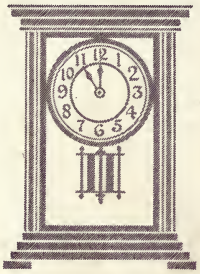
THE ELEVENTH HOUR

THE ELEVENTH HOUR



This book tells in story and picture the inside history of Mrs. Douglas's party.

WITH THE COMPLIMENTS OF THE
NEW YORK TELEPHONE COMPANY
AS A SOUVENIR OF YOUR TRIP BE-
HIND THE SCENES IN A TELEPHONE
CENTRAL OFFICE

The Eleventh Hour

JUST a little party—dinner for eight and the theater. But they didn't start to plan it until nearly noon, and then there was so much to be done. The guests had to be invited; dinner had to be ordered; and theater tickets had to be bought.

Mr. and Mrs. R. Gordon Douglas easily solved the problem. They simply took the telephone into their confidence, made their arrangements over the wire, and gave a successful dinner party.

There's nothing particularly unusual in that,—it is exactly what you or anybody else would have done under the circumstances. But—

Back of this story of a party arranged by telephone is another story of absorbing interest to every telephone user. It is the story of the vast organization and the delicate apparatus that make each call possible—the story of a world of unseen wonders. What goes on in this world,—the flashes of signals, the spoken words, the constant tests and care taken to maintain a great system of communication—is practically unknown to you. You see very little of it except the handy instrument on your table or on

the wall. You hear only the cheerful voice that asks, "Number, please?"

So we will lift the curtain and take you behind the scenes in the telephone central office while Mrs. Douglas' dinner party is being arranged. We will follow each call and describe briefly some of the central office apparatus that is called into play. So rapid and varied is the action at "Central" that we will tell the story, as nearly as possible, in the form of a motion picture. We will show the relation between the story and the pictures by means of black face type.

New York City is here chosen as the scene of action, but the story of how telephone calls are handled and the description of the telephone central office apply with but slight variation throughout the whole Bell system.

The actors in this drama "behind the scenes" are real persons. They take part in thousands of similar dramas every day in the year. Only the people at the ends of the wires—Mr. and Mrs. Douglas and their friends—change each time.

Because this story is so much the same every time a call is made; because you yourself have been

frequently in the position of Mr. and Mrs. Douglas in making use of the telephone as a time saver, we believe you will find in it a personal interest.

Here you will see how the "Local" and "Long Distance" operators weave the ever-changing web of conversation. You will watch the switchboard electricians at work. You will visit "Information" and the "Trouble Operator" and the "Wire Chief," as he guards the system against interruption of service, and through it all you will see the Spirit of Service—the spirit that directs the loyal, dependable work behind the scenes so that *you*, too, if you wish, may arrange your parties at "The Eleventh Hour" by telephone.

The Characters

in this little chapter of every-day life are:

Mr. R. Gordon Douglas . . . . . *A Broker*

"PBX" . *Private switchboard attendant in his office*

Mrs. R. Gordon Douglas . . . . . *The Hostess*

Mrs. Charles Pickard Turner . { *Her Sister, the Guest of Honor*

Mons. François Maurier . *The Chef of the Occasion*

Dr. Mortimer W. Ripley . . . . . *A Guest*

Mr. James T. Townsend . . . . . *A Guest*

Mr. John T. Harrison . . . . *A Friend in Albany*

Mr. Louis Bennett . . . . . *At the Box Office*

Telephone operators at "Central," the "Trouble" Operator, "Information," "Long Distance," "Wire Chief," "Outside Trouble Man," etc.—all behind the scenes.

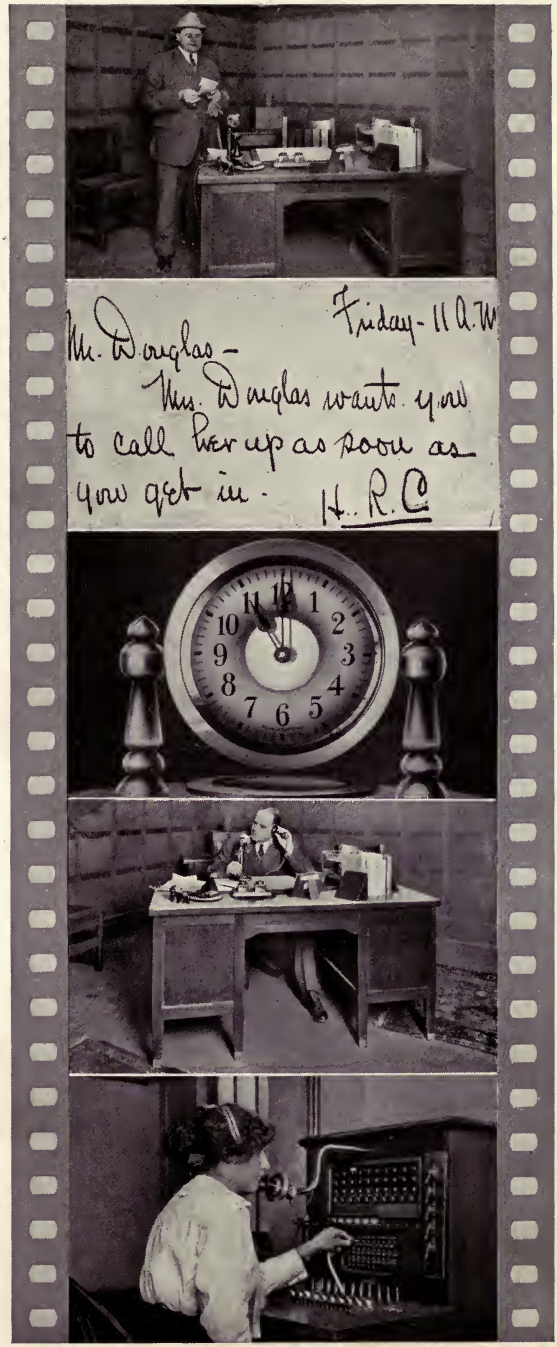
HAD the conference lasted one minute less, or had the elevator stopped one floor less on its upward trip, **Mr. R. Gordon Douglas** would have talked with Mrs. Douglas instead of **finding the note from her on his desk.**

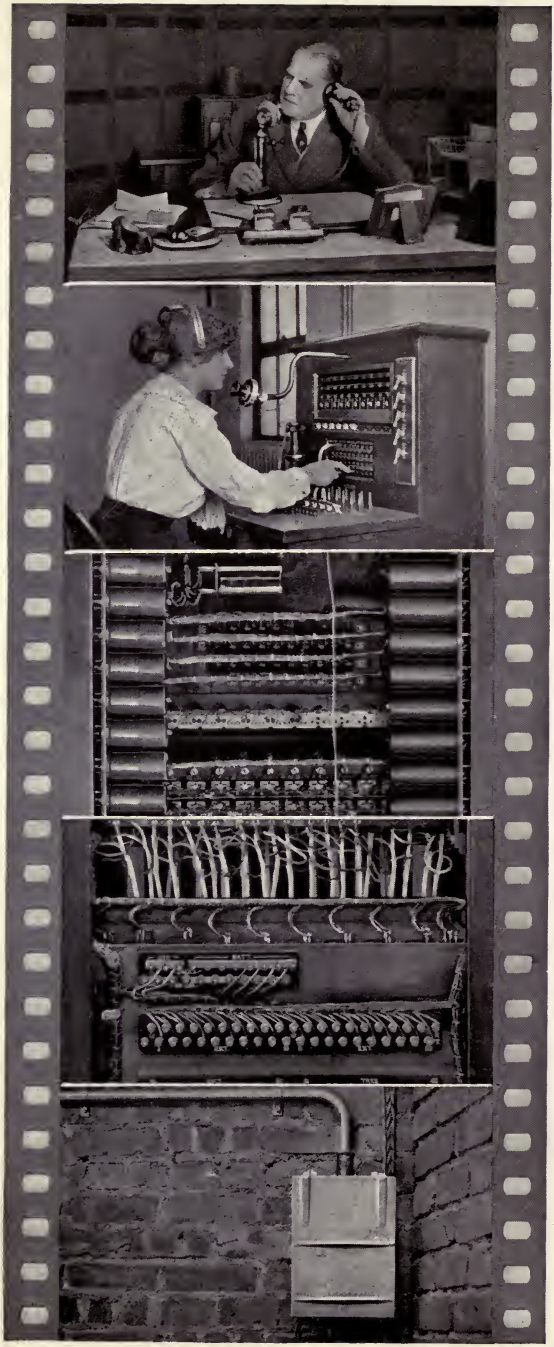
Eleven o'clock! and a raft of work piled up ahead. But business had been waiting on Mrs. Douglas for eight years, and it must wait again. Mrs. Douglas simply must be called.

