

Automatic Telephon

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**The Keystone Equipment in
Picture and Story**

**For the Service of the Telephone
Industry**

**The First Automatic Exchange in
Eastern California**

**Why the Automatic will Solve the
Operator Problem**

Automatic Telephone



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The Sales Manager's Page

THE Sales Manager is quite naturally expected to favor the equipment he is selling; it may be well, therefore, in the interest of absolute impartiality, to present in these columns from time to time the opinions of those not chargeable with any particular degree of partisanship. Such an opinion—especially when it comes from one who has had seventeen years of experience operating the Automatic Telephone—is likely to be of interest.

Recently the Director of Telegraphs of a certain foreign country wrote a number of users of the Automatic Telephone in the United States, asking their candid opinion not only of the good points, but also the bad points, of the Automatic. The replies made to this gentleman were written by the local telephone companies without consultation with the Automatic Electric Company, and without solicitation upon the part of the Company that they be made favorable. It is therefore most gratifying to the Company—and also to all users of the Automatic—to know that these letters were in general highly commendatory of the Automatic.

Many of these letters—copies of which have been voluntarily sent the Automatic Electric Company by the writers—are most interesting. One of them is of particular interest to the operator of the exchange of medium size, being the statement of an official of a company operating some 2,600 lines of Strowger Automatic, with about 3,100 telephones.

"Regarding the good points (of the Automatic)," wrote this gentleman to the Director of Telegraphs, "there are:

"First: Prompt connection with the subscriber desired. The time of the longest dialing (being four digits in our system of ten thousand) is six seconds. This is not the average time; it is the longest possible time it takes to get a number. The *average* time would be under six seconds, because the average numbers are shorter than 0000.

"Second: There is no chance for an operator to misunderstand the number.

"Third: It can be used equally well by all nationalities and needs no interpreter.

"Fourth: It has all of the desirable features of the latest and best of the manual systems, that is,

- a—automatic ringing,
- b—revertive ringing tone,
- c—instantaneous disconnect,
- d—secret service,
- e—immediate recall,
- f—positive busy signal.

"Fifth: The Automatic system gives equally good service every minute of the twenty-four hours of the day. There are no times such as holidays or other times when light traffic might be expected when the Automatic system is not capable of

handling its full load. It knows no holidays and it is always ready for its maximum load."

"Many of our subscribers have been away from home for varying periods of time, and they always come back with the same feeling of relief at not having to put up with the telephone operator," adds this telephone man. "The dialing is so simple that people soon prefer to do that rather than tell the number to the central operator. We have been operating an Automatic exchange for practically seventeen years, and the truth of this statement has been proven over and over again."

Concerning the bad points of the Automatic, this experienced telephone man says: "Regarding the imperfections of the Automatic system, we have not found any that would not apply equally to the best manual system. The apparatus must be taken care of just the same as the manual, but it is no more difficult to maintain than the manual, and, in fact, the different parts of the various pieces of the apparatus are much more accessible for maintenance than in any manual system. The lines have to be free from grounds and shorts, but this can hardly be held against the Automatic system, because to give good telephone service in any system the lines should be free from grounds and shorts. The fact is that we do not believe there are any features which apply to the Automatic system only, and which should be listed in answer to the second part of your question."

"Our company, while a small one, has had a rather unique history," concludes this gentleman, "and we attribute it to the fact that seventeen years ago we decided upon the Automatic system as being the coming telephone system. *We feel that our experience for years has amply justified this faith.* . . ."

Such is the statement, made gratuitously and without solicitation by the Automatic Electric Company, of a telephone company with almost twenty years of experience with Strowger Automatic—and using, today, *the same equipment it purchased seventeen years ago!* Nor is this the only telephone company with such experience—many others, with first-hand knowledge of the day-by-day performance of the Automatic Telephone, extending over a period of years, will testify as willingly in its behalf.

Surely, in the face of such statements as these from companies actually operating the Automatic, this system of telephony is proven as being worthy of the most serious consideration of every present or prospective purchaser of telephone equipment!

The Sales Department of the Automatic Electric Company holds itself in readiness to furnish promptly preliminary or complete estimates for exchanges of any size; to make preliminary or complete studies of traffic or other local conditions, and

to furnish willingly to operating companies information of any kind concerning the Automatic Telephone.

Within the past few years so great a demand has developed for Automatic equipment that the Automatic Electric Company has been centering every effort on increased output. New factory buildings have been erected; new shop equipment has been installed, and the organization has been practically doubled, all with the idea of matching, by steady production, the heavy flow of orders. The result of this work has been that the Company is finally in a position to manufacture, expeditiously and efficiently, orders of practically any size, and to make

prompt deliveries and installation of equipments for exchanges of any size, in any part of the country.

Fear of long-delayed delivery need not deter the prospective user of Automatic, because, unless his case is very exceptional, his equipment can be engineered, manufactured and installed in what is practically the minimum of time required for the production and delivery of apparatus of the character of Automatic.

It is not too early for the operating manager to begin thinking of the future equipment needs of his company—and the possibilities of the Automatic telephone will naturally interest him now, when the trend of telephony is so strongly toward Automatic.

For the Service of the Telephone Industry

Highly Organized Engineering and Manufacturing Facilities, Backed Up by a Far-Sighted Production Policy, Have Placed Automatic Electric Company in a Position to Meet Promptly and Effectually the Needs of Telephone Operating Companies of Every Size

By R. C. GIFFORD

Superintendent of Production
Automatic Electric Company

THE active recognition of the fact that future telephone development will be along the lines of Automatic operation, and the greatly increased demand for Automatic telephone equipment during the past few years, not only in this country but also abroad, have combined to place a great responsibility upon Automatic Electric Company as an organization devoted to the service of the telephone industry.

To build up such an organization, and one that is capable of meeting the obligations imposed by such a combination of circumstances, has not been without its trials. Indeed, had it not been for the fact that our manufacturing and engineering facilities have long been developing with an eye to the future, conditions would not be so gratifying as they are today.

In the early days of Automatic telephony, this process of developing facilities on the basis of future needs was greatly aggravated by the peculiarities of the business itself. As a manufacturing organization we stood absolutely alone, and only those that were privileged to take a hand in the evolution of the business at that time can fully appreciate just what we had to contend with.

BUSINESS PECULIAR

No manufacturing organization had ever attempted the quantity production of such a complex arrangement of electro-mechanical parts that went to make up the Automatic telephone switchboard of those days. No operating methods or mechanical processes had ever been evolved that would fit exactly into the economic manufacture of our particular product. There had been no precedents established from which we might have gleaned ideas, either of a manufacturing or organization nature.

The result was that we were compelled to originate methods of our own, methods not required in other or simpler lines of business. As an example of this we might cite the development of efficiency

engineering, which is nowadays everywhere hailed as an economic essential in practically every line of business.

But efficiency engineering was realized as a necessary factor in the economic production of Automatic telephone equipment almost from the beginning. True, it may have been applied in ways that were peculiarly adaptable to our business, but the fact will serve to emphasize the need that existed for specialized effort.

OPERATION PLANNING

Another example may be found in the planning of operations, and the routing of parts in process of construction through the factory. A moment's thought as to the thousands of different parts, materials, and finishes that enter into the assembly of a complete Automatic telephone installation, will serve to emphasize the necessity for absolute co-ordination between the various departments of the plant.

