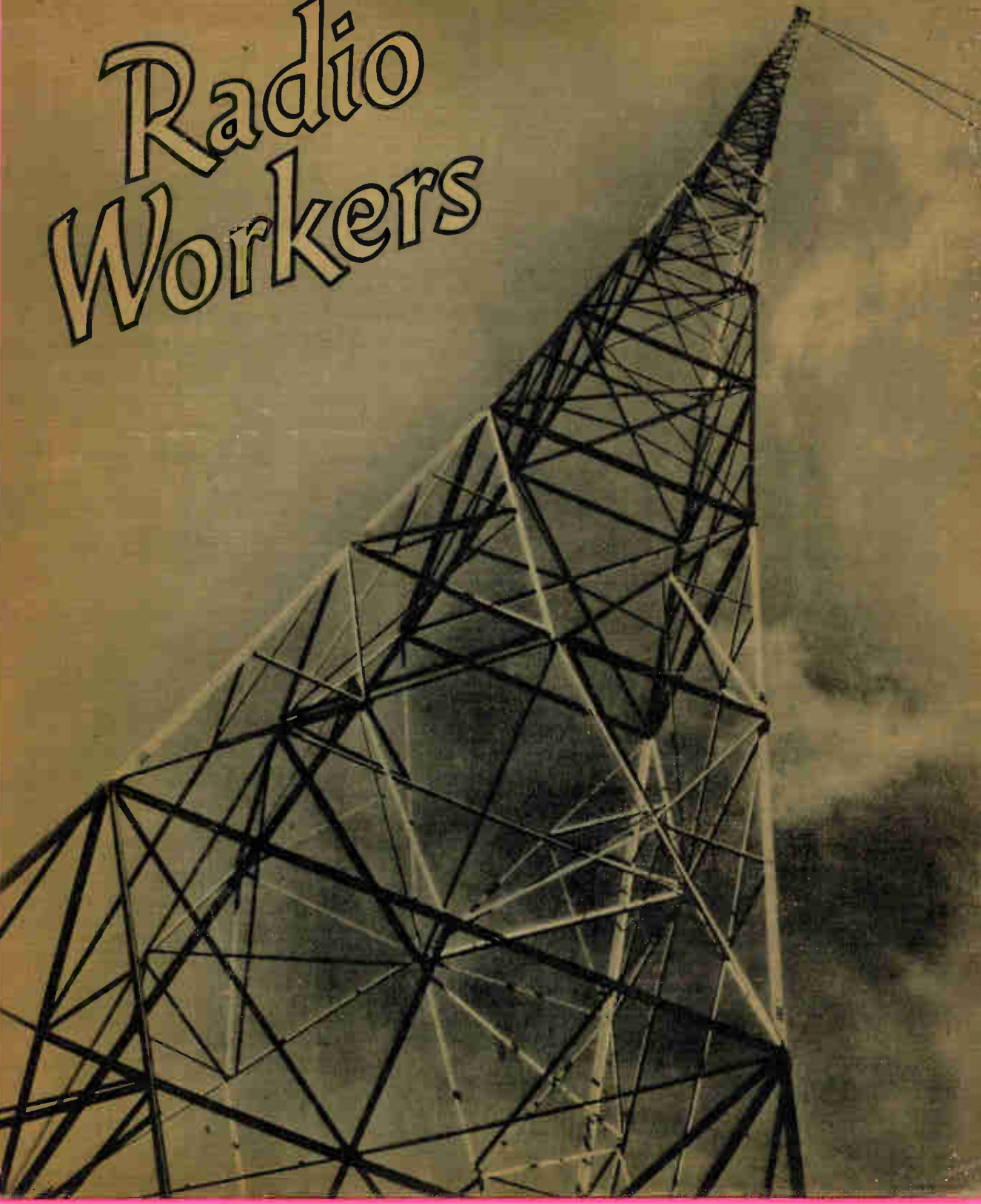


Radio Workers



574
PROPERTY OF
Gordon School District
GORDON, PA.

AUG 27 1940

RADIO

WORKERS

Picture Fact Associates

ALICE V. KELIHER, Editor

FRANZ HESS

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RADIO HISTORY

Abraham Lincoln was elected President in 1860. The news of his election was telegraphed to his home town in Illinois. The message was delivered to him while he was playing baseball. Forty years later, when McKinley was assassinated, Theodore Roosevelt became President. Roosevelt and his family were mountain climbing at the time, thirty-five miles from a telephone. The message that he was President traveled twenty-five miles by telephone and ten miles by messenger.

Twenty years later, the news of Harding's election was broadcast by radio—the first public broadcast. It was in 1920 when radio carried the first of such important messages to the public. Just a few short years ago, Franklin D. Roosevelt heard over the radio that he was nominated and promptly hopped a plane for Chicago to accept the nomination in person. On election night he and his family listened to the returns by radio to get the immediate news of each of his elections.