As **he removes the telephone receiver** a signal shows on the switchboard in his office exchange. This signal is on his line, and connection may be made through a hole or "jack" in the upper part of the board.

Brass tipped cords grouped in pairs are used to form the connections between two office telephones, or between the office and the great outside world. Upon receiving the signal from Mr. Douglas, **his telephone attendant inserts a back plug** in the "jack" corresponding to the number of Mr. Douglas' extension, and throws a switch so that she may talk to him.

"Number, please," she asks, so that she may know with whom he wants to talk.





"Riverside 2-2-4-8-0," says Mr. Douglas. This is a call outside of the office, and we will follow the call through the maze of telephone equipment until it reaches Mrs. Douglas in her home, miles away.

His operator, who, as will be seen, is called "PBX" in official parlance, **picks up the plug** in front of the one now connecting with Mr. Douglas' telephone, and " plugs into " a trunk line leading to the telephone central office.

Immediately a tiny electrical current passes from the private switchboard over the trunk line wire to the telephone central office, **flashing down an insulated wire** to a **cable box** where it enters a main cable that covers that section of the street.

Several hundred pairs of wires, leading from as many separate telephones, are bound up in this lead-encased cable, which runs from the cable box down into the ground.

Thousands of miles of copper wire—really the most valuable copper mine in existence—are carried in cables under the streets of a city.

These heavy cables are far too many and too heavy to run overhead on poles or supports. They are deep in the earth, and are reached through covered **manholes,** placed as conveniently as possible, usually at street corners.

Through seemingly endless **conduits** these heavy cables lead directly to the central office located in the very heart of the district it serves. In this case the wires are leading to the "Spring" telephone central office, because Mr. Douglas' office telephone is Spring 43250.

They enter the telephone building through a corridor called the cable vault, in the basement.

Pictured here is a group of these **cables as they leave the street,** each carefully numbered, so that it may be properly identified. Order is the first command behind the scenes.

Up through the walls they go to distributing frames, where the thousands of pairs of wires may be carefully arranged so that the connections may be made in an orderly manner.

Here **on the distributing frames,** enormous racks ceiling high, and filling a large room, **the many wires are separated,** each pair to go its way.

This room is fireproof and moisture proof, so that nothing can injure the delicate wires or interfere with their messages.

Each wire has its own fuse, providing against damage by an overcharge of electricity. Such a charge only burns the individual fuse; thus "Central" and the telephone user at the other end of the wire are protected.

All of these wires are readily accessible, permitting electricians to work easily and quickly.

The wires carrying the message to this point are **here joined to another pair,** leading to the central switchboard.

Joining these pairs of wires is a delicate and thorough operation, for unless they are perfectly and tightly fastened together the message would be hindered or interrupted. Constant supervision and careful examination are given this very important detail, as well as every other detail inside and outside the telephone central office.

The equipment employed in handling the particular call now being followed represents thousands of dollars and millions of cares, appreciated only when one realizes how many calls have to be answered promptly and properly during every hour of the day.

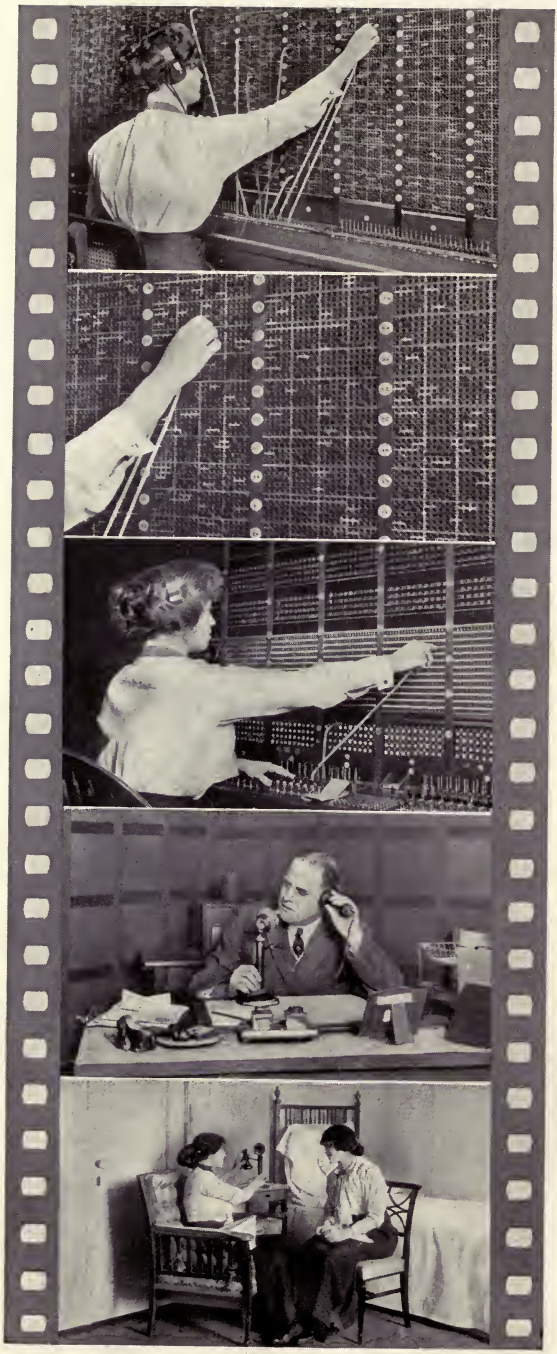
Sometimes a condition arises where a part of the switchboard becomes overloaded by an unusually large number of calls.

To correct this **overloading** some of the **lines must be transferred** to another part of the board. This change is made possible by an **intermediate distributing frame,** where any series of wires may be switched about.

The second and third pictures show how this work is quickly done.

Both the distributing and the intermediate distributing frames are under the direction of expert electricians.

The call now approaches the switchboard through what is technically known as a **"relay,"** which operates and automatically lights a tiny signal lamp in front of "Central," showing her that a call demands immediate



The "B" board has a long row of single cords, instead of pairs of cords, as on the "A" board. Each one of these cords is connected back through a "trunk" line to a numbered jack on the "A" board of some other central office. Each one is numbered, and each has a tiny signal lamp connected with it, which signals "B" to disconnect when "A" has disconnected.

In this case **"B" picks up the plug of "46" trunk,** which is idle, and assigns this trunk number to "A." At the same instant she tests the line being called by **touching the tip of the plug to the sleeve of the subscriber's jack.** If the line called is busy, she hears a click in her receiver, which informs her of that fact. If the line is not busy, she plugs in. She plugs in now.