Here again it was essential that we initiate methods that were apparently peculiar, methods that were undesirable or unnecessary in other lines of business. Parts had to be manufactured in sufficient quantities to justify bonus methods of compensation, at the same time without tying up money by stocking up on partly finished products. Operations had to be planned so as to eliminate rushes of work in the various departments, and yet to conform to definite delivery schedules.

TOOL DEVELOPMENT

The same thing has applied also in the development of our manufacturing equipment. While standard punch presses or other machine tools could be used for the quantity production of many parts, others were so peculiar in design, material or function, that we were compelled to design and manufacture our own machinery in order to produce them.



Wiring the Bank Multiples for Strowger Switches

Particular care was needed here not to tie up money in expensive tools or machines that might shortly be rendered worthless by changes in design or material of the parts to be made. On the other hand, the design of the equipment itself had to be governed as far as possible by the manufacturing processes already available.

SELECTION OF MATERIALS

Another difficulty we had to contend with in earlier days was the selection of suitable materials from the very limited variety that was then on the market. The development of electro-mechanical products had not progressed sufficiently far to justify the development and marketing of the many excellent materials that are available today. Rather than risk the production of an inferior product by the use of cheap or unsuitable materials, in many cases we were compelled to develop our own, or to induce other firms to develop them for us.

Fortunately the natural development of electrical products during the past ten or fifteen years has eliminated most of the trouble of this nature. Indeed the chief difficulty now is not to find a material suitable for a certain purpose, but to decide which one, of the many that are available, is the best.

SWITCH FRAME

It has sometimes happened that the material used in a certain part of an Automatic switch has been governed largely by manufacturing possibilities. An interesting example is found in the construction of the Strowger switch frame, the shape of which has remained essentially the same for more than 20 years. This is one of the most complicated castings ever designed, and at first no foundry could be found to undertake the manufacture of this casting in iron. In fact, only one foundry consented to undertake it at all, and this necessitated the use of a special alloy and the casting of the frames by a special process.

This die-cast frame was in use for many years and served its purpose in a very satisfactory manner, although the frames were not as permanent in construction as could be desired. At a later date we were able to induce another foundry to produce the same frame cast in iron, but at a somewhat greater expense. The present cast-iron frame is

entirely permanent and is highly successful in every way.

To assist in these phases of our development, we have at all times maintained a chemical research department where materials for work in progress are carefully tested, and held to certain definite specifications, both as to quality and dimensions. In this laboratory also, new materials are constantly being developed and those developed by other firms given careful tests to determine their suitability for any part of our product.

INSPECTION PROCESSES

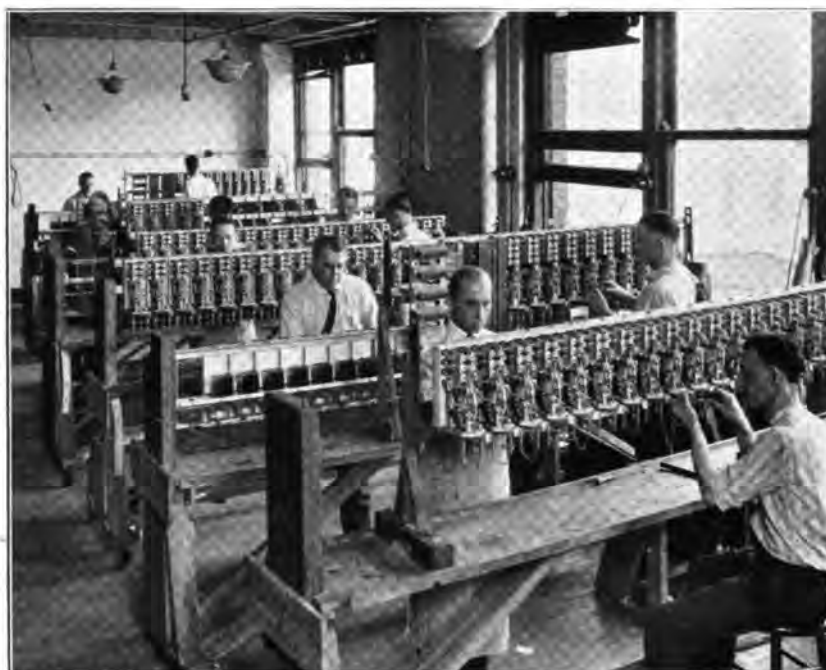
Another important phase of the production of Automatic equipment is process and finished product inspection. Serving a large number of telephone companies, whose requirements vary so widely, has naturally necessitated slight differences in circuit or mechanical design. A staff of inspection experts, which has recently been tripled in size, and which is capable of passing on every conceivable type of equipment, insures that no finished article be packed for shipping unless it is in perfect operating condition.

Owing to the widely different service requirements of many operating companies, and the various conditions under which they operate, it is manifestly impossible to standardize very highly on switch-board equipment. Although the fundamental design of all Strowger Automatic switches and switchboards is very rigid, it is considered advisable to carry standardization of the finished product only so far as it will not conflict with the requirements of our customers and their subscribers.

For this reason it is not economically possible to carry completely assembled switchboards in stock. We are, however, enabled to carry completely finished parts in stock, so that deliveries within the capacity of the factory can be made promptly.

VALUE OF STANDARDIZATION

The value of standardized requirements and their effect upon delivery schedules is much greater than most of our customers are able to realize. It is difficult for many companies to understand why a variation from an established standard, even though the difference be slight, should have the effect of setting forward the delivery date. It is nevertheless true,



A Corner of the Selector Switch Inspection Department

and while we are willing to go the limit in meeting delivery requirements, it is usually impossible to set a date for special equipment as early as that for standardized equipment.

ENGINEERING DETAILS ESSENTIAL

One of the things that stood in the way of prompt delivery then, and still often does, is the necessity of securing every minute detail of engineering information, before a hand can be stirred in the actual production of the equipment.

For example, a customer may be very careful to explain every detail of his service and traffic features, the kind of equipment he desires and the number of stations to be served, and then neglect to submit a floor plan, with the result that the entire job must be held up and all engineering and manufacturing stopped until this information is available.

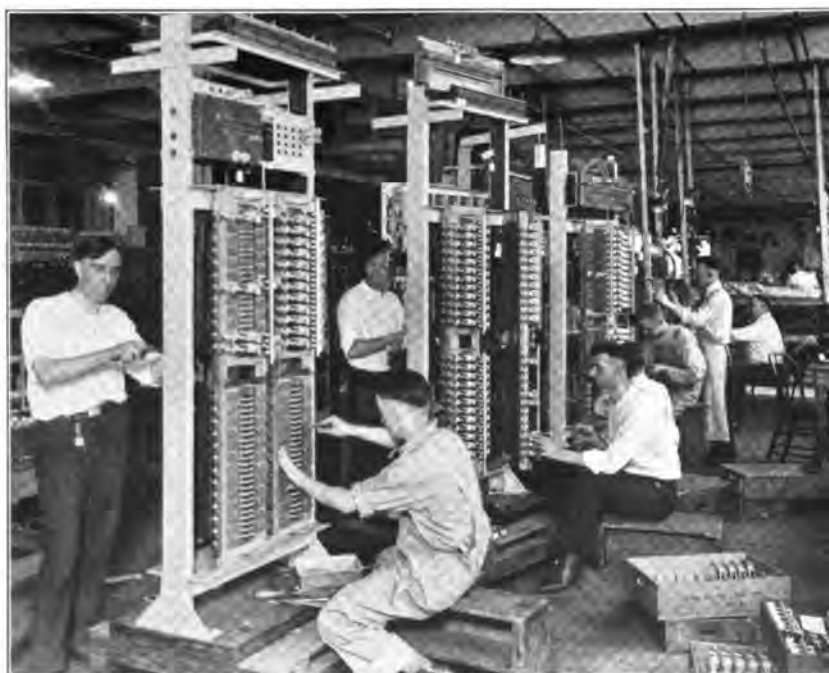
Another may intimate in a broad way the kind of service he desires the equipment to render, but fail to indicate the way in which this service is to be given. A frequent cause of delay in the design of power equipment is the lack of information as to the class of commercial power available.