In a very few years radio has conquered time and space. Planes talk to submarines. Passengers at sea talk by radio-telephone to their families on land. Explorers send messages home from the far poles of the earth. The engineer of a freight train talks by radio to his conductor in the caboose. Passengers in a plane see on a television screen

Dr. Korn Perfects Device To Radio Maps From Air

Special to THE NEW YORK TIMES.
HOBOKEN, N. J., Jan. 10—Dr. Arthur Korn, a pioneer in the transmission of photographs by

wire and radio, announced in a lecture before the Stevens Institute that he had perfected for transmission of ground of strategic areas. He said the apparatus

RADIO

Red & Black

However radio broadcasting may stack up among the arts, it is as much as a

Police to Get Pocket Radios

Pittsburgh police will soon have talking pockets.

Short Wave Radio Aids Fight on Forest Fires

HARRISBURG, Pa. — Pennsylvania has enlisted the short wave radio the airplane

Radio 'Scrambling' to Foil Spies

WASHINGTON, Oct. 7—When President Roosevelt calls up Ambassador Kennedy in London, his Olleh Eogh sound like

TRAIN CARRIES RADIO

TWO-WAY radio communication system has been installed by the Bessemer & Lake Erie Railroad on one of its long



Mayor Testing Two-way Radio

Motors Upstate to Give City's Emergency Communication System Thorough Tryout.

High officials of the city government received confidentially advising them that during

RADIO

By-Products

To develop more exact methods of finding out the who, what, when, why of radio listening deep half of

Radio Facsimile Newspaper Seen By Delegates

RADIO MEN ON WAY TO POL

Byrd Expedition Include Group of Amateurs.

Telecast From Here Is Received By a Plane 200 Miles Away

Test Made by Airliner 21,000 Feet Above Capital Supports Theory That

HALL. edition is o a polar regio tivities of th ve as on prev re listeners ar

their own landing. The President talks by radio to his ambassadors and envoys abroad. At the sending station on this side of the water, small vacuum tubes change his voice and “scramble” the sounds. At the receiving station abroad tubes change back his voice and “unscramble” the sounds. No one can understand the message if it is picked up while it is on the way.

Today news flashes to us while it is being made. In the New York offices of the Columbia Broadcasting System, Paul White, chief of the news department, sits at his desk. At his left is an instrument panel. On his desk are telephones and a microphone. In the wall is a loud-speaker. At a second's notice, White can connect with his control engineer, news editors, announcers and local stations. If he wants to talk to London, Berlin, Paris, Bucharest, he connects up his microphone and calls them on short wave. The voices answering him come in by short wave through the wall speaker. In a listening room nearby, foreign short wave broadcasts are taken down word for word. In another room, news broadcasts from other American stations are recorded. News editors watch the rows of teletype machines that bring in reports from the news services. As the news comes off the tape it is edited, rewritten and made ready for the next news broadcast. A news analyst studies the items as they come in so that he will be ready to interpret what the news means. At



In the N.B.C. special events division, special news broadcasts are prepared. *Below*, the news comes off the teletype. The pictures at the left show the editing and preparation of scripts for special newscasts.



times of crisis he practically lives at the studio, sleeping in a nearby lounge room, ready to go on the air at a moment's notice.

The telephone on Paul White's desk rings. London has important news to report. White throws the switch to connect his microphone. "Hello, London, Paul White speaking. Hello, London. Go ahead, London!" From the wall speaker comes a voice, "Hello, hello, C.B.S. This is Ed Morrow calling Paul White." "Come in, Ed. This is Paul speaking. What have you? Go ahead!" "Special meeting of Parliament has just ended. There's been an important cabinet shift. Do you want it?" "Yes, we do, Ed Morrow. We want you on network. Stand by for 90 seconds and we'll give you network."

Paul White signals the network engineer. Signals flash to the studio where a program is on the air. The announcer steps to the microphone, "Ladies and gentlemen, we interrupt this program to bring you an important news flash. Please stand by."

The news analyst is listening so that he can come on after Ed Morrow to interpret the news. In the studio an announcer is already saying rapidly into the microphone now connected with network, "We bring you important news from London. Ed Morrow speaking from London, England." And before the members of Parliament have started for home, we get the news of their meeting.



Above, in the C.B.S. news department just before the broadcast of a news program during the Finnish-Russian war. *At the left*, Kaltenborn is giving one of his regular programs of news analysis.