The "A" operator back in the Spring Central Office now **plugs her front cord into the jack** which is the terminus of "46 trunk," leading to the "B" board at the Riverside Central Office. **This connects Mr. Douglas'** telephone straight through both central offices to **Riverside 22480,** the number he is calling.

Mr. Douglas has been holding the line, and is therefore ready to talk as soon as Mrs. Douglas answers.

"Riverside 2-2-4-8-0," she says, answering with her number, in order that the person calling may be sure that he has the right number and may state his message without delay.

"Hello, Helen." Mr. Douglas recognizes his wife's voice immediately, and he starts speaking to her just 25 seconds after he took his receiver off the hook.

"Hello, dear," Mrs. Douglas answers. "Dorothy is here, and you know she sails for Europe tomorrow. I'd like to give her a little dinner before she sails."

Mr. Douglas agrees and suggests a theater party. **He makes note of the arrangements** as they decide upon them.

"I'll see that everything is arranged," says Mr. Douglas.

"All right, dear, and be sure to come up early. Good-bye."

They both hang up their receivers. Instantly a white signal on the private branch exchange board tells "PBX" that Mr. Douglas has "hung up."

She disconnects, pulling out the two cords and allowing them to drop back into place.

"A" sees the little lamps associated with the cords light, and knows that the conversation is finished, so **she disconnects. As soon as "B" sees the signal lamp on her board light, she disconnects** too, allowing the cords to fall back into place. All of these operators, "PBX," "A" and "B," disconnect at almost the same time, and as soon as Mr. Douglas and his wife have "hung up." This clears the line for future calls.

Only two minutes have elapsed since Mr. Douglas entered his office. And now to arrange for the dinner party.

"I'll make sure of the dinner, anyhow," says Mr. Douglas to himself as **he lifts the receiver to call François Maurier, the caterer.**

"Number, please?" says "PBX."

Mr. Douglas asks for "Information." Maurier has opened a new establishment and his new

telephone number is not yet in the directory. But Mr. Douglas can get the new number at once.

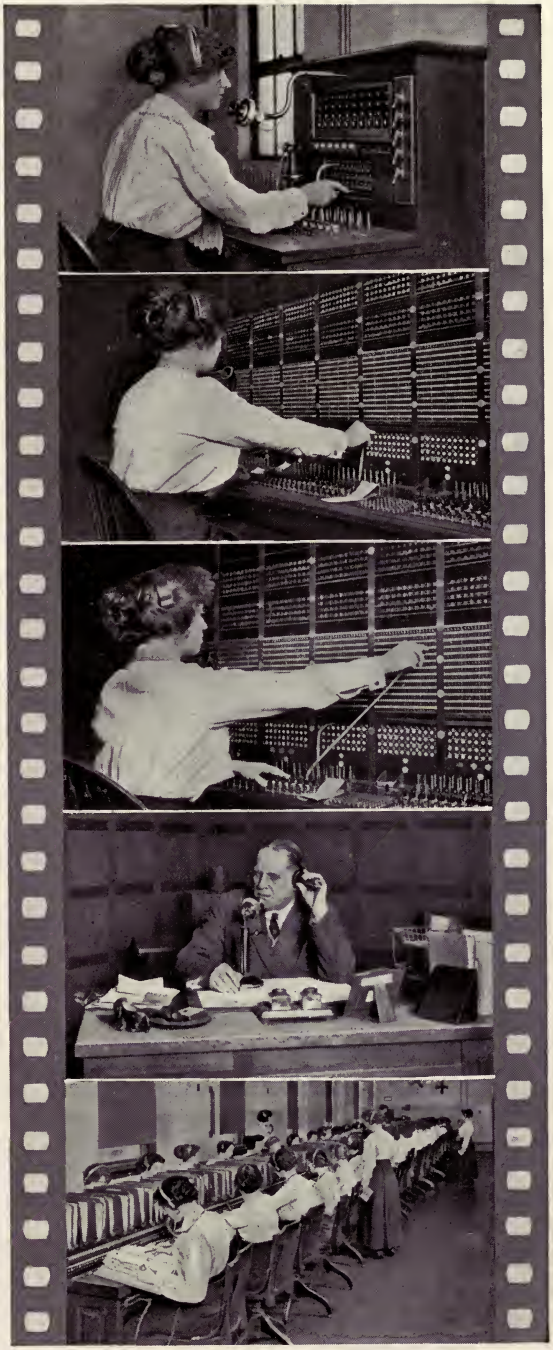
"PBX" connects with the operator at the "A" board, as before.

"A" answers, and "PBX" asks for "Information."

"A" promptly **"plugs in" on a special jack** which **connects Mr. Douglas directly with "Information."**

Answering questions is not a part of the work of the operators who are usually known as "Central." All calls of this nature are handled by a special department. It is known as **"Information,"** as all branches of the telephone exchange have the simplest possible names, for the convenience of the public and the operators who handle the calls.

"Information" will tell you the telephone number of an apartment house, or the number of a residence, if you can supply the name of the party living there. She can give you the telephone number of a friend you may wish to call in a distant city.



The information operator has records of telephone numbers by street address, records of listings against telephone numbers, and records showing changes in numbers or the disconnection of telephones.

The information records are kept up-to-date easily, as they are typewritten loose leaf books, which can be revised at any time.

"Information" answers, "This is Information." **Mr. Douglas gives her the name of François Maurier** and his approximate address.

"One moment, please," says "Information" cheerfully. He holds the wire.

She takes down the address record of telephones, and turns to the page on which **Mons. Maurier's address appears.** The picture shows the record as she has it.

The number, she finds, is Gramercy 51287. She gives the number to Mr. Douglas, in case he may wish to make a memorandum of it for future calls, and then **signals "A" by moving the listening key back and forth.**

"Gramercy 5-1-2-8-7," she repeats, giving "A" the number which Mr. Douglas is calling.

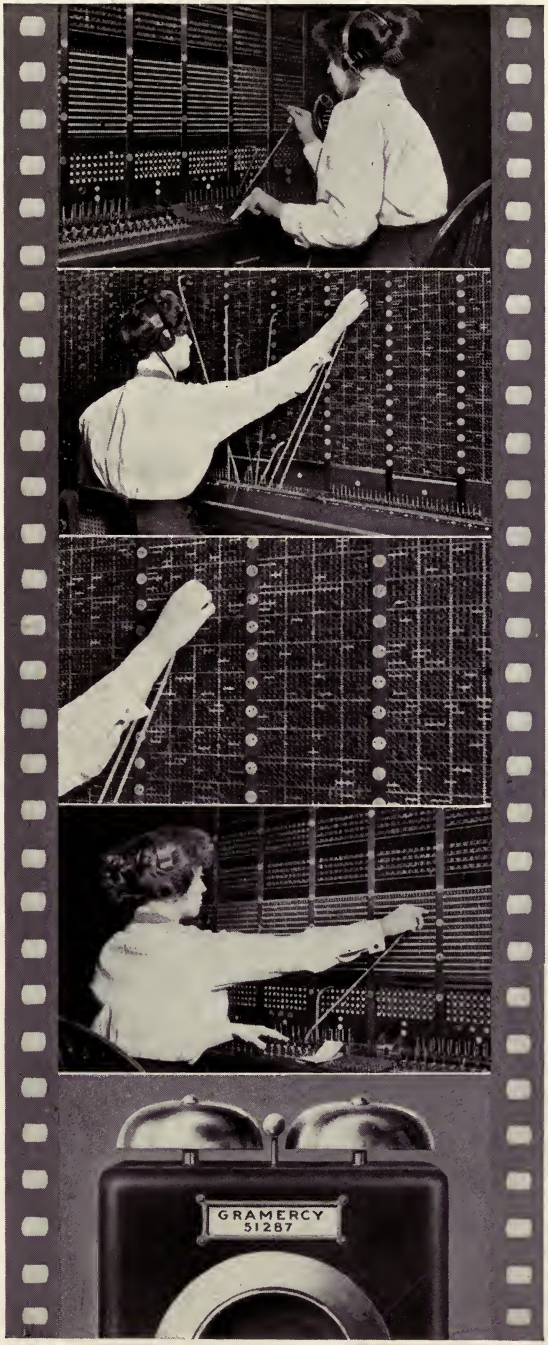
"A" repeats the number, so that "Information" may know if she has it correctly, and then disconnects "Information" from the calling line.