It is impossible to choose any one part of our organization and say that it is our most important and valuable asset. Lacking any one of these elements in production just described, continued operation would be impossible.

But perhaps the most impressive factor in Automatic Electric Company's activities is its highly trained and closely co-ordinated personnel. Systematic and thorough training of employes has been an established practice almost from the beginning.

These things, together with our engineering experience and research facilities form an organization which is as permanent and indestructible as it has been difficult and costly to build. Its value to the telephone industry as a whole cannot be measured directly in dollars and cents. While it is

ostensibly an organization devoted to the manufacture of Automatic telephone equipment, this describes its activities and possibilities in only a very limited way. Built at an immense expenditure of time, money and effort, but as permanent as the telephone industry itself, it stands ready to meet completely and promptly every requirement of the telephone field.



Assembling Line Switch Units

In Memoriam



Wilson Lee Campbell
1874 - 1921

IT IS with profound regret and sincere appreciation of his worth as a man and a member of this organization that the management and Board of Directors of Automatic Electric Company place upon the corporate records this expression, upon the occasion of his death after 26 years of service.

Entering the employ of the Strowger Automatic Telephone Exchange, predecessor of the present corporation, in 1895, immediately upon graduating from the Iowa State College, he took the customary apprenticeship course, and early gained the notice and confidence of his superiors because of his evident intelligence, earnestness, loyalty and good judgment.

Passing through various positions and executing all of the duties entrusted to him uniformly well, he became general superintendent in 1908 and for thirteen years devoted himself with unexcelled earnestness, singleness of purpose and success, to the building up of the production departments of the organization in all its branches.

Assuming the direction of the factory at a time when the organization was a relatively small one, he developed its processes along the lines of modern systematic and efficient methods until today it stands as a monument to his close study, wide knowledge,

keen foresight, patient endeavor and prudent progressiveness.

A man of practical affairs, engaged in solving the problems involved in the mass production of a highly specialized equipment, he never lost the truly scientific point of view. He retained through all his activities the ability to study each question presented in a detached and impersonal manner, but having arrived at a solution, his personal devotion and enthusiasm were unflagging, and these contributed as much to his success as did the absolute impartiality of his judgment.

Through close study and sympathetic understanding, he gained a wide knowledge of the problems of the telephone operating field, a knowledge invaluable in the development of Automatic Telephone equipment to meet the requirements of changing service conditions, and recognized in the high esteem in which he was held by all members of the telephone profession, regardless of position or affiliations.

A man of unquestionable probity, wide interests and deep sympathies his loss is felt by his associates no less keenly because of his character and personality than because of his ability as executive, engineer and scientist.

The Northern Indiana Convention, Lake Wawasee, June 14-16

THE Northern Indiana Telephone Association has been holding conventions for a number of years, but never have its members had a more delightful time than at Lake Wawasee. The weather was ideal; the South Shore Inn where the convention was held and all accommodations provided, is delightfully located on the bank of the lake; the building and the equipment are new, and the service throughout was exceptionally good.

Members and friends of the association began arriving Monday and when President Frank V. Newman, General Manager of the La Porte Telephone Co., La Porte, Ind., called the meeting to order at 8 o'clock Tuesday evening, there were perhaps 150 people assembled to hear the Honorable Henry A. Barnhart, who is President of the Rochester Telephone Co., Rochester, Ind., and President of the Indiana Telephone Association, give his popular lecture on "Congress in Action." Mr. Barnhart's address was most favorably received and enjoyed.

Wednesday morning, President Newman called the men together on the big veranda where a most interesting session was held.

Mr. Max Hosea, Secretary of the State Association addressed the meeting on the value of association work. Mr. Sam Tomlinson of Plymouth discussed relative costs of present-day operations compared with costs of the past five years. It was pointed out that operating costs within this period have been increased with startling rapidity.

LABOR LAWS TROUBLESOME

The law passed by the last legislature, limiting working hours of female employes under eighteen years of age to forty-eight hours per week and not more than eight hours in one day, and prohibiting the employment of such persons before 6 A. M. or after 7 P. M. was thoroughly discussed.

This law has caught many large companies in a trap for evening and all night operators. The representative of one company states that they were employing 22 operators under age and that it will require two months to eliminate them. Many companies are similarly situated.

It was stated that this law would increase the operating expense of the smaller companies so greatly that they would be compelled to do one of three things: To obtain higher rates for their service, to limit the service after 7 P. M., or to operate with automatic equipment.

Mr. W. S. Vivian of the Automatic Electric Company delivered a paper on "Why the Automatic Will Solve the Operator Problem." Mr. Vivian's very interesting paper is reprinted in part elsewhere in this issue of "Automatic Telephone."

Mr. Frank E. Bohn, General Manager of the Home Telephone & Telegraph Co., Fort Wayne, Ind., was next introduced and in his usual forceful manner he gave a splendid address on "Public Relations." He explained his company's policy in dealing with both employes and public. Mr. Bohn showed by numerous illustrations the benefits that were accruing to his company, not only in increased efficiency of the employes but also in their increased influence and power in the community.

The report of the Nominating Committee was given by Mr. Walter J. Uhl of Logansport and the following officers were elected:

Mr. Frank V. Newman, Gen'l Mgr., La Porte,	Telephone Company, La Porte.....	President
Mr. Harry Phend, Gen'l Mgr., Milford Tele-	phone Company, Milford.....	Vice-President
Mr. W. H. Van Horne, Gen'l Mgr., Wabash	Telephone Co., Wabash.....	Secretary-Treasurer
Mr. S. Tomlinson, President, Plymouth Tele-	phone Co., Plymouth.....	Director
Mr. C. R. Stoops, Gen'l Mgr., Nappanee Tele-	phone Co., Nappanee.....	Director
Mr. R. O. Dorland, Sec'd La Porte Telephone	Co., La Porte.....	Chairman Auditing Committee

Lake Wawasee will long be remembered by those who attended this convention as being one of the most pleasant and profitable meetings ever attended. The telephone industry in Northern Indiana will be better because of it. Both manager and operator will have a clearer conception of their responsibilities and obligations to the public, the subscriber and their fellow employes.



Over 300 Interested Persons Attended the Wawasee Meeting

The Keystone—the Dial and the Keystone Subscribers

Converting Philadelphia Network to Automatic Operation is Latest Step in the Progressive Career of That Company. Move Amply Justified by the Cordial Reception Accorded Mechanical Service by Telephone Using Public

THE twenty years which have passed since the Keystone Telephone Company entered the field in Philadelphia, have seen many and great changes in the telephone business throughout the world. Few other industries have increased with such rapid strides, and no other touches the public more closely and is more vital in their daily life.

And during this twenty year period, the Keystone Telephone Company has consistently maintained its reputation as a progressive and forward-looking organization.

