Manchester has 433 trunks. They are working 114 sections, and have 132 in the room. There are 220 persons on duty at the same time, and about 250 on the staff. As showing the number of circuits necessary to some centres, it may be stated that there are twenty-one to Ashton and thirty-two to Oldham.

These trunk switchboards are all of British Insulated and Helsby manufacture. The methods of working are practically the same in all. The number of calls that can be handled on a circuit in the busy hour is about ten, and an operator does well when she handles thirty calls in an hour at her position. Circuits used to be actually paid for only during thirty minutes of an hour, but arranging for the next call by telegraph raised that to forty-two minutes, and the telephone call-wire enables forty-five minutes paid time per hour to be attained.

Continent of Europe.

On the Continent, except the automatic development, there was little of interest seen as compared with the United States and Britain. In Berlin the trunk positions were slightly detached from each other, and girls were attending to not more than three circuits—many to two, and some even to one.

At Munich the exchanges seen were old mangeto type, with many additions on the key-shelf and anywhere space could be found for adding jacks and apparatus to meet requirements not originally provided for on the board. An improvement would be welcomed. The movement is towards automatics, which are also favoured by the engineers at Berlin.

At Munich, in a large room near the public entrance to the telegraph-office, were sixteen booths for the public. In the same room there were two girls who allotted the booths and collected the money. They had jacks by which they could supervise the time at each booth. Each person paid the fee before entering, but if time was exceeded the girl made a demand when the person speaking was finished.

Munich has a flat rate—£7 10s. up to three miles air-line for both business and residence. The measured rate is £4 10s., and 5 pfennig, or about ½d., each talk. Every 100 metres are charged 3s. beyond the three miles. Speech to several exchanges not far outside the city is free of any toll rate. Generally up to fifteen miles the charge is 2½d. for five minutes, fifteen to thirty miles 3d., thirty to sixty-two miles 6d., sixty-two to 310 miles 1s. To Vienna and Paris the charge is 3s., to Berlin 1s., and to Hamburg 1s. 6d.

In Paris there is little of interest. The exchange equipment was still that which had been hurriedly put up in the temporary structure that was erected in the street adjoining the exchange building in which the fire occurred about three years ago. In the basement into which the tunnels carrying the lead cables lead was a 25,000-line distributing-frame of the Western Electric Company's type. Lead cables, each containing about 240 pairs, were occupying every available inch of wall and other space. There were large iron heads for 112 pairs, in which joints were made, and the interior kept airtight by the cover being screwed tight down on to rubber gaskets, and these heads were placed wherever room could be found. Great activity was going on in the tunnels preparing for the change over to the new exchange that was soon to be installed in the renovated building. Messrs. L. M. Ericcson and Co. are the contractors for the new switchboards, which were expected to be ready about May. There were 874 female operators and 75 supervisors employed. Men work at night. The law does not permit of women working after 9 p.m. The operators work eight hours daily. The men's pay ranges from 1,500 to 2,400 francs, or £62 10s. to £100, per annum; average, £75. Women receive from 2s. 4d. to 3s. 3d. a day. Sundays and holidays are paid for as overtime at the rate of 25 per cent. above ordinary pay.

Reference has been made to loading-coils. These are used in many places where the underground cable is long and the wire small, to increase the talking properties of the circuits. They are introduced really to enable light wire to be used, so as to reduce the cost of junctions. In cables they are placed about one mile to one mile and a quarter apart. They are freely used in the United States on aerial wires, and have lately been applied to large conductors with good results, although the same ratio of increase of distance does not result as with the smaller wires. In Germany and Austria loading of overhead wires is largely availed of. Messrs. Siemens and Halske, of Berlin, and other firms have developed coils and metal cases for them with lightning-arresters and methods of mounting that minimize troubles which under certain conditions have been found to result from the use overhead of loading-coils.

ORDINARY TELEGRAPHY.

The Western Union Company's telegraph operating-rooms in Chicago consist of two large rooms about 50 ft. wide and 200 ft. long, one above another. There are about a thousand employees, and six hundred persons are on duty at one time in both rooms. The lines come in in lead cables underground, are taken to a main distributing-frame similar to telephone frames, and are led thence to the test-board. Associated with the test-board are numerous banks of lamps, which are used for cutting resistances into the circuits as required to keep the current of the desired strength.

Dynamos are run in the power-room giving positive and negative current of voltages 7, 24, 50, 75, 110, 220, 280, 340. These are led to the operating-room, and plugging arrangements are provided by which any voltage may be picked up. Constant current is very largely used upon the shorter circuits, of which they have about two hundred instruments for the city work alone.

The rooms are very crowded. There are over a thousand lines to different places. Some are lines of the American Telephone and Telegraph Company, and are composited. The test-boards take up a lot of room, as they are not at all compact. On a platform running along the test-board the instrument leads terminate in cords and wedges, which are supported on the