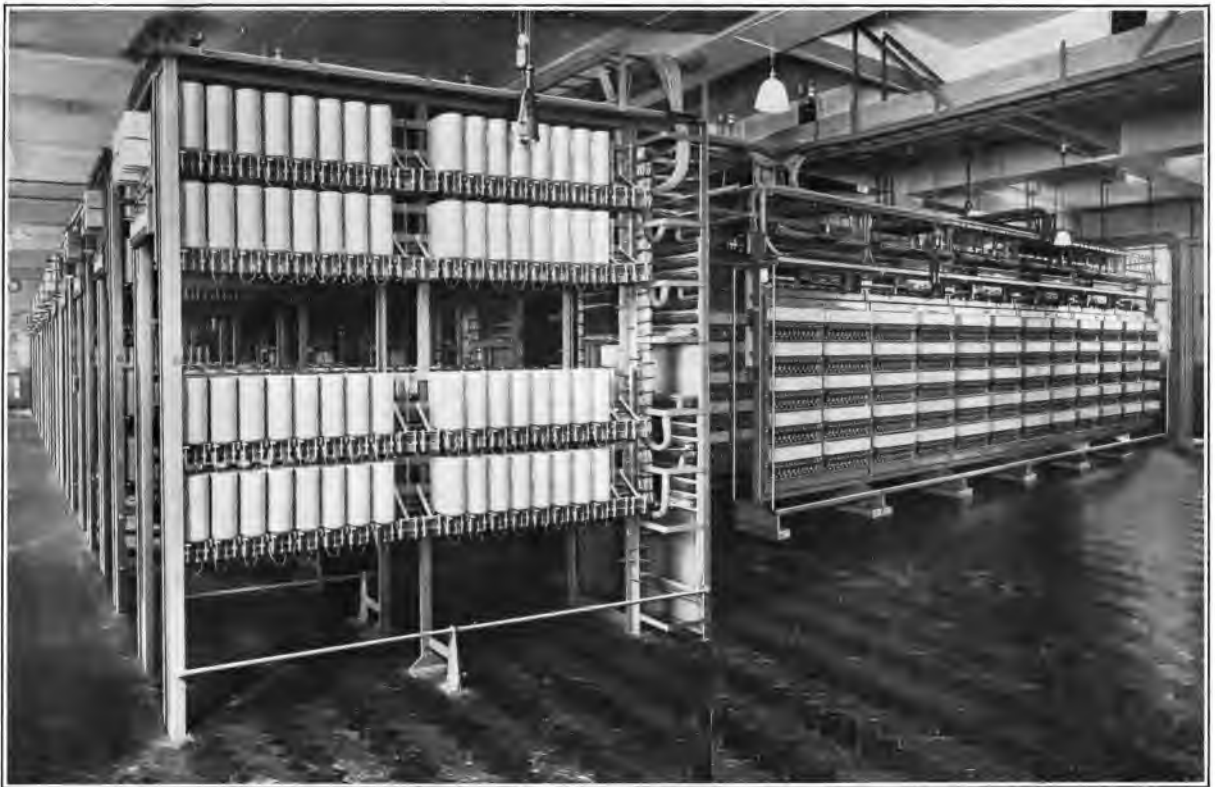


The Director System of Automatic Telephony.

The provision of an efficient telephone service in large and thickly populated areas introduces many problems which are not so evident in less congested areas. Amongst the more important are the complications of the junction system, which prohibits the use of direct junctions between each pair of exchanges in the area. Furthermore, delay and

errors are introduced when a call is routed via other exchanges, since the exchange and number required must be repeated several times. In addition, the cost of operating junction lines manually is excessive and there is also the difficulty of forecasting direction of growth.

The British Post Office realised for some



Flaxman Exchange, London—Group Selector Boards and Line Units.

time that it would be impossible to overcome these difficulties by additions to the existing manually operated systems and their investigations led to the adoption of automatic exchanges, the reliability of which had been proved in several provincial districts.

Of the systems that had been tried, the Strowger or step-by-step, was widest in its appeal, owing to the comparative simplicity of its circuits and since the trunking via successive ranks of self-contained switches is easily followed.