Established in 1901 by a group of prominent Philadelphia men, among them Robert Foerderer, John Mack and Charles E. Wilson, the aim of the company has constantly been to meet the requirements of that city, although the company's network of long distance lines were rapidly extended outside the corporation limits and soon covered the Philadelphia trade area very completely.

LIMITED SERVICE CUSTOMARY

In 1901 the general theory of the telephone business was that a limited number of subscribers, paying high rates and using the service only to a slight extent, was the utmost that could be expected of this instrument, which had not yet proved its value as a real utility.

The Keystone Company organized itself along lines which are universally recognized as correct today—namely, the largest possible number of subscribers at the lowest possible rates, and used as frequently as necessity or convenience dictates. This policy, novel and of doubtful worth twenty years ago, won instant support from the public of Philadelphia, and enabled the company within two years after its establishment, to place six exchanges in operation and cover practically the entire city with its network.

This policy of the Keystone Company was particularly popular with the business interests of the city, and from the beginning the industrial and commercial institutions of Philadelphia have made up a large percentage of the company's subscribers, so much so, in fact, that Keystone service has been called the business man's service. Its methods of operation have been largely influenced by this fact, and its P. B. X. development is probably larger than is found in any other operating company of similar size.

HIGHEST TYPE CONSTRUCTION

On the technical side, the Keystone staff has maintained standards of material, construction and operation in harmony with the best practices of the day. Equipment and line construction insuring the



EDWARD M. COOKE,
General Manager, Keystone Telephone Co.

best possible transmission was placed at the service of its subscribers, while the switchboard operators were selected and trained with the utmost care, to reduce service imperfection to a minimum.

But with the growth of the system and the increased traffic, the management of the company, including Mr. Edward M. Cooke, vice-president and general manager, and Mr. Joseph F. Stockwell, operating manager, foresaw the time when the existing equipment would prove inadequate and would no longer be able to render the high type of service which was set as the goal of the Keystone Company. These executives, familiar with the trend of development in telephone engineering, realized switching by machine instead of by hand was the next great step. The uncertainties and difficulties of the war hurried the final decision somewhat, and in 1918 the Board of Directors determined upon the adoption of the Automatic method of operation throughout their Philadelphia network.

The First Automatic Exchange in Eastern California

The Interstate Telegraph Company's C. A. X. at Big Pine, Cal. is Showing a Substantial Saving in Cost of Operation Over the Manual Exchange which it Replaced. Plans Are Proposed for the Ultimate Conversion of the Entire Network

By VERNON WILDER

General Superintendent
Interstate Telegraph Company

BESIDES including within its boundaries the highest and lowest points of land in the United States (Mt. Whitney and Death Valley), Inyo County has the distinction of possessing the first Automatic exchange installed in Eastern California. This exchange was installed by the Interstate Telegraph Company at Big Pine, California, and placed in service on August 1, 1920.

No one in connection with the Company was familiar, except in a theoretical way, with the Automatic apparatus but with the kind assistance of Mr. R. H. Burfeind of Automatic Electric Company, and Mr. Meckel of The Pacific Telephone and Telegraph Company, who both gave us the benefit of their wide experience, we had no difficulty in getting it installed.

When both of these gentlemen went away and left us to our own devices we were somewhat dubious as to what we should do if anything happened to the exchange. Up to the present time, however, we have been able, with very little effort, to solve such minor difficulties as have arisen in connection with the operation of the apparatus.

NOW CONTINUOUS SERVICE

Prior to the installation of the Automatic exchange, we were operating a small manual exchange and giving service thirteen hours per day, except Sundays, when the exchange was open for four hours. To do this it was necessary to employ two operators. We were renting a building and paying a considerable annual sum for light and heat. We purchased a lot and constructed on the rear of it, a small galvanized iron building with a concrete floor, in which we installed the Automatic equipment. The building is lined with non-inflammable wall board and as all the wiring is in conduit, there is very slight danger from fire—a risk which always confronted us in the manual exchange.

We had some slight trouble with a few of our subscribers at first because, through lack of familiarity with the use of the Automatic telephone, they did not dial properly. A specific instance was found

in the case of No. 10. The Bishop exchange, at which all Big Pine toll business is center-checked, is reached by dialing 01. Some of our subscribers,

when calling Bishop, would reverse the digits and dial 10 instead, which so annoyed the subscriber whose number was 10 that we gave him another number and have left No. 10 vacant.

No serious trouble has developed in connection with the operation of the Automatic exchange. It is working very nicely, giving twenty-four hour service seven days in the week and is showing a substantial saving in the cost of operation over the manual exchange which it superseded, in addition to giving the subscribers a

much more satisfactory service. At the time the exchange was installed, we placed an order for a supply of repair parts, of which we have used only a few up to the present time.

The fact that the exchange is in an isolated location, a long distance from the source of supplies, has made no great difference to us so far since we have had no occasion to make any rush orders on the factory for repairs or replacements.

One problem which has come up is the matter of keeping the inside temperature of the building down. Summer temperatures in Owens Valley are very high although the nights are cool and comfortable. At all the windows we have placed curtains which are kept down, to keep the direct sunlight out of the building, but we still find that it gets very hot. We are now about to experiment with louvers. These are to be placed in two of the windows and are to be covered on the inside with cheese cloth to keep out the dust. Dust in this section of the country is quite a problem as it very rarely rains from May first to January first. By this combination we hope to keep the temperature down within reasonable limits.

On the whole we are very much pleased with the Automatic installation and plan eventually to make nearly all of our small exchanges Automatic and finally to install an Automatic exchange at Bishop, which is the toll center for the northern part of our territory and our largest exchange.



Mr. Wilder Believes in the C. A. X.

Automatic Telephone

*A Journal of Information for the
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Issued Monthly by
AUTOMATIC ELECTRIC COMPANY
CHICAGO, U. S. A.

H. E. CLAPHAM :: Editor

*This publication will be sent without charge to all
interested persons upon request*

TODAY Automatic Electric Company is in a position to engineer completely, manufacture, install and place in operation, telephone systems of any size from the smallest community exchange, to the largest multi-office systems, as promptly as it is possible to carry out any undertaking of equal magnitude.

Automatic Electric Company is able to make prompt shipment and, when desired, installation, of additions to existing networks, either in the form of small increases to existing offices, or the establishment of new sub or main exchanges.

Automatic Electric Company's staff is at the disposal of the telephone companies to study their requirements and make out programs covering a part or all the exchanges in a network, to be executed at once, or at a future date, or to be carried out gradually over a period of years.

Specially trained experts are available to instruct operating staffs in the particular operating methods found most economical and efficient in Automatic exchanges, and to carry on educational work among the subscribers of any company which plans to convert its system, in whole or in part, to Automatic operation.

In a word Automatic Electric Company today stands ready and willing to assume any obligation which the equipment needs of an operating company may impose upon it, and to carry out such obligations to the utmost.

This position is not the result of accident or recent development. It comes from thirty years of constant effort in designing and producing Strowger equipment, and more particularly the determination of the management of the company during the past three or four years, to expand the staff and equipment of Automatic Electric Company so that it may meet adequately every requirement made upon it. Already the capacity of the factory has been increased 300 per cent, and such further increases will be made as the needs of the telephone companies require.

As to the future, probably this can be answered best by pointing out that Automatic equipment, built to the specifications met by the Strowger apparatus, has been accepted as standard by operating organizations responsible for 80 per cent of all of the telephones in the world today, and is being installed by such organizations as rapidly as possible.

Strowger equipment may, therefore, fairly be called "standard" in every sense of the word; its future position is assured and the continued ability of Automatic Electric Company to meet the requirements of its customers, beyond all doubt.

