

distant, where the exchange is also automatic, with many thousand subscribers, was spoken, there being thirteen miles of underground cable in circuit, and the result was quite satisfactory. The manager at Lincoln informed me that the system gave them every satisfaction.

At Omaha there are flat rates of 4 dollars 50 cents (or 18s. 9d.) a month business, and of 2 dollars (or 8s. 4d.) a month residence. The radius of the exchange-area is six or seven miles. There are no party lines used.

The next step was to Chicago, where there were eight automatic exchanges just opened with about 22,500 lines. A vigorous automatic campaign had been conducted for some time. There was a clause in the franchise which required that 20,000 automatic telephones should be operating by the 1st June, 1911, or the franchise would be lost. The automatic movement was progressing rapidly, as they had applications for about 45,000 lines, were getting more, and were connecting up as fast as they possibly could. More exchanges were to be opened when found necessary.

Five of these exchanges were visited. The Plymouth exchange is located in a three-story building, leased. The exchange-room on the second floor is 30 ft. by 80 ft.; and in this space are accommodated the main frame, the switches for 4,700 lines, the wire-chief's and the trouble desk. The room will accommodate apparatus for about 5,200 lines. Everything is placed rather closely. At the trouble-desk is a Gray's telautograph on which announcements of trouble received at the Chronicle or central office are promptly sent out to the office concerned, and recorded. This saves time and delay. The batteries, charging-plant, and power-board are on a portion of the lower floor. The ringing is automatic and is of four frequencies—16, 33, 50, and 66—the voltage-range being from 50 to 150. Machines give the ringing in the daytime. For night ringing the battery is used passed through transformers and special vibrating-apparatus. Forty-six volts are used for speaking. The receivers are without permanent magnets: there is only the coil used. This has been well tried and has been found to give very satisfactory results.

These Chicago exchanges are all on the two-wire system and have the Automatic Electric Company's most recent developments applied to them. The Plymouth exchange has the following *personnel*—Manager, about £27 a month; 4 superior switchmen at £20 16s. a month each; 1 wire chief at £20 16s. a month: total for inside staff, £135 per month. For outside work and attending to telephones there are 3 men at £20 16s. a month each. The rates of pay are high, but not quite so high as in San Francisco and the West.

There is no repair-room in any of these exchanges. They are, of course, new yet. There is a bench in the switch-rooms with a few tools. The repairs are effected at that by the switchmen. One trouble-man was said to be enough for about 1,500 telephones when they are not too scattered. Telephones give no more trouble on this system than on manual, as they are ordinary C.B. type with dial attached. The dial is an extra piece of apparatus to get out of order, but from inquiry made as to the trouble that results, and judging from the number of trouble-men usually employed, the cost of maintenance of the dial is low.

Brooks office has 4,500 lines and space for 6,000.

Chronicle office has about 5,000 lines and space for about 7,000. This is practically the main office, as it is here the "information" and "complaint" for the whole system concentrates and is then passed on to the various exchanges. This makes for economy of staff for this class of work, and expedites handling. There is a four-position board for these purposes, which will be increased as required.

Cottage Grove has about 4,000 lines and is located in a brick building specially built. Everything was on one floor so as to keep good supervision and reduce the labour.

The number of persons in the different exchanges and the rates of pay correspond with what has been set forth for the Plymouth exchange. The apparatus is practically the same in all, only the lay-out differing somewhat to meet the varying shapes of the rooms or to avoid pillars.

The following flat rates are being charged per annum: Business, 84 dollars, or £17 10s.; residence, 50 dollars, or £10 8s. 4d.; four-party business, 39 dollars, or £8 2s. 6d.; four-party residence, 30 dollars, or £6 5s.

The Bell Company's charges are 125 dollars per annum for business flat rate, but they have quite involved charges for various kinds of service. The Bell Company has recently announced its intention to relieve telephone rates to the public to the extent of 400,000 dollars per annum, or £83,333.

The Illinois Tunnel Company, operating the automatic telephones in Chicago, has made arrangements with the Postal Telegraph Company for the use of its wires for long-distance communications.

About £500,000 a year is being spent in development of automatics in Chicago. Dividends are not being looked for at present.

Much could be referred to to show how automatics are developing. Newark (population 27,000) is a new automatic, replacing a thoroughly good common-battery board. As the company has already got the common-battery telephones, 3,000 lines are being equipped and only dials supplied. Honolulu, about eighteen months ago, put out a good common-battery board and put in automatics. At Dallas, Texas—population 100,000—automatic for 9,000 lines is being installed and is nearing completion. The contracts were got in thirty days, when soliciting ceased. There are to be four exchanges. The Bell Company had already 17,000 telephones in the city. The rates of both companies are: Business—60 dollars (or £12 10s.) per annum, unlimited service; residence—25 dollars (or £5 4s. 2d.) per annum, unlimited service. At Houston, Texas, an automatic exchange is almost completed for 4,250 lines. There are two exchanges, and the population is about 90,000. At Quebec (population 80,000), automatic equipment for 3,000 lines is in progress.

In Canada the Provincial Governments of Alberta, Saskatchewan, and Manitoba have acquired the telephone systems. Alberta has equipped Edmonton, which has now 3,800 lines; Lethbridge, with 1,000 lines; and is now equipping Calgary (population 50,000) with 4,800 lines. Saskatchewan