

that were in most general use and considered to be standard. Any deviation from the use of standard methods could only be exercised with the greatest caution where such vast interests were concerned, and it was therefore necessary to review carefully what would be the effect of any change upon the whole commercial, economic, and engineering aspects of the Associated Companies' affairs. The responsible officers had further to consider whether any system of automatics extant had attained that degree of perfection in operation and freedom from growing quickly obsolete by more improved methods being devised that would warrant the displacing by such system of the common-battery system that was meeting so efficiently general telephonic requirements. There was also always the patent situation to consider, and companies in such active rivalry were not to be expected to proclaim that there was merit in the equipment of their rivals. With the weight of so powerful an organization opposed to existing automatics and manufacturing companies, both manual and automatic, of the "Independent" interests competing with each other for business in the "Independent" field, the 4-per-cent. development of automatics, so far from being insignificant, is rather to be regarded as a testimony of the merits of that system.

Three hundred thousand automatic telephones in America are about half the number of telephones in use in the British Islands, and there are to-day more automatic telephones in use in *each* of two cities, Los Angeles and Chicago, than there are telephones operating in the whole of this Dominion. This development in automatics has come about in the last few years, due, no doubt, to improvements introduced, such as the use of common battery at central points, the use of the two wires instead of what was called the three-wire system, and the party-line private branch exchange, metering, automatic ringing, and other facilities afforded.

It is now conceded by almost all telephone engineers that automatic and semi-automatic apparatus can be obtained that will work exceedingly well, and that will perform satisfactorily under the manipulative guidance of the subscriber or of the centrally situated operator the functions of effecting connections for telephonic intercommunication. The controversial question that invariably arises is, will it do so economically as compared with manual when questions of first cost of plant, maintenance of plant, depreciation, and the need of mechanics to keep the apparatus in order are considered. In the matter of full automatic the question also arises, in countries where it has not been in operation, whether the public will take kindly to effecting their own connections by manipulating a dial. The question of the economy will be dealt with at a later stage. So far as the manipulation is concerned, in my opinion, based upon inquiry and upon what has been observed, that feature need not be looked upon as an objection at all. People in the States seem rather to like to work the dial. In Munich, on the first introduction of the automatic there about two years ago, fully 60 per cent. of the people expressed dislike to the system; they soon became pleased with it, and now not 2 per cent. of them have any objection. There are about 5,000 automatic subscribers.

The American Telephone and Telegraph Company, despite its attitude already referred to towards automatics, began itself the study of a full automatic system in 1900, and took up the study of semi-automatic systems in 1904. From the latter year to the present time it has had a large force of engineers and mechanics engaged in developing a satisfactory system at heavy expense. This company, from the studies so far made, appears to be satisfied that it can produce apparatus that, operated as a semi-automatic system, will give both satisfactory and economic telephone service under the exacting conditions that are peculiar to complex rates and classes of service that have grown up in the principal cities of the United States, which are amongst the most populous in the world and possess a business intricacy second to none. They estimate that the application of semi-automatic methods to the whole of their exchanges in the States would result in very considerable annual savings. The Western Electric Company, which is the manufacturing company for the American Telephone and Telegraph Company, has devised the semi-automatic system referred to, which is also suitable for full automatic, and has had it in operation in a 450-line board in its factory for about eighteen months. The system is giving the best of satisfaction operating as an exchange of New York City telephone-area. The American Telephone and Telegraph Company is not satisfied that *for its conditions*, which are largely those of providing telephone service in great cities, the full automatic can be made sufficiently flexible to be acceptable to the subscribers. They therefore hesitate about equipping telephones with dials to enable the subscriber to set up his own connections, fearing that under the circumstances peculiar to large cities the attempt would not meet with success. The experience derived from those places where full automatic is in operation in moderately large cities does not seem to support that view. Subscribers appear to like making their own connections, and have not at any time urged to me any objection on that score. Generally they prefer automatic service, and commend the features that you get through to your subscriber quickly; that you hear the bell ringing when the dial movements are completed; that you know any delay in answering is due to the called subscriber, which really speeds up the service, as subscribers answer more promptly; that there is no girl "butting" in on the line, as they express it; that if your subscriber is engaged you get the "busy" signal at once; that ringing is continuous until the answer is given, and that any connection can be broken instantly at any stage by merely depressing the lever and a new call sent in immediately.

The objection of the American Telephone and Telegraph Company, however, while applying in some measure to the manipulative feature of the dial, has more particular reference to an opinion entertained by the engineers—that the public like to have access to an operator who can give special attention when irregularities arise (and a certain percentage do arise) and so help through connections. There have also grown up around the manual system in large cities many different ways of giving service and of charging for it, and many privileges that some subscribers by paying avail themselves of and that others do not take, all of which are indicated by various bars and marks on the opals and other switchboard parts, and have to be looked out for by operators. Semi-automatic under these