What Operating Companies Want

THE success of the telephone industry in America and its present high state of development are due largely to the constructive policies of and close co-operation between the manufacturers and users of telephone equipment.

Instead of attempting to force the adjustment of the needs of both subscriber and operating company to whatever types of equipment could be most easily produced, manufacturing companies have consistently endeavored to develop and produce equipment that would meet these needs as they arose.

There are many different types of telephone equipment on the market today. This fact gives rise to the thought that the real and fundamental needs of the purchasers and users of telephone equipment have not yet been clearly defined and understood.

The place of the Strowger Automatic system in the telephone industry has never been more firmly established than it is today, and this is due perhaps more than anything else to Automatic Electric Company's close cognizance of the needs of the telephone field. A brief review of these needs and the way they are met by the Strowger Automatic system may serve to emphasize this fact.

The first essential to the successful operation of a telephone plant is an adequate profit. By this is meant the maximum fair profit allowed by regulating commissions.

The economy of operation of the Strowger Automatic system not only provides for a fair return, but does this without the necessity of an upward rate revision, where the rates have been adequate for former equipment. Even though the service is such as to justify higher charges, rate revisions are seldom forced by the adoption of Strowger Automatic.

Other things being equal, the telephone investor prefers that his company be easy to manage. Even a fair profit is not satisfactory if he is constantly beset with operating difficulties or industrial strife. But Automatic equipment has been known to continue in operation with service unimpaired for weeks at a time without attention, and there is no constant revision of wage schedules to interfere with the stability of his investment.

An equipment which encourages the natural growth of a system at the same time providing ease of addition when required, is naturally better than one which is inflexible or one in which the initial investment is out of proportion to the initial traffic. Strowger equipment need be installed only as fast as the traffic requires. Additional sections are always available on short notice.

Another and perhaps the most important factor in the continued prosperity of a telephone company is that of pleasant public relations. This can be assured only by service which is in every way satisfactory, and this is the only kind of service that Strowger Automatic can render.

Mr. F. L. Baer Appointed Assistant Chief Engineer

MR. Fred L. Baer, since 1919 contract sales engineer, has been appointed Assistant Chief Engineer, assuming these duties on July 15.

Mr. Baer entered the employ of Automatic Electric Company in 1903, upon graduating from Notre Dame University. After the usual apprentice course in the factory, he was engaged in installation work at various points and in 1907 became superintendent of equipment of the Bay Cities Home Telephone and Telegraph Company at San Francisco.

During 1912 and 1913 Mr. Baer was with the Pacific State Telephone and Telegraph Company, and in 1913 went to Australia as resident engineer for Automatic Electric Company. Returning to America in 1915, Mr. Baer was resident engineer in connection with the Automatic installations for the Tri-State Telephone and Telegraph Company in Minneapolis and St. Paul.

In 1918 Mr. Baer became sales engineer and in 1919 took charge of the contract sales engineering, which duties he retains in his new position.

Mr. Baer's experience during the past 18 years covers every phase of Automatic Telephone en-

gineering and operation, and he brings to his work exceptional qualifications of knowledge and personality. Mr. Baer is widely known in the telephone

profession, both because of his numerous personal contacts and also through his important contributions to the literature of Automatic Telephony in the form of papers and studies presented before various engineering societies. Mr. Baer's experience with Automatic networks, large and small, has endowed him with a wealth of knowledge that will be altogether invaluable in the performance of his new duties.



FRED L. BAER

Mr. Gonseth Returns from England

MR. Jules E. Gonseth, for many years a member of the engineering staff of Automatic Electric Company, and for some time past resident in England, where he assisted in the reorganization of the engineering department of the Automatic Telephone Manufacturing Company, Ltd., of Liverpool which, because of its war activities and greatly enlarged production program, has found it necessary to add substantially to its technical staff, has returned to the United States and will assist Mr. Fred L. Baer in connection with contract sales engineering.

"Just Like a Charm"

Lexington, N. C., is One of the Many Smaller Cities That Are Turning to Automatic Operation of Their Exchanges as the Only Solution to Their Operating and Service Problems

THE conversion of telephone exchanges from manual to Automatic operation is an occurrence that has become so common in the telephone field, that there seems to be little or nothing that we can say about it that has not already been said about former installations.

We are therefore more than usually pleased whenever such an event and the subsequent operation of the plant are described by a layman. Besides bringing to the story a freshness of style and

novelty of viewpoint not attainable by a mere Automatic expert, his views are naturally unbiased and are chiefly derived from his own personal experience with both the old and new equipment, rather than from theoretical considerations of what Automatic equipment ought to accomplish when compared with other types.

When the four hundred line Strowger Automatic switchboard was recently cut in service at Lexington, N. C., the installation and cutover were so

smoothly conducted as to evoke little comment from any members of the telephone fraternity outside of the local company.

But the story of the cutover and the popularity of the new equipment with the user can best be told by the following announcement taken from the June 13th issue of the "Lexington Dispatch."

"Just like a charm." That's what most of the folks were saying yesterday after they had tried out the new automatic telephone system, which was cut into operation at eleven o'clock Saturday night.

"So clear are the tones carried over most of the lines in the city today that a whisper would almost suffice. The entirely new apparatus and first class battery service is proving most effective toward good service.

"Then just think of turning a little dial three or four times and almost immediately hearing an answer at the other end of the line. Ordinarily under the new system one has the party desired

on the telephone quicker than heretofore 'central' would answer—and certainly quicker than most people have been able to get an answer in recent weeks.

"A number of citizens and practically all the officials and employees of the telephone company were present at the new building Saturday night when the switch was made from the old system to the new. There was but little delay while the offices were being changed and within a short time after the old quarters were abandoned, long distance messages were being handled through the new board."

The Lexington plant has an installed capacity of 400 lines and is equipped for single line, party line and P. B. X. trunk service. The party line equipment is designed to handle five stations per line with bridging harmonic ringers. Each party line connector is equipped with a minor switch for automatic selection of the proper frequency.

The Keystone Equipment in Picture and Story

Some Interesting Facts Concerning the Strowger Central Office Equipment, which is Successfully Meeting the Traffic and Service Requirements of the Keystone Telephone Company's Network

A LARGE multi-office telephone plant such as that of the Keystone Telephone Company at Philadelphia cannot be successfully converted to Automatic operation merely by the manufacture and assembly of switchboard equipment. Only those that have been actively engaged in planning such an undertaking are in a position to realize what it means both to the operating company and the manufacturer, in the way of engineering studies, plant preparations and the planning of operating routines.

More than a year and a half has elapsed since the work of conversion has begun, and it is chiefly to this long period of concentrated effort on the part of Automatic Electric Company's engineering staff and the co-operation of the local company, that the smoothness of the cutover process and the subsequent efficient working of the plant is due.

ONE OF LARGEST NETWORKS

One of the largest Automatic networks in operation today, the Keystone system possesses some unusually interesting features. The Automatic equipment serves some 47,000 stations in Philadelphia, the traffic being handled from six offices, namely Main, Race, West, Park, North and East. The system as a whole is of the five digit type.

Main office, in which the Keystone Company's executive and general offices are located, is the largest, the switchboard having an installed capacity of some 7,000 lines. Race office, which is the next largest, is of importance in that it houses not only the Automatic switchboard, but also all the manual desks associated with the local system.