"A" holds the front plug, which she has just disconnected from the line to "Information," in her hand while she **passes the number on to the "B" operator in the Gramercy Central Office.**

"B" assigns an idle trunk line to "A," and tests the line by **touching the sleeve of that jack** with the tip of the plug. She finds that the line is not busy and "plugs in." **"A" promptly plugs into the assigned trunk** on her board, back in the Spring Central Office.

This part of the operation is precisely the same as when Mr. Douglas called his wife a few minutes ago. It is repeated in a city like New York about two million times a day. But this time **the bell of Monsieur Maurier's telephone does not ring.**

"A" watches the signal lamp and sees that Monsieur Maurier does not answer immediately. Perhaps there is something



wrong somewhere. There is. But the trouble is soon remedied.

One of the electricians in the Gramercy Central Office hears an alarm bell ring—an automatic signal of trouble. On examination he discovers that **a shutter on a certain "annunciator drop" has fallen,** which indicates that an excess current has blown out the generator fuse on "B's" position, thus preventing the current from reaching and ringing Monsieur Maurier's bell.

The automatic ringing apparatus meanwhile continues to send the current out over this interrupted circuit every few seconds. Consequently, as soon as the new fuse is put in place, the bell will ring.

The location of the fuse is indicated on the plate back of the shutter.

Immediately **the electrician goes to the side of the frame** where the fuses are inserted, and replaces the **"blown" fuse** with a **new one.**

Since any fuse trouble is indicated at once by the ringing of the alarm bell, making whatever repairs are necessary is a matter of seconds. Any accident is reported automatically.

But as a matter of fact, cases of real trouble occur very seldom. Repairmen are constantly on the watch for anything that might endanger the equipment or interrupt the service. In this way no serious accident can put a line out of order without its being detected within a very short time.

The first picture shows the method of **putting the new fuse in the place of the one which has burned out.**

The trouble has been discovered so quickly that the fuse is replaced before any unusual delay is experienced in the response of Monsieur Maurier. **His bell starts to ring** as soon as the fuse is replaced, and he answers at once.

"Maurier's," Monsieur Maurier answers, which **assures Mr. Douglas that he has the right number.**

This is a courteous and time-saving way to answer the telephone. It saves much of the time which the exchange of "Hellos" wasted, and allows the conversation to start at once.

"This is Mr. Douglas speaking—420 West 72d Street. Can you serve dinner for eight tonight?"

Monsieur Maurier assures him that he can take care of the dinner very nicely. He suggests the menu and **makes a memorandum of the various dishes** and the time. The dinner is to be served in Mr. Douglas' home at 6:30.

Mr. Douglas hangs up; Maurier hangs up; and **"PBX" disconnects.**

"A" and "B" both disconnect as usual.

Mr. Douglas' clock points to just **seven minutes past eleven** when he takes up his receiver to call Dr. Ripley.

Instantly the white signal of extension No. 3 flashes up on the private switchboard. "PBX" knows that Mr. Douglas is calling again.

She plugs in on jack No. 3 with one of her inside plugs and pushes a listening key.

"Number, please," she asks.

"Schuyler 5-3-4-1-7," says Mr. Douglas, giving the number of Dr. Ripley's telephone.

Three seconds later "PBX" has signaled "A" in the Spring Central Office, and "A" has plugged in to answer.

Mr. Douglas, while he makes it a practice to have "PBX" secure his connections for him through the central office, has adopted the courteous practice of **"holding the wire" while she gets the connection.**

"Number, please," asks the "A" operator.

"Schuyler 5-3-4-1-7," repeats "PBX."

"A" presses a button that connects her with the "B" operator in the Schuyler Central Office, which is in another part of the city. Meanwhile, she holds the front plug in readiness to insert it in the trunk line that "B" assigns to her.

"B" assigns a trunk, **and when she tests the line by touching the plug to the sleeve of the jack, she hears a click** in the head receiver, which rests lightly against her ear, and which all telephone operators wear in order that both hands may be free for work all the time.

This click tells her that Doctor Ripley's telephone, Schuyler 53417, is busy.

In order to inform "A" that the line called is already in use, **she inserts the plug in a "busy" jack** at the bottom of the board, which gives the automatic signal back to "A," who tells "PBX" that the line is busy, **while preparing to disconnect.**

"Please call me when you get them?" asks "PBX."

"A" promises to do so, and **notes down on a specially printed ticket,** which has previously been dated, the number calling, the number called, the abbreviation "By," and the time of day. She then crosses the ticket to indicate that no connection has been made, and writes the capital letter "C" in the upper right hand corner, which signifies that the calling party has requested her to complete the connection as soon as possible. She has previously written her initials over the date which appears on the ticket.

This ticket is known as a **"busy ticket."** It provides a memorandum of what "A" has been asked to remember.

All of the records and memoranda used in the central office are designed to make the service as perfect as possible, and also to make the operator's part of the work as simple as is consistent with the proper working of the system.

"PBX" tells Mr. Douglas that Dr. Ripley's telephone is busy, and **he hangs up.**

"PBX" now disconnects, **as does also "A."**

"A" continues to call the number every few moments until she finds it free.

She will call "PBX" when the connection with Schuyler 53417 is made.

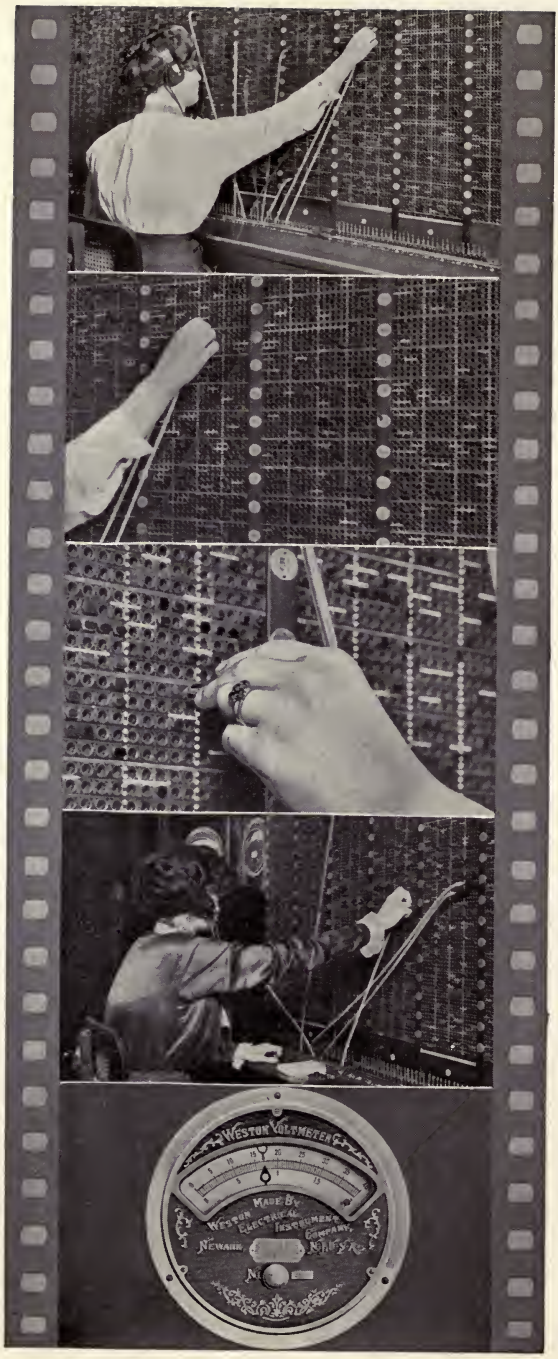
Mr. Douglas, however, almost immediately **takes up his receiver to call** another number. This time it is Mr. Townsend, the next guest on the list.

