Rates and development react upon each other. If the rate is low and common throughout an extended area considerable development may be expected to result, but this may so enhance the cost of providing each telephone that a loss is produced, and business that is to result in loss is not worth pursuing. When the development has resulted the value of the telephone to each subscriber may now be greater that it was formerly, owing to the large number of persons that can be reached, and each should pay more: but it is difficult, if not impossible, to raise rates under Governmental control. The reaction of rate and development thus becomes obvious, and it is necessary to be extremely careful to set out with a rate that is likely to meet both conditions.

Rates that will pay in one telephone-area may not in another, according as the areas are congested, or scattered, or have special difficulties such as waterways to be passed over. Hence it is that in the United States the rates are scarcely alike in any two cities. Competition keeps them below the point of paying legitimate profits in some cases. In other cases the rates are as high as the business will stand without inviting competition, and in yet other cases they are lower or higher than the average according to the smaller or larger capital expenditure that may be found to be necessary to provide telephones within the area.

It is assumed that we desire development and that it should proceed along business lines. This implies due provision for interest and depreciation of apparatus and plant on a basis that will meet not only the wear-and-tear, but also any obsolescence that may result due to changes in the art. This has its effect upon the rate, because money for these purposes must be earned, and this modification in the rate will again reflect itself upon the development.

There is no doubt that the measured rate is the correct principle upon which to charge for telephone service. It amounts to charging each subscriber some fixed sum for the apparatus and plant necessary to provide telephone service to each, and a charge besides for the wear-and-tear and attendance according to the use made by each subscriber, and also to provide the margin required for depreciation, interest, &c. Each subscriber should have as much concern about others having service as he has for himself, because subscribers are necessary to service being given at all. Measured service keeps down frivolous conversations, reduces the frequency with which subscribers are given "Busy," and thus expedites business. It also keeps the capital cost of the apparatus down, as less is required to carry on the legitimate telephone service of the community. This limitation of the plant enables it to be accommodated in smaller buildings, and the operating staff is prevented from growing out of proportion to the revenue produced, because increase of talk with a flat rate does not signify a larger income.

These elements have more effect in manual than in automatic methods, which are the more suitable for flat-rate service, but all our equipment of whatever kind should be ready to allow of measured service being undertaken at any time. In the meantime, it is necessary to be chary with the rate until some notion of the extent of development, the area over which it will occur, and the difficulties of accomplishing it have been arrived at. Whether our rates, with automatic method of operation, if made applicable to what may be expected to be our areas, are likely to produce results that will be satisfactory cannot be definitely stated until a suitable study has been made.

It is sometimes assumed that a telephone exchange can be put down almost anywhere and subscribers connected to it. This is quite erroneous, and not in keeping with recognized engineering methods. Probably two-thirds of the total capital cost to give telephone service has to be expended in plant outside and between offices, and it is necessary to so locate the exchanges as to keep this plant at a minimum. This necessitates a careful study and a weighing of the costs that will be incidental to locating exchanges at the theoretical centres against those of departing to some extent from these centres so as to make use of sites and premises that may exist already. To this end development studies are called for to determine where the subscribers will be, not necessarily at the time of opening an exchange, but during the process of development, so that the most suitable location may be chosen to keep the capital costs and the annual charges for outside plant at a minimum and to most easily serve them.

These development studies are a prominent feature of the American Telephone and Telegraph Company's methods. Indeed, no works are undertaken without them, and they are being continually made for fifteen to twenty years ahead, and being revised every three to five years in the light of actual happenings and having regard to changes that may be found to be taking place in the art. Although these studies have to be largely what may be styled an "intelligent guess," it has been found that the various data that can be gathered enable so good a judgment to be formed of what may be expected that the results are highly satisfactory.

These studies are not made by the technical or engineering branch, but by the commercial branch, whose officers, of course, have considerable technical knowledge as a result of being long engaged on such work and of being associated with the technical officers. When the study by the commercial branch is completed it is handed over to the engineering staff to carry out. The organization consists of commercial, traffic, and plant engineers. These are closely associated, and as far as possible have rooms so that they may freely meet and confer, and no action is taken by any one upon any matter that may affect the methods or works to be cared for by the others without advising them. Conferences between them are frequent, and even conferences of the officers of these branches from neighbouring and sometimes remote cities or companies take place from time to time.

It is not to be expected that our development studies can at first attain an accuracy corresponding to that referred to, but a beginning has to be made, and it may fairly be claimed that we shall be able to decide where exchanges should be placed much better after such a study than without it.

To do these works staff is required. Our engineering staffs are not nearly sufficiently manned. As outlined, the works contemplated call for a staff of Head Office engineers, whose duty it would be to