Apart from the magnitude of the system as a whole, perhaps the most interesting feature of the Keystone plant is the provision made for carrying

the heavy traffic, for which the two larger offices are especially noted.

This heavy traffic results from two principal causes. First the lines of the Keystone system are centered largely within the business districts, which results in sharp and heavy peak loads during the business hours. Second, these exchanges serve an unusually high ratio of private branch exchanges. This combination of circumstances has necessitated a somewhat special treatment in the kind of equipment used, and in the grouping of the switches.

To an equipment or traffic engineer an attractive feature of the installation is the use of secondary line switches of the rotary type, both for local and inter-office traffic distribution. This type of switch was decided on as being best able to meet the company's traffic demands, and the present smooth operation of the equipment is proving that the decision was justified.

As is generally known, the rotary type of line switch has a number of distinct advantages over the plunger type, chief among which are its greater trunk capacity, and its simplicity of operation. Since each rotary switch has access to twenty-five trunks and each plunger type primary switch access to ten secondaries, an efficient cross connecting scheme assures a first selector efficiency closely approximating that of a theoretic group of 250.

ROTARY SECONDARIES

It is a noteworthy fact also that even during the busy hours of the morning when the traffic is heaviest, the great majority of the rotary switches take trunks entirely without motion of the wipers. In other words, the secondary—first selector traffic distribution is so thorough that when a call comes to a rotary switch, it is more often standing on the contacts of an idle trunk than a busy one.



Main Office Switchroom, Showing Rotary Secondary Line Switches

The Keystone numbering scheme has been planned with an eye to future growth as well as present distribution. The distribution of first selector trunks in each office is, in general, as follows:

First level—Reverting Calls (118 - -).

Fire and Police (119).

Second level—Trunks to Main Office.

Third level—Trunks to Race Office and Special Service desks.

Fourth level—Reserved for contemplated "Broad" Office.

Fifth level—Reserved for contemplated "South" Office.

Sixth level—Trunks to Park Office.

Seventh level—Trunks to West Office.

Eighth level—Trunks to East and North Offices through Park Office local second selectors.

Ninth level—Trunks to Camden (N. J.), manual switchboard.

Tenth level—Trunks to long distance board at Race Office.

The manual switchboards, including special service equipment, toll board and official P. B. X., are located on the fourth floor of the Race office building. The trunks to the special service desks are taken from the tenth level of the Race office second selectors, using a numbering plan as follows: Wire Chief, Race 01; Information, Race 02; Complaint, Race 03; Time, Race 04; Keystone Telephone Com-

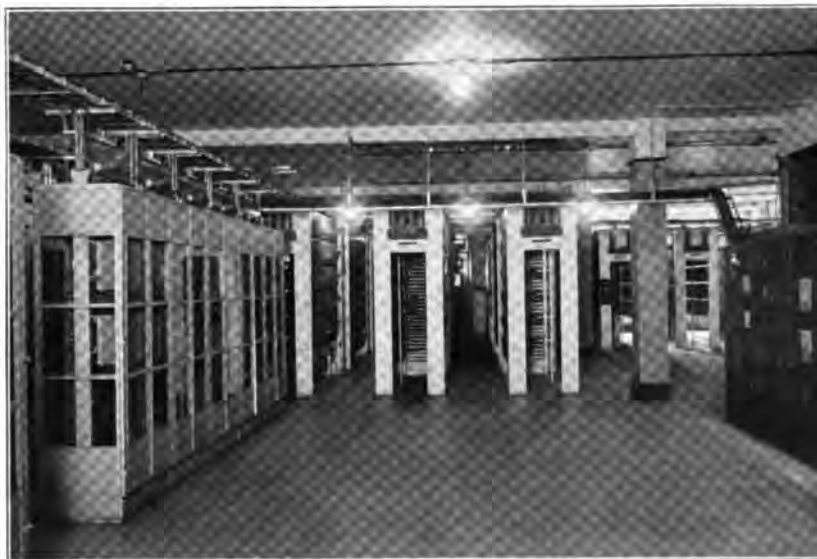
pany, Race, 06.

To reach the long distance recording operator "0" is dialed. Each toll operating position is equipped with a calling device for setting up calls for local stations incoming from long distance points. Each operator has access to trunks leading to toll second selectors in each office.

Each straight line and party line unit is equipped with combination connectors which, although primarily for the use of the toll operator, may be taken by local subscribers when the regular connectors are all in use. The rotary (P. B. X.) units are equipped with local connectors as well as those that are exclusively for toll use.

The pay station line traffic, individual and two party, is handled in a very effective way. Each pay station line is terminated on a line switch (plunger type), and the originating pay station traffic is trunked through rotary secondary line switches to the pay station desk at Race office, where the pay station operator sets up the call by means of the dial. Calls to pay stations are handled automatically in the usual way. The automatic distribution and handling of pay station traffic has worked wonders in speeding up connections.

The majority of the local traffic, including all the party line and P. B. X. traffic, is handled on an unlimited service basis. Provision is made for message rate individual line service where the subscriber prefers.

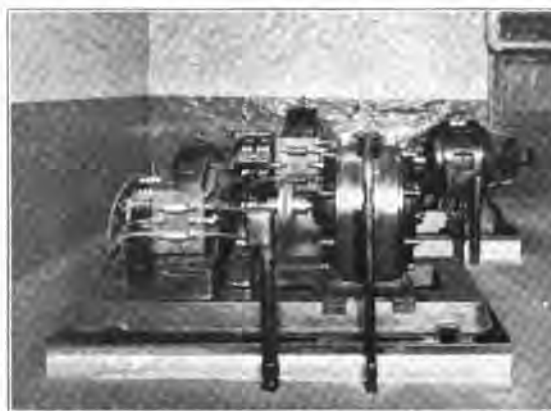


Line Units, Selector Boards and Power Board, Main Office

The party line equipment in each office provides for four party selective ringing, using harmonic ringers turned to 30, 42, 54 and 66 cycle current. Both two and four party units are provided, although in general not more than two stations are equipped.

The power and signal equipment installed in each office is of the type customarily supplied for Automatic offices, including charging machines, storage battery with counter cell voltage control (voltage limits automatically signalled), ringing, busy and tone machines, and harmonic converters for party line ringing. Associated with each power board is the usual supervisory panel for controlling the alarm signals of the Automatic switchboard.

A description of this plant would be far from



Charging Machines, Race Office



Power Switchboards and Counter Cell Control Unit, Race Office

complete without a word of praise for those who were active in bringing the work of conversion to a successful conclusion. The quiet, simple, yet dramatic moments of the transfer of service from manual to Automatic tell but little of the many months of undivided effort that have been given to necessary preparation, both by the Keystone Telephone Company and the installation force of Automatic Electric Company under the leadership of H. P. Mahoney, Assistant Superintendent of Installation and Operation, and Austin Hill, Chief Installer.

There were many times and many places where friction might have developed, but did not, and the Keystone Automatic network today stands as an enduring monument to the unfailing tact and courtesy and conscientious endeavors of those to whose co-ordinated efforts its present successful operation is due.

Why the Automatic Will Solve the Operator Problem

Excerpts from an Address Delivered Before the Northern Indiana Telephone Association, Wawasee Lake, Indiana, June 16, 1921

By W. S. VIVIAN

*Mgr. Dept. Service and Traffic Development
Automatic Electric Company*

IN discussing the subject, "Why the Automatic will solve the operator problem," with you, I fully realize how important a subject it is. There are three distinct types of telephone equipment on the market: Automatic, Semi-Automatic and Manual. Each is radically different from the others. Each manufacturer presumably believes his equipment to be better in most particulars than any other type of equipment. Each type of equipment has its users and its friends.