"Plaza 4-9-1-4-0," he tells "PBX" when she has answered.

"PBX" "plugs in" to reach "A" as usual, through one of the central office trunk lines, and repeats the number.

"A" answers in the usual way, and at once **passes the call on to the "B" operator in the Plaza Central Office.**

The distance between the Plaza Central Office and the Spring Central Office is several miles. However, so complete is the system of wiring between the different central offices that the connection to the "B" board at Plaza is made with no more difficulty than if it was in the same building.



"B" **assigns a trunk** and tests Mr. Townsend's line by **touching the plug of the trunk line** inside the sleeve of that jack.

But this time she hears a peculiar noise, which indicates to her that the line is out of order. So, instead of plugging in, she **connects up with the "Trouble" operator,** by plugging in on another jack before her.

Every telephone exchange has its own "Trouble" operator. Trouble occurs but seldom, but when something does go wrong it must be fixed without delay.

"Trouble" sits at a position at the "B" board, and has facilities for determining whether or not lines are out of order.

She finds out from Mr. Douglas what number he is calling. He promptly gives the number again, realizing that it must be needed for some good reason.

"Trouble" then **tests the called line by connecting it up with her voltmeter,** which shows whether anything is wrong with the line. She finds that something is wrong, and reports to Mr. Douglas that Plaza 49140 is "out of order." She then signals "A" and gives her the report. All parties disconnect.

Here's the "trouble." Mr. Townsend's six-year-old daughter has been **"playing" with the telephone.** She has been a little puzzled by the sounds which she has heard over it without being able to see any person speaking anywhere around.

But at last she has become tired of playing at telephoning, and has left the instrument with the **receiver hanging off the hook.** Naturally this prevented the bell from ringing, and thus stopped the use of the line. The little girl doesn't know how much her play has interfered with the telephone service.

After "Trouble" has reported that Mr. Townsend's line is out of order, **"A" endeavors to complete the connection with Doctor Ripley's number,** the number which had previously been reported "busy."

She passes the number on to "B" again in the Schuyler Central Office. **"B" assigns an idle trunk,** tests the line, and plugs in, while **"A" plugs in on her end of the connecting trunk line.**

When Doctor Ripley answers, "A" tells him that she has a call for him, and asks him to hold the wire.

Then she calls Mr. Douglas' office by ringing 43250.

One of the electric shutters on his private switchboard drops. This signals "PBX" that a call is coming in on one of the main trunk lines.

Picking up one of the front plugs, **she inserts it in the trunk line jack** directly under that shutter and says "Douglas & Company."

"Do you still want Schuyler 5-3-4-1-7?" asks "A."

"Yes, thank you," "PBX" answers.

She **plugs in on Mr. Douglas' extension** with the other cord, and presses the button that rings his bell. This calls Mr. Douglas to the telephone at the same time that "A" is connecting.

"Mr. Douglas speaking," he answers. He talks to Doctor Ripley and invites him to the dinner.

Dr. Ripley accepts for himself and his wife.

Mr. Douglas' clock says **ten minutes after eleven,** and already he has invited two guests and has called the caterer. But he still has not received connection with Mr. Townsend.

When **Dr. Ripley** and **Mr. Douglas hang up their receivers, "PBX" disconnects.**

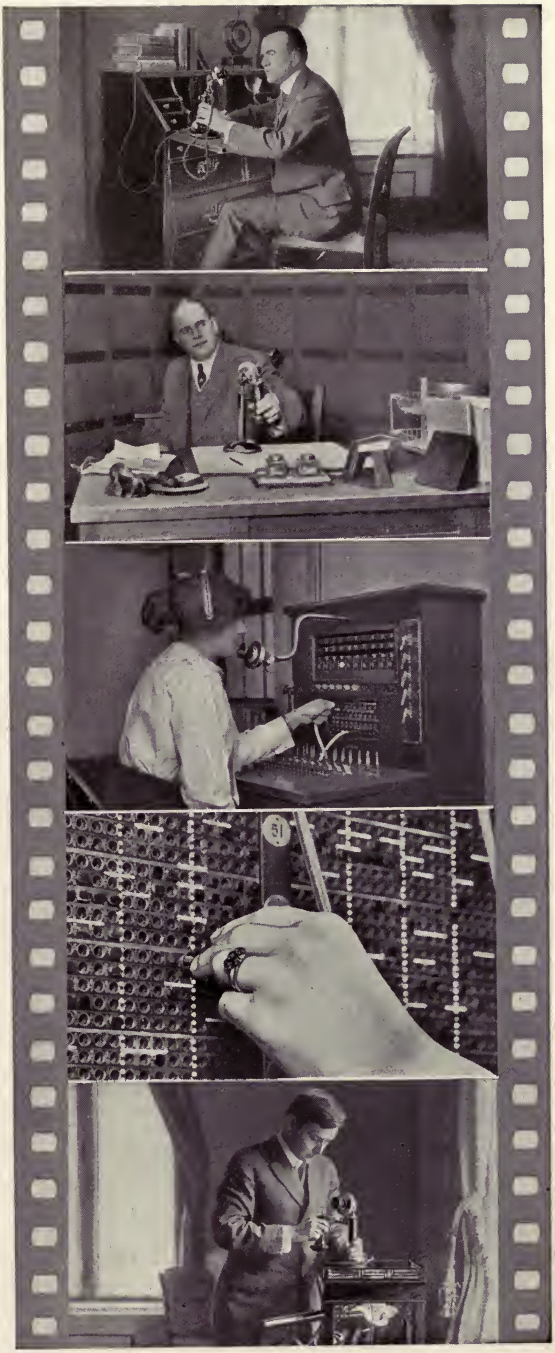
"A" and "B" also disconnect. This leaves both the lines free for incoming and outgoing calls.