In its original forms however, it does not meet economically the conditions in an extremely large city and although it provides a satisfactory solution to the requirements of most areas, it has many limitations when applied to a large city network. Some of these are —

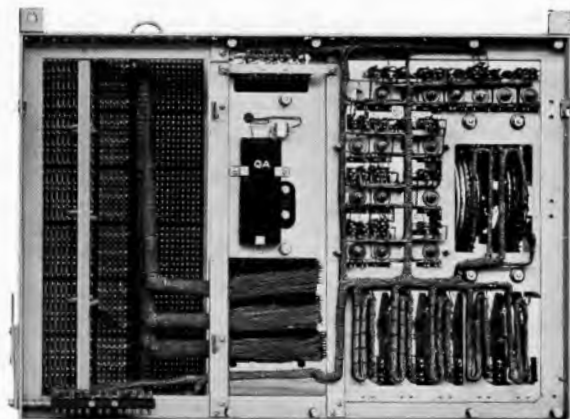
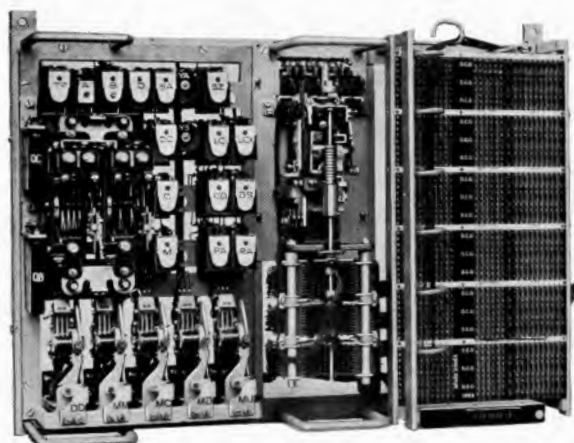
(a) A complete renumbering of the sub-

scribers in the area is necessary

- (b) Direct junction lines must be provided between each pair of main exchanges and between the main exchange and each exchange in its district.
- (c) It is necessary to forecast accurately the future requirements for a large number of years, so that a trunking scheme may be evolved to cater for future growth as well as present requirements.
- (d) A definite order of opening is necessary, since the main exchange of each district must be available before any other exchange in that district can be opened.
- (e) Difficulties are found in providing for the requirements of outlying districts when a large number of small exchanges supply the most economical solution.



Typical Suites of Line Units.



The Director—Front and Rear Views.



Director Racks—London Exchanges.

- (f) A complete revision of existing junction routes must be undertaken and considerable expense incurred in the provision of small junction groups.

A close study of these and other problems involved, resulted in the addition of a call storing and translation device to the step-by-step system. This is commonly termed a Director, since its principle function is to direct a call over any desired junction route.

The Director system has proved to be the most economical solution to the difficulties mentioned and has been adopted for London and the larger provincial cities.