Therefore, it is important from every standpoint that I do not over-rate the possibilities and advantages of Automatic equipment and naturally I do not desire to under-rate them, although of the two possibilities I would rather under-rate. My desire is to treat the subject in a manner that will be fair and impartial and to allow suitable opportunity for

others to participate in a discussion, should they so desire.

The subject assigned to me quite naturally suggests three divisions; first, that there is an operator problem; second, why the Automatic? and third, why the Automatic will solve the operator problem. We will discuss them in that order, and confine our remarks to local exchange service.

FIRST: "THE OPERATOR PROBLEM"

The problem of the telephone company is to secure young women between the ages of seventeen and twenty who have the proper qualifications, who will undergo a course of training so that they may become capable and efficient; who will be willing to work day hours, evening hours, night hours, Sundays, Saturday afternoons and holidays; who will study and master the rules, and by means of standard phrases handle the traffic in a uniform and cap-



able manner; who will cultivate certain essential qualities of voice so that in using the phrases, subscribers will be impressed with their courteous, cordial manner and interest, and as they gain experience they must be able to improve both in speed and accuracy to the end that subscribers will receive quick, rapid and satisfactory service.

Almost every manager has worked hard to perfect a splendid organization, spending much in time, money and effort. He has used care in selecting young women for the work. He has taken every precaution and made every effort to train the Chief Operator so that she will know how to instruct and supervise her operating force so as to get the best possible results. Possibly with the assistance of competent engineers he knows just what his busy hour traffic is. He knows just how many calls each operator should handle per hour, whether 200, 300, 450, 600 or more calls depending on the type of equipment in use. The operator schedules have been prepared so there will always be just the right number of operators on duty at every hour, each handling the required number of calls per hour. And then—almost without a moment's warning—he receives word that his Chief Operator is going to get married, and right on top of that several of the young ladies of the force are leaving the employ of the Company for one reason or another and he finds the organization that he has gone to so much trouble and expense to build up, destroyed over night and then, while he is securing and training other young ladies to take the place of those leaving, his service deteriorates, and complaints and expense increase.

In the larger centers it costs approximately one hundred and fifty dollars to train an operator until she is able to take a quiet position. It then takes from three to six months before the applicant becomes expert and efficient.

Statistics gathered from various sources over a considerable period of years showed a one hundred per cent turnover every two years. Thus telephone companies have about one year and a half of service from the average operator.

A manager can install a type of manual or semi-automatic equipment which will permit him to reduce his operating force. Still his problem will be with him, for is not the fundamental operator problem the operator herself?

If there is a strike and all operators walk out, he has no "service" to sell. If there is an epidemic which temporarily takes away a number of operators, the schedules are not met and suddenly he is furnishing a grade of service which is below standard.

If there is an operator problem—and there apparently is, else this subject would not have been assigned—the operating company must do one of these three things.

First: They can continue with the problem as it now is. There may be companies operating in certain communities where conditions are such that it is not considered either for the present or the future as serious or important.

Second: They can reduce the seriousness of the problem by installing improved equipment which will require a lesser number of operators.

Third: They can eliminate the problem entirely by installing full Automatic equipment.

THE NEXT DIVISION IS: "WHY THE AUTOMATIC?"

The invention of the telephone in 1876 was as you know, credited to Dr. Alexander Bell. Within

a year or two of that time he is credited with having written a letter prophesying that the day would come when connections would be established mechanically rather than manually. It is therefore interesting to know that the invention of the Automatic Telephone finally took place in the Independent telephone field.

The immediate cause of the original invention was an incident that occurred to a business man in 1888. The story goes that there was an undertaker who was expecting a call, but the call never came. Upon inquiring he learned that the party had called, but that the operator had reported his line busy. This incident, which had occurred tens of thousands of times before, was not only the immediate cause of the invention of the Automatic telephone,

but it was destined to bring about a revolution in the telephone business.

This man, whose name was Almon B. Strowger, became so thoroughly aroused over the fact that he had lost that particular piece of business, because of the operator reporting his line busy, that he resolved to devise a system that would do away with operators. His theory was that so long as there were human operators with their attendant human frailties, there would be human errors. Mr. Strowger received his patents for an Automatic telephone system in 1889.

After receiving his patents his greatest difficulty was to get someone who would assist in financing the project so that he could develop and make his Automatic telephone a practical and commercial success. It is said that he met Mr. Joseph Harris quite by accident. Mr. Harris became interested in the possibilities of the vision which Mr. Strowger

MARITIME TELEGRAPH AND TELEPHONE COMPANY

Halifax, N. S., May 6th, 1921.

Mr. W. F. Benoist,
Assistant General Manager,
Automatic Electric Company,
Chicago, Illinois.

Dear Sir:

In a recent issue of "Telephony" I note the advancement you have again made in your organization. Kindly accept my congratulations on this promotion.

Our Automatic Equipment in Halifax is working in splendid condition, and giving perfect satisfaction; in fact, we have not had one case where the subscriber has been dissatisfied with his service and wished to return again to the former manual system.

Our outside cable is in good condition and our service troubles are lower per station than at the other manual offices.

We will have ready in a few days the summary of our maintenance reports for the month of April. In accordance with arrangements made with Mr. James Engh of your Operating Department, we will send a copy of this report to Chicago, in order that we may receive either criticisms or suggestions that your Operating Department may wish to supply, which will help us to maintain this plant in a manner that your Company would like to see it done.

Yours truly,

A. J. Barnes,
Equipment Engineer.

AJB/JR.

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It is interesting to note that the first Automatic telephone exchange in the world was installed in your great state of Indiana, at La Porte, in 1892. This exchange was more or less crude in that each telephone had three push buttons and five wires leading to the telephone office. To make a call a subscriber manipulated these buttons and then by means of a hand generator rang the called subscriber's bell. That was the beginning, but from that day to this, because of its secrecy, accuracy and availability, there has been a constantly increasing demand for Automatic telephone service.

This brings us to the last phase of the discussion, namely: "WHY THE AUTOMATIC WILL SOLVE THE OPERATOR PROBLEM."

Automatic telephony has weathered the storms of trial and is now before the world as an established fact. The mechanical switch made of iron and steel is superseding the human operator as the express train has superseded the stage coach, the arc lamp the tallow candle, the power loom the hand weaver and the automobile the horse. We are living in the days when science is applied to make the work of men and women easier. *Nothing is done by hand that can profitably be done by machine.*

SERVICE ALWAYS AVAILABLE

The Automatic telephone is as great an improvement over the manually operated telephone as type-writing is over hand writing. It is quick—it is secret, sure and simple. A child can operate it with ease, and blind people use it every day. It is always available; every minute of the day or night, and every night of the week. It is as quick at three A. M., when oftentimes seconds mean life or death, as it is at 3 P. M.

When there is an epidemic and many operators are home because of sickness, the result is the material slowing up of service, with great inconvenience and loss to the telephone using public. The Automatic telephone, however, continues to give the same quick and uniform service.

When there is a strike of telephone operators such as there was in Christian, Shelby and Montgomery Counties, Illinois, during the summer of 1919, telephone service is suspended. Commenting on this strike the Chicago *Tribune* of September 19, 1919, said that the town residents affected had learned "that modern life without the telephone, if not impossible, is disastrous." The *Tribune* then recorded six disastrous incidents of the strike; five deaths and one heavy fire loss which might have been averted except for the lack of telephone service. If the Automatic telephone had been in use, service would have gone on without interruption. With Automatic service, labor troubles are reduced to a minimum.