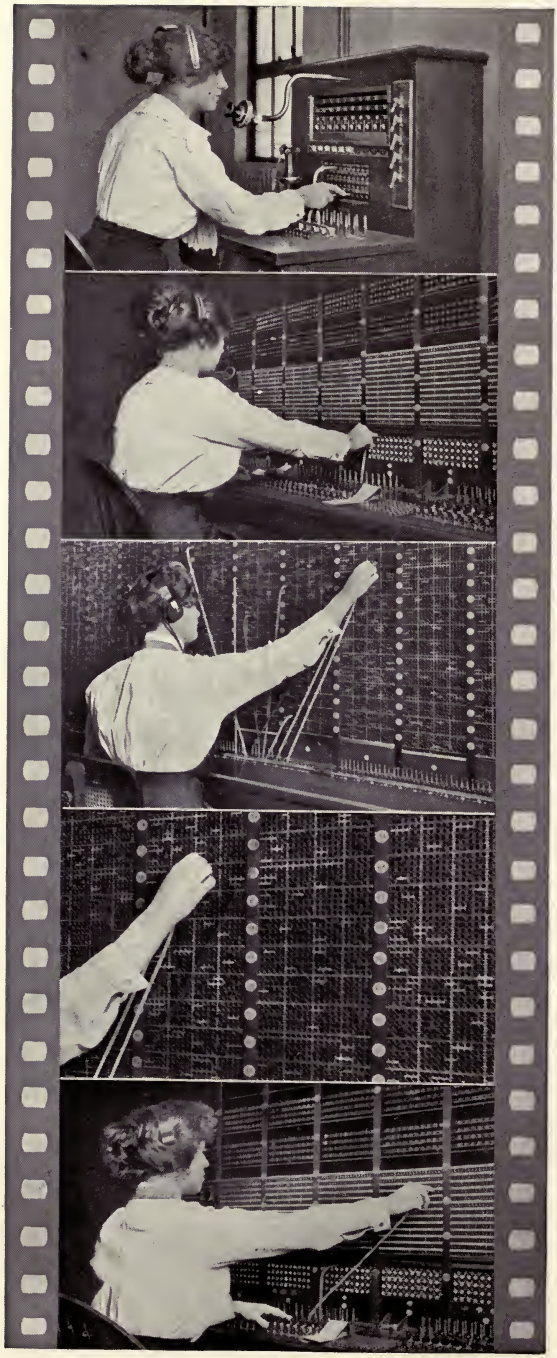
Because of the frequency of calls and the speed at which they are handled, prompt action is necessary at "Central" in disconnecting as well as in connecting the lines.

Mr. Townsend's telephone, Plaza 49140, that has afforded amusement for his little six-year-old daughter, has been reported to "Trouble" for "steady signal," which is the official way of saying that it gives a steady signal before the "A" operator. This means that either the receiver is off the hook, or that some trouble on the lines causes this condition.

"Trouble" has plugged into the line with a "Howler" plug, from which a peculiar form of current is sent into Mr. Townsend's receiver.

This produces a shrill, insistent noise in the receiver, which **brings Mr. Townsend to the spot** at once. He sees the difficulty and hangs up the receiver. The noise stops. The "Trouble" operator receives a lamp sig-





nal showing that the receiver has been put back in place, and, knowing that the line is all right again, she disconnects the "howler."

"PBX" shortly after this **calls Mr. Townsend's number again.**

"Number, please," says the "A" operator as she answers the call by plugging in with her front cord.

"Plaza 4-9-1-4-0," says "PBX"; "A" repeats it, brightly, cheerfully. No matter how many times a day she repeats the old familiar "Number, please," and the names of the various central offices, she is always courteous, always obliging. That is one reason for the efficiency of the system, because "Central" is ready to "do her best" all the time.

Once again "A" passes on the number to the "B" operator in the Plaza Central Office. **"B" assigns her a "trunk," testing Mr. Townsend's** line at the same instant.

Finding that it is not busy, she plugs in on this jack. **"A"** in the meantime **plugs in on the other end of the trunk line assigned.**

This completes the circuit, and automatically causes Mr. Townsend's bell to ring.

Mr. Townsend takes up the receiver and answers with his number, speaking directly into the mouthpiece of the transmitter. He speaks in a low voice, but always talks "with a smile."

"Hello, Jimmy," he hears, **"this is Bob.**

"Oh, hello, Bob—what's the news?"

"Helen is giving a little dinner and theater party tonight for her sister, Mrs. Turner of Baltimore, who is sailing on the Mauretania. We want you and Mrs. Townsend to meet her. Can you join us?"

"We will be delighted to, old man."

"All right—that's fine. Awfully glad you can come. About six-thirty, up at the house. Good-bye."

"Good-bye."

Mr. Townsend hangs up.

Mr. Douglas hangs up.

"PBX" sees by her white signal that Mr. Douglas is through with the line, and **takes down the cords.**

"A" and "B" disconnect as usual.

The clock points to 11:11. It is just one minute since Mr. Douglas finished speaking to Dr. Ripley, but in that minute he has talked with another friend four miles away, and has invited two more guests to his party.

"And now I had better get hold of Jack Harrison," Mr. Douglas says to himself.

Mr. Harrison lives in Albany, but it is nearly as easy to get a man on the Long Distance Telephone as it is to get a man just around the corner.

Mr. Douglas calls his offices in Detroit, Cleveland, Chicago, and Philadelphia every day. He is almost constantly using the Long Distance Telephone as a business getter. And so he **picks up his receiver** with the same unconcern as though he were calling "Plaza" or "Tremont," instead of a city a hundred and more miles away.

"Long Distance, please," he says to "PBX" when she has "plugged in" and asked, "Number, please," as usual.

"PBX" now plugs in to reach "A" and asks for Long Distance.

"A" "plugs in" to one of the Long Distance trunks on her board. This puts **Mr. Douglas** in direct connection with the **Long Distance Recorder.**

The Long Distance operating room is in many ways the most interesting in the whole building.

Here sit three hundred or more girls, each one handling calls in much the same way as any other operator does.

All of this switchboard work is done with practically no noise. The whole switchboard room, in fact, is operated so quietly that a stranger would hardly guess how important the work is that these operators are doing.

The **Long Distance Recorder takes down the details of the call,** as Mr. Douglas gives them. Mr. Douglas' name and his telephone number—Mr. Harrison's name and address in Albany—all these go down on a special ticket, which is arranged to facilitate the "putting through" of the call.

Mr. Douglas is to be called when Mr. Harrison is on the wire and is ready to talk.

Mr. Douglas accordingly "hangs up."

In order that Mr. Douglas' telephone may be kept free from interruptions, the **Long Distance Recorder "orders up" his number,** 43250, on the "B" board of the Spring Central Office. In other words, she tells the "B" operator to plug into Mr. Douglas' line, in order that no other calls may be made on that wire until the Albany call is completed. The line will be held up long enough to allow time for putting through the call, not more than ten minutes as a rule.

"B" assigns "Long Distance" a trunk line, and the **Long Distance Recorder plugs into this jack.** All this is done instantly.

The Recorder now puts the ticket bearing the details of the call **into a pneumatic tube,** which brings it immediately to the **"Distributing Operator."**

All the messenger work in the Long Distance room is done by means of pneumatic tubes. This permits of quick and noiseless communication between the operators who take care of the calls at the various stages, and avoids the necessity of moving around to reach another operator in another part of the building.

The Distributing Operator notes that Mr. Harrison's telephone number is not given as yet on the ticket. She therefore **sends the ticket on to the Directory Operator,** who looks up Mr. Harrison in the Albany Directory, and **adds the missing details** in their proper places.

All of this preliminary work is made necessary in order that there may be no delay or lost time when the Albany "Central" is finally called. It would have facilitated getting the connection had Mr. Douglas been able to give this Albany number to the Long Distance Recorder.

Long Distance conversation is valued at so much a minute. With the tremendous number of Long Distance calls handled daily, it is essential that no time be wasted on any call after the Long Distance wire is put into operation.

The ticket is complete now, and the Directory Operator **sends it back through the tube** to the Distributing Operator.

The Distributing Operator sees that the call is ready to be "put through." She therefore drops the ticket into another slot, which conveys it directly to the operator at the Albany section of the New York switchboard.

This operator is called, for the sake of convenience, the New York-Albany Operator.

The New York-Albany Operator notes Mr. Douglas' number on the ticket, and **plugs in the trunk to which his line is connected,** in order that she may call him directly when she has made the proper connection with Albany. The trunk line number was put on the ticket by the Recorder.

This action, which connects the Long Distance switchboard to the original "A" board, lights the signal lamp on the board in front of the **Long Distance Recorder**, who sees that Mr. Douglas' line is now being "held" properly by the New York-Albany Operator. The Long Distance Recorder accordingly pulls out the plug with which she has been "holding" his line. Her part of the work is done.

