speech is good.

The number of operators in Chicago is 4,500. Of these 883 are in the exchanges being referred to. This number includes the American Telephone and Telegraph Company's long-distance force. There is a large dining-room. Meals are free, and cost the company about 4d. each. The total amounts to between £5,000 and £6,000 per annum. Girls' rest and retiring rooms are spacious and well aired.

In the school about 100 girls were receiving oral instruction. There are usually about 150 a month or 2,000 a year. In one year the whole staff of 4,500 was changed. The average length of service is twenty-two months. Girls between sixteen and thirty years are employed. Great care is exercised in choosing them. Each girl is reckoned to have cost 150 dollars, or £31 5s., before she is useful. Girls start in the school at 5 dollars, £1 0s. 10d., a week for a course of three or four weeks. They are then put to evening work, 5 to 10 p.m., and paid as for eight hours at 5½d. an hour for six months. They may get on the day staff, when they work eight hours and a half. All day staffs work eight hours and a half. This does not include half an hour for lunch, which is deducted. All girls get fifteen minutes relief in the morning and the same in the afternoon. Evening operators get fifteen minutes for lunch, say, between 6 and 7 p.m. After six months operators work three months at 6d. an hour, three months at 6½d., three at 7d., six at 7½d., six at 8½d., one year at 9d., one year at 9½d., three years at 10d., two years at 11d., and then 11½d. is the maximum. Supervisors get ½d. advance on what they may be drawing when promoted. Each three months they get ½d. increase. They work at 11d. for six months, at 11½d. for six months, and 1s. for a year.

There are day and night operators: they do not change. The A operator in the daytime is interchanged with the B operator to keep each familiar with the work. The night operators work from 10 p.m. to 7 a.m., and are paid for eight hours and a half. They get half an hour's rest about midnight, and later lie down for an hour.

Two exchanges, Central and Randolph, have 25,000 stations on 9,000 lines. There are 475 operators, of whom 325 are on at one time, 100 in the evening and 25 at night. There is only one residence station in these exchanges. There were forty-five absentee operators on the day these exchanges were visited. Randolph has sixty-two A positions and twenty-four B; Central has 104 A positions and thirty-six B. These two exchanges are in one large room, which was dark and the ceiling low, about 12 ft. Electric light was burning to give sufficient light. The atmosphere was not all it might be, and ozone was being used to improve it. There is plenty of floor-space.

A private-branch exchange at Marshall Fields has 16 A positions and more being added, and two B positions. To deal with the traffic to and from this private-branch exchange there were seventy outgoing and fifty-five incoming trunks at the Central exchange. The power plant, cells, racks, repeating-coils were of the Western Electric Company's usual type.

There were 253,000 stations in Chicago, and the increase of stations was at the rate of 40,000 a year.

At Detroit (population 450,000) the Independent Company has a plant of the Dean Company's manufacture. The switchboard is a fine-looking structure. The operating-room is large. The company has been four and a half years in business. It has five sub-offices and 16,000 stations. One of the sub-offices to this exchange is at Crest, three miles distant, and is working automatically with 10 per cent. of trunks to the main office. It is equipped for 300 lines, and is giving satisfaction. One man is attending to the equipment. 210 operators are employed: of these 105 are in the main exchange. The average pay of operators is 28 dollars, or £5 16s. 8d., a month. The operating staff is changed frequently. Operators get two weeks' instruction, and are paid 20 dollars, or £4 3s. 4d., a month while learning. There is a switchboard with twelve positions in the main switch-room: this is used for school purposes. Two instructors attend to operators who are learning. The B board has fourteen positions. Five positions on the A board are for pay-stations. The Gray nickel machine is used. The arrangement is that the operator gets the required subscriber and then asks that the money be deposited. The operator listens, and when she hears that the money has been paid she completes the connection.

Frequency four party ringing is employed, and gives every satisfaction. 40 volts are employed for speaking and signalling from the subscribers' stations.

Their long-distance lines are composited, and worked simplex and duplex by those who lease them. The battery for telegraphs is supplied by the Telephone Company up to 120 volts.

Some long-distance rates give an idea of their charges for that class of service: Seventy-five miles, 1s.; fifty miles, 7½d.; forty-five miles, 7½d.; thirty miles, 5d.; twenty-two miles, 5d.; seventy miles, 5d.; twenty miles, 5d.; twenty-five miles, 2½d. It will be seen that there is an absence of uniformity in mileage charges. These distances are to particular towns, and the rate has been made as has been found to suit the business. The subscribers' rates are, per month,—

		One-party Line.	Two-party Line.	Four-party Line.
		£ s. d.	£ s. d.	£ s. d.
Business		1 0 10	0 16 8	0 12 6
Residence		0 10 5	0 8 4	0 6 3

The cables are lead-sheathed, mostly underground, 200 and 300 pairs.