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Because of these and other features which could be mentioned, the Automatic Telephone appeals to all classes, tongues and ages. It appeals to the lawyer because it gives secret service. It appeals to the banker, not only because it is secret but because it is accurate and saves his time. It appeals to the doctor because it is swift, sure and always available. In fact, in one of the cities where Automatic service is used a minister wrote a letter com-

mending the company because it was an aid to good morals, in that it is a temper saver and an aid in the use of good language. It never talks back.

The real test of telephone service is not what it can do under the best possible circumstances but under the worst. Traffic varies greatly from hour to hour throughout the day. At one time the volume of calls is so great that in manual exchanges it overtaxes the ability of the maximum number of girls who can work at a switchboard. At another time the calls may hardly be sufficient to keep two or three operators awake. The Automatic is built on a different plan. It must of necessity always be ready to meet the traffic. It cannot help but operate with the same speed and accuracy in the dead of night as at midday. Machines do not go to sleep. It does not matter to them whether ten calls or ten thousand calls are made in an hour.

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When the switchboard operators are tired or when the calls come with a rush they cannot give accurate service. But switches of steel and brass are never tired or confused. They always work at lightning speed. They are always on the job every minute, day or night, winter or summer.

That all human agencies are liable to err is aptly stated by the phrase "To err is human, to forgive divine." In spite of the efforts of the operators to give the best possible service, so numerous are human frailties that mistakes will happen. Connections are made with lines already busy—in fact, a thousand and one things are possible and the result, on very many occasions has been a loss of temper with resultant complaints, misunderstandings and expense to the company. With Automatic, the telephone user makes all connections. An Automatic user once said, "To avoid error is automatic." The opportunity for errors are reduced to a minimum and the error, if error there be, has its responsibility in the user and not the exchange.

GREAT FLEXIBILITY

One of the noted features of Automatic equipment is its flexibility. It serves with equal facility a large multi-office system like Philadelphia, the third largest city in the United States, with all of its complications, and a small country town or village, with only a few telephones on individual, party and rural lines.

The operator has been and is a very important part of the telephone business. Instances of her ability, loyalty and courage are legion. In time of fire, flood or other emergency, she has seldom been found wanting. Never has she been so fully appreciated or so high a value placed on her service, as at the present time. But, because a machine made of brass and steel can operate more accurately, rapidly and continuously, and can carry a heavier load more easily and economically than can the operator made of flesh and blood, whom we wouldn't have any different if we could, are reasons, "Why the Automatic Will Solve the Operator Problem."

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It is interesting to note that the first Automatic telephone exchange in the world was installed in your great state of Indiana, at La Porte, in 1892. This exchange was more or less crude in that each telephone had three push buttons and five wires leading to the telephone office. To make a call a subscriber manipulated these buttons and then by means of a hand generator rang the called subscriber's bell. That was the beginning, but from that day to this, because of its secrecy, accuracy and availability, there has been a constantly increasing demand for Automatic telephone service.

This brings us to the last phase of the discussion, namely: "WHY THE AUTOMATIC WILL SOLVE THE OPERATOR PROBLEM."

Automatic telephony has weathered the storms of trial and is now before the world as an established fact. The mechanical switch made of iron and steel is superseding the human operator as the express train has superseded the stage coach, the arc lamp the tallow candle, the power loom the hand weaver and the automobile the horse. We are living in the days when science is applied to make the work of men and women easier. *Nothing is done by hand that can profitably be done by machine.*

SERVICE ALWAYS AVAILABLE

The Automatic telephone is as great an improvement over the manually operated telephone as type-writing is over hand writing. It is quick—it is secret, sure and simple. A child can operate it with ease, and blind people use it every day. It is always available; every minute of the day or night, and every night of the week. It is as quick at three A. M., when oftentimes seconds mean life or death, as it is at 3 P. M.

When there is an epidemic and many operators are home because of sickness, the result is the material slowing up of service, with great inconvenience and loss to the telephone using public. The Automatic telephone, however, continues to give the same quick and uniform service.

When there is a strike of telephone operators such as there was in Christian, Shelby and Montgomery Counties, Illinois, during the summer of 1919, telephone service is suspended. Commenting on this strike the Chicago *Tribune* of September 19, 1919, said that the town residents affected had learned "that modern life without the telephone, if not impossible, is disastrous." The *Tribune* then recorded six disastrous incidents of the strike; five deaths and one heavy fire loss which might have been averted except for the lack of telephone service. If the Automatic telephone had been in use, service would have gone on without interruption. With Automatic service, labor troubles are reduced to a minimum.

SPEAKS ALL LANGUAGES

Because of these and other features which could be mentioned, the Automatic Telephone appeals to all classes, tongues and ages. It appeals to the lawyer because it gives secret service. It appeals to the banker, not only because it is secret but because it is accurate and saves his time. It appeals to the doctor because it is swift, sure and always available. In fact, in one of the cities where Automatic service is used a minister wrote a letter com-

mending the company because it was an aid to good morals, in that it is a temper saver and an aid in the use of good language. It never talks back.

The real test of telephone service is not what it can do under the best possible circumstances but under the worst. Traffic varies greatly from hour to hour throughout the day. At one time the volume of calls is so great that in manual exchanges it overtaxes the ability of the maximum number of girls who can work at a switchboard. At another time the calls may hardly be sufficient to keep two or three operators awake. The Automatic is built on a different plan. It must of necessity always be ready to meet the traffic. It cannot help but operate with the same speed and accuracy in the dead of night as at midday. Machines do not go to sleep. It does not matter to them whether ten calls or ten thousand calls are made in an hour.

SIMPLE TO USE

A simple movement of the dial in the Automatic system calls someone next door—in the next block—or miles away, as may be desired. It makes each call quickly and accurately. Being a machine it must connect you to the telephone whose number is dialed, and being a machine the service is uniform.

When the switchboard operators are tired or when the calls come with a rush they cannot give accurate service. But switches of steel and brass are never tired or confused. They always work at lightning speed. They are always on the job every minute, day or night, winter or summer.

That all human agencies are liable to err is aptly stated by the phrase "To err is human, to forgive divine." In spite of the efforts of the operators to give the best possible service, so numerous are human frailties that mistakes will happen. Connections are made with lines already busy—in fact, a thousand and one things are possible and the result, on very many occasions has been a loss of temper with resultant complaints, misunderstandings and expense to the company. With Automatic, the telephone user makes all connections. An Automatic user once said, "To avoid error is automatic." The opportunity for errors are reduced to a minimum and the error, if error there be, has its responsibility in the user and not the exchange.

GREAT FLEXIBILITY

One of the noted features of Automatic equipment is its flexibility. It serves with equal facility a large multi-office system like Philadelphia, the third largest city in the United States, with all of its complications, and a small country town or village, with only a few telephones on individual, party and rural lines.

The operator has been and is a very important part of the telephone business. Instances of her ability, loyalty and courage are legion. In time of fire, flood or other emergency, she has seldom been found wanting. Never has she been so fully appreciated or so high a value placed on her service, as at the present time. But, because a machine made of brass and steel can operate more accurately, rapidly and continuously, and can carry a heavier load more easily and economically than can the operator made of flesh and blood, whom we wouldn't have any different if we could, are reasons, "Why the Automatic Will Solve the Operator Problem."