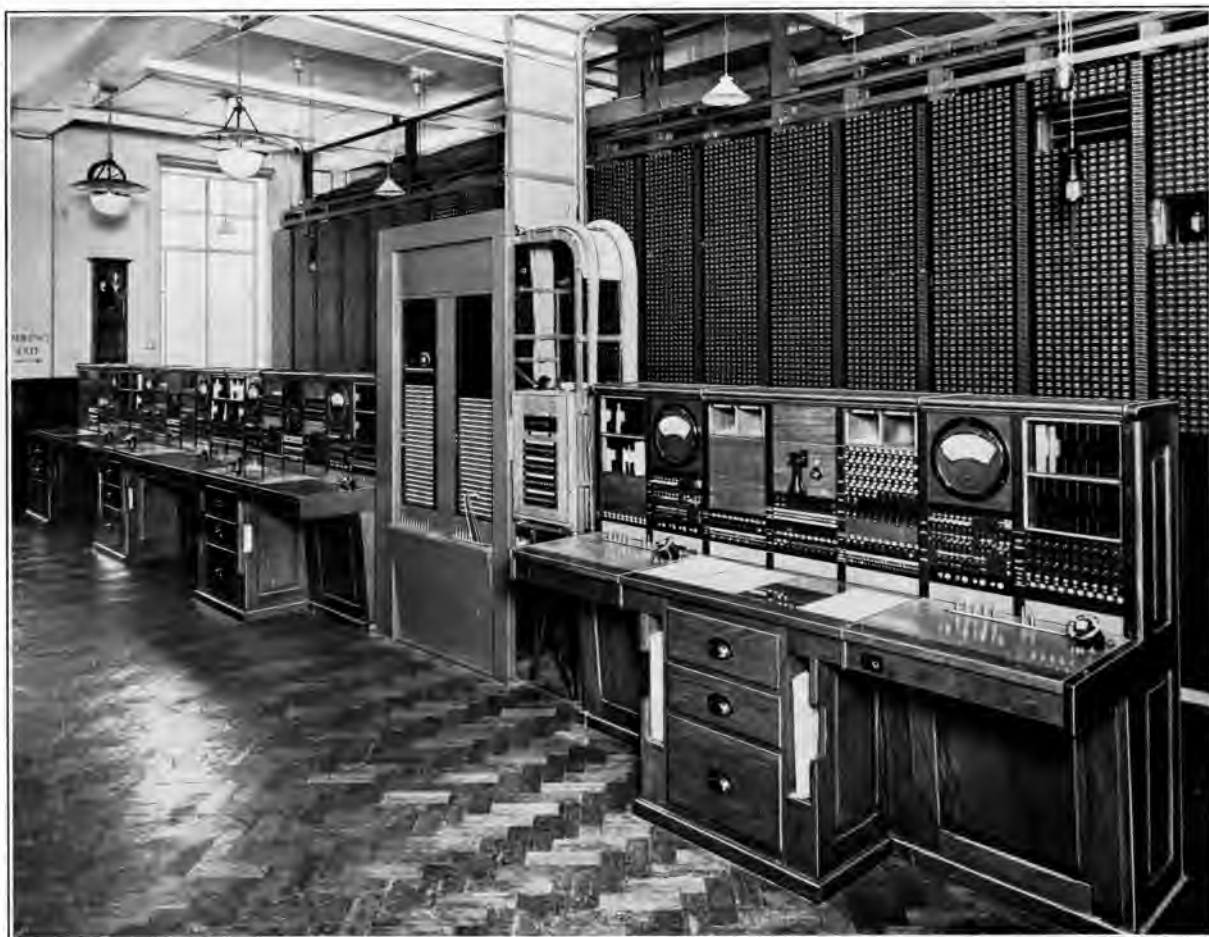
The dial on the subscriber's telephone is of the usual form but with letters in addition to the numerals. To originate a call, it is necessary to dial the first three letters of the exchange name, followed by the four digits of the number required. The first letter,

known as the "A" digit, selects a Director which then receives the remaining letters known as "BC" digits, and the digits corresponding to the subscriber's number. The Director stores the dialled impulses, translates the "BC" digits into a predetermined code corresponding to the junction route by which the required exchange is reached, and sends out this code followed by the digits of the subscriber's number.

In translation, the "BC" digits, consisting of two trains of impulses, may be converted into from one to six trains of impulses, according to the number of successive ranks of switches through which it is desired to route

the call. Thus, if two digits are utilised in selecting an outgoing junction at the originating exchange, up to four more are available for routing the call to the required exchange via one or more intermediate exchanges if necessary.

It is apparent, therefore, that the junction code allotted can be arranged to suit the existing junction network and that the existing names of exchanges and subscribers' numbers may be retained, after changing only the name of those exchanges having the same first three letters as other exchanges in the area (e.g. HAMmersmith and HAMpstead could not both exist in the same area).



Flaxman Exchange, London—Test Positions and Meters.

Should a breakdown occur on any portion of a junction route, the translation can readily be changed to direct the call over a route not affected.

It is not essential to forecast the ultimate trunking of the whole area, since a suitable route can always be arranged to reach an exchange in any part of the area, without affecting the number to be dialled by the subscriber

The Director system allows exchanges to be of any capacity up to the limit of 10,000 lines. By use of the same translation, calls to an exchange not yet built, may be routed to another exchange where spare equipment can temporarily be used to provide service without alteration to the name or number dialled. Similarly subscribers on a manual exchange which is shortly to be transferred to auto-

matic, may be accommodated on spare equipment at a neighbouring exchange without affecting the directory numbers.

In fact, the extreme flexibility of the system allows of an easy solution to all the complex problems introduced by modern traffic conditions and renders frequent re-issues of directories unnecessary during the transition period.

In the London area, the General Electric Co. Ltd. has already installed seven Director exchanges. One has also been completed in Manchester, the second city to adopt the system, and when it was recently decided to introduce director working in Birmingham the contract was placed with the Company for the four automatic exchanges constituting the whole of the initial programme of conversion.



Archway Exchange, London—General View.