The New York-Albany Operator is now **ready to call Albany.** This she does by taking the cord in front of the one which connects back to Mr. Douglas' line, and plugging into one of the Albany trunks.

By **operating a ringing key** associated with this cord, she signals the Albany operator.

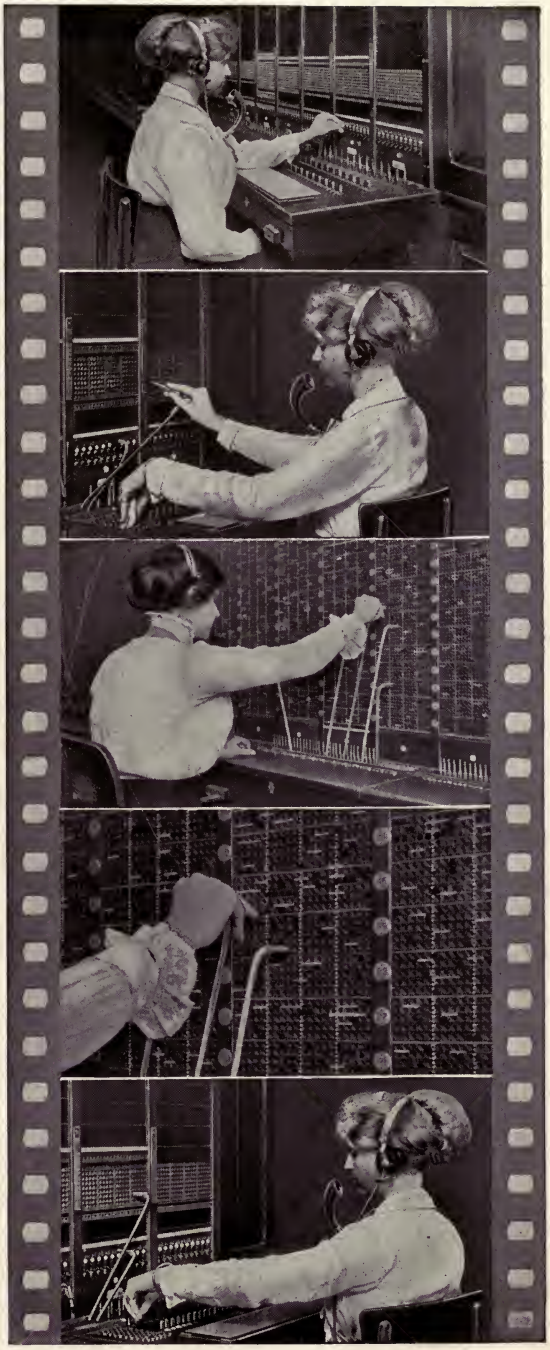
"Albany" thereupon "plugs in," and takes the number, Main 23750. Mr. Harrison is to be called to the telephone before the final connection is made.

The Albany operator **presses a call circuit button** which connects her with the "B" operator in the Main Central Office, and asks for Mr. Harrison's number. This part of the operation is already familiar to the reader.

The "B" operator assigns a trunk to the Albany operator, and **tests Mr. Harrison's line.** Finding that it is not busy, she "plugs into" it with the trunk she has assigned. The Albany operator **takes up this trunk,** thereby completing the circuit between New York and Mr. Harrison's wire.

The "B" board in the Main Central Office in Albany is very much the same as the "B" boards we have already seen.

In fact, the telephone equipment has been everywhere so improved and standardized that the switchboard equipment in various cities differs very little from the equipment described here, except in size and the number of subscribers it will accommodate.



As soon as the "B" operator in Albany "plugs in" on the jack leading to Mr. Harrison's telephone, his bell rings automatically.

Mr. Harrison answers the telephone at once, and speaks directly to the **New York Long Distance Operator,** who tells him that "New York is calling Mr. Harrison."

While Mr. Harrison holds the wire, the New York-Albany Operator operates the ringing key on her board and calls "PBX."

"Ready with Mr. Harrison at Albany," she says, when **"PBX" answers.**

"PBX" "plugs in" on Mr. Douglas' extension and **presses the button that brings him to the telephone.** Mr. Douglas and Mr. Harrison are ready now, each at his end of the wire.

Mr. Douglas speaks first; he is making the call.

"Hello, Jack."

Mr. Douglas' voice sounds so natural that Mr. Harrison recognizes it at once.

"Come on down this afternoon on the two o'clock train. We're having a little party tonight, and want you and Mrs. Jack to be there."

Mr. Harrison thanks him heartily for the invitation, but explains to him that he will be unable to come. So after a brief conversation, they both hang up.

The record of the call is then completed, and all of the operators disconnect as usual.

The clock on Mr. Douglas' desk shows that it took four minutes to "get" Albany, and three minutes to carry on the conversation.

It is now 11:18.

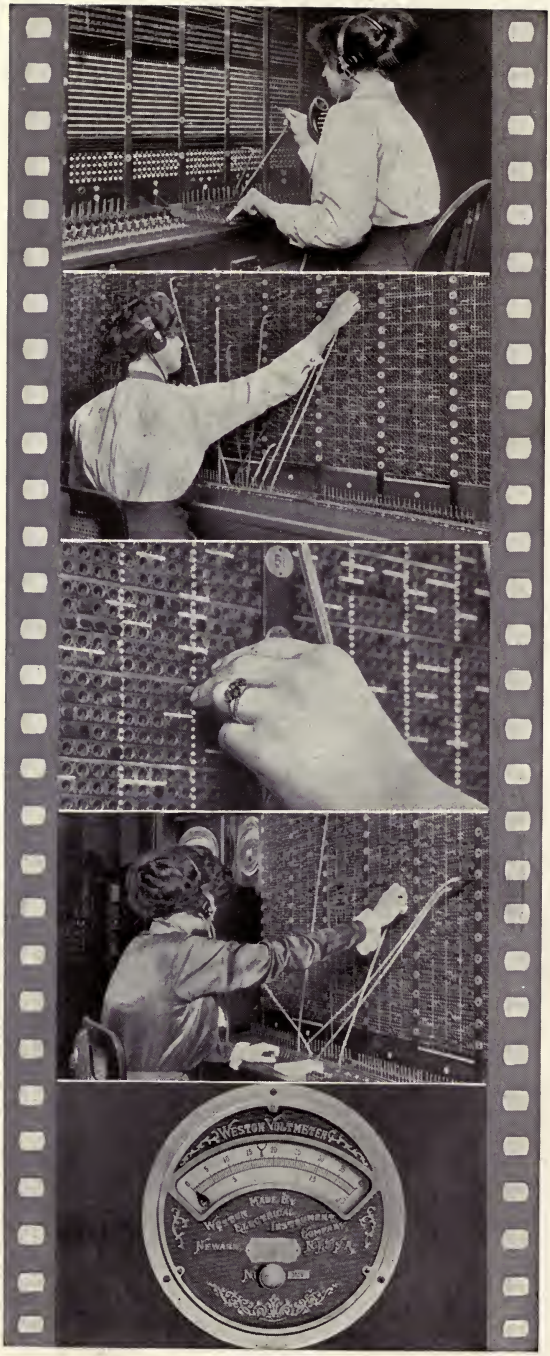
"Guess I'll skip Spenc Norman—Helen will invite him. Now for the theater tickets."

He knows that Mrs. Douglas will make good use of the residence telephone if any further plans have to be made. For in the social world and the sphere of activity around the home the telephone is as great a time-saver as it is in the business world.

Mr. Douglas lifts his receiver.

"Number, please," asks "PBX," when she has "plugged in" on his line.

"Bryant 3-3-0-0-0, please." That is the number we will use for the Casino Theater.



"PBX" "plugs in." "A" answers and takes the number, Bryant 33000, and **passes it on to the "B" operator** in the Bryant Central Office.

When "B" tests the line, **she hears a peculiar sound,** which indicates to her that the telephone of the theater is out of order.

So instead of completing the connection with the theater, **she plugs in on the "Trouble" jack.**

This connects Mr. Douglas with the "Trouble" operator in the Bryant central office.

The "Trouble" operator, just like "Trouble" back in the Plaza Central Office, sits at a position on the "B" board.

All the subscribers' lines in the Bryant district are represented there in the thousands of little holes or jacks in the board before her. She can thus test any line in the office by plugging into the proper jack on her board.

"Trouble" answers and learns that Mr. Douglas is calling Bryant 33000. By means of "trouble" detecting **apparatus which is wired to her position,**

she finds that the line being called is temporarily out of order. It is "open"—broken.

In fact, Bryant 33000 has just been reported to her for "trouble," and is now on an "out of order" cord, which gives the "out of order" test to other operators in the Bryant Central Office who may wish to call this line.

She **reports the line "out of order" to Mr. Douglas, who hangs up. "PBX"** accordingly **disconnects her cords as usual.**

"Trouble" then signals "A" in the Spring Central Office by working her signaling key back and forth, and tells "A" that Bryant 33000 is "out of order."

"Trouble" just before this has **made out a "trouble" memorandum,** giving the number of the line, the time, the trouble, and such other information as is necessary.

This memorandum she rolls into a **small leather cylinder** provided for the purpose,

which **she drops into a delivery tube** at her side.

A moment later **this cylinder** with the "trouble" memorandum **drops out on the desk of the Wire Chief's clerk.**

The Wire Chief is responsible for the mechanical end of the telephone central office—the wiring, the dynamos and storage batteries, the cables and fuses. He is a master electrician, and directs a corps of trained men who repair any injury to the wires or instruments as soon as it is reported.

A squad of "outside trouble men" attend to the accidents which affect the wires outside of the central office.

These men telephone to the Wire Chief at half hour intervals to report and to get new assignments of lines which are out of order.

The Wire Chief now **makes a second memorandum** of the trouble which has been reported about the theater telephone. This memorandum **he holds on file,** for his own record. The original "trouble" memorandum is endorsed with his signature and the time of its receipt. It is subsequently returned to its originating point to be filed.

In the meantime **the Wire Chief makes a test with his instrument,** and when the **"outside trouble man" telephones in** from some public telephone in the square mile or so of territory covered by this central office, the **Wire Chief gives him the number and address** of the theater telephone, and the details of the trouble.

The "outside trouble man" **makes a note of these details** on his pad.

The trouble, as stated in the blank, is that **the line is "open"**—in other words, it is broken.

The "outside trouble man" hangs up his receiver, and a moment later is at the corner of Broadway and Thirty-ninth Street.

To locate the trouble he inspects the telephone—not from the inside, but from the outside.

He begins by connecting with the wire by means of a small pocket telephone which he carries with him, together with the tools needed in making repairs to the wires and instruments.

He finds the insulation has worn off in one place, where the scenery has been rubbed up against the wall and the wires that run along it.

The damage was slight, but it was sufficient to break the circuit and throw the subscriber's line out of commission.

The "outside trouble man" quickly **makes the necessary repairs** and reconnects the wire.

He then reinsulates the wire by binding adhesive tape tightly around the place which had been scraped bare. Then he inspects the line thoroughly to see that nothing else is wrong.

He makes sure that all parts of the line are once more in perfect working order before he leaves the premises.

Then he **telephones to** the Wire Chief over the theater wire. **The Wire Chief tests the repaired line,** and tells him that everything is "O. K." **The voltmeter,** an instrument which the Wire Chief has for testing lines, indicates that the line is all right again.

The "outside trouble man" accordingly leaves the theater and goes to another telephone a few blocks away which is in trouble.

The Wire Chief in the meanwhile has told "Trouble" to take down the "out of order" cord from jack 33000. The line Bryant 33000 is now O. K., and calls may be completed both to and from it.

Mr. Douglas has been reading his mail during **the fifteen minutes since he found the theater telephone was out of order.**

Now **he lifts his receiver** to call the theater again.

His private switchboard operator, **"PBX," "plugs in"** in the usual way, and **passes on the number,** Bryant 33000, to the **"A" operator.**

The board in front of her, the private branch exchange switchboard, is a small sized replica of an "A" board, simplified in some details to permit of its being used by operators who have had less technical experience than "A" and "B" were required to have before they became operators. For "A" and "B" had to go to school at headquarters before they were given their present positions as operators. They are graduates of the Telephone Operators' School maintained by the Company.

"PBX's" switchboard merely passes on outgoing calls to the "A" operator in the Spring Central Office.

"A" passes the call on to the "B" operator in the Bryant Central Office and **"B"** promptly assigns a trunk and **tests the line** being called.

The line is not busy, so she plugs in. **"A" in the meantime plugs in** on the trunk assigned, and the connection is completed with the telephone in the theater box office.

The bell rings.

"Casino Theater," says the box office man, taking up the receiver.

This answer indicates at once to **Mr. Douglas** that he has the right number. He speaks directly.

"Have you a box for eight for tonight?" he asks.

"Box for eight? **Yes**—give you **Box AA, on the right.** What's the name, please?"

Mr. Douglas orders the tickets to be held in his name until he can send a boy for them. He has long used the convenient telephone method of arranging for theater tickets.

Assured now of the **theater tickets, Mr. Douglas hangs up his receiver.**

"PBX" **draws out the plugs** and lets them fall back into place.

The **box office man hangs up.**

"A" sees the disconnect lamps light and knows that the call is completed, so she **takes down the connection.** "B" also disconnects.

Mr. Douglas now turns to his day's work.

The party has been arranged definitely; the guests have been invited, the dinner has been ordered, and the tickets have been provided for.

He takes up his work with the satisfaction of one who has done much—with the aid of the telephone.

During the rest of a busy day his work is made lighter and smoother by the use of the telephone. And Mrs. Douglas, in her home, is saving time at her end of the wire by using the telephone.

Soon after six **the guests begin to arrive.**

Thanks to the ever helpful telephone, "Jimmie" Townsend and Mrs. Jimmie, and "Doc" Ripley and his wife, and "Spenc" Norman—and the guest of honor, Mrs. Charles Pickard Turner, Mrs. Douglas' sister—are all there, and **a jolly party it is indeed.**

The telephone at the "eleventh hour" brought them all together, and the story of how it helped to make the party a success is ended.

But the work at the telephone central office goes right on, day and night. When the day operators go home for the night, other operators come to take their places. The telephone never sleeps.

Every night, after midnight, **all the subscribers' lines in every central office are tested** carefully.

The night tester **watches the voltmeter** as he connects with every one of the jacks on the board in front of him. He can detect any kind of electrical trouble instantly.

If anything is wrong, he makes out a **detailed report** of the trouble.

This is the **night tester's report.** Every number that is out of order is crossed off as soon as the trouble has been repaired.

Every telephone operator in every central office is trained in the subject of telephony, so that she thoroughly understands the operation of the telephone system.

These young women are **carefully selected,** and after they have become employees of the Telephone Company every care is taken to provide for their comfort and efficiency.

The Telephone Company in all of the large cities has its own schools for operators, where they are taught the principles of switchboard operation, and later on are given lessons in actual switchboard work in the school practice room.

The pictures show the **study room, lecture room, and practice room.**

There is also a pleasant rest room for operators in every central office.

Mr. Douglas' jolly party arranged at the eleventh hour would have been almost impossible but for the help of the telephone and the operators, whose watchword is:

"The Voice With the Smile Wins."

American Lithographic Co., New York