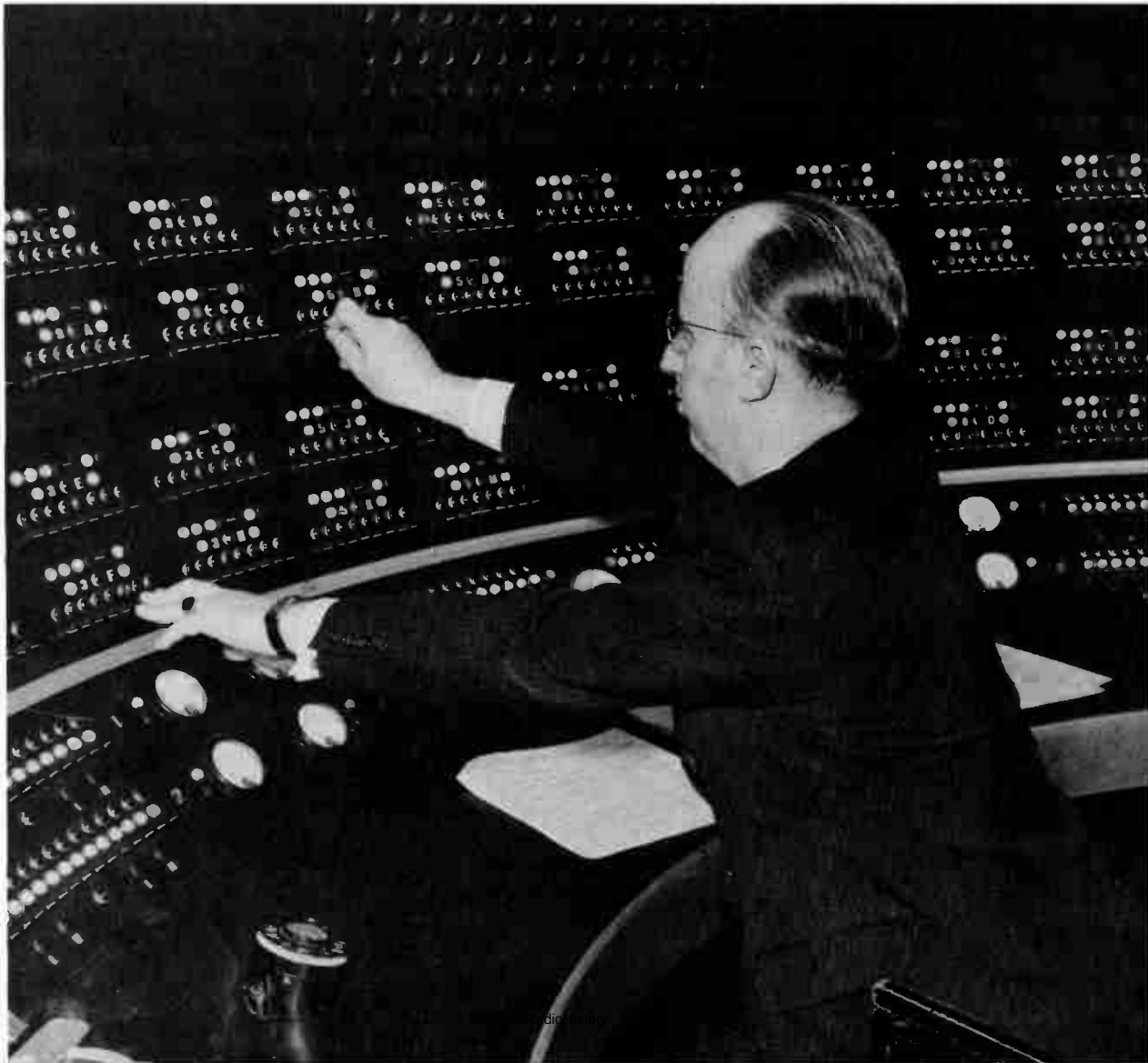


One Sunday afternoon in December, 1939, a German pocket battleship, the *Graf Spee*, ordered to put to sea or be interned, steamed out of the Montevideo harbor. In Montevideo, capital of Uruguay, thousands of miles from New York, an N.B.C. announcer was giving his report by short wave and getting his instructions from New York. As he was talking he heard a dull thud and saw the blaze of an explosion. The *Graf Spee* had been blown up by her crew! "Give me the air," he shouted. "They've blown her up!" In the next minute he was on the N.B.C. network with one of the speediest news scoops radio has ever known.

When we see and hear some of the remarkable things radio can do, it is hard to realize that public broadcasting first started no longer ago than 1920. At that time in a rough garage in Pittsburgh, station KDKA began the first broadcasting of public entertainment.

But radio was already twenty-five years old when public broadcasting began. In 1895 Marconi completed the wireless telegraph. Thirty years before Marconi, Maxwell had worked out the theory of electro-magnetic waves. Using Maxwell's theories, Hertz had actually produced radio waves in 1886. In 1901 the first code wireless message was sent across the Atlantic. But these messages were in dots and dashes. To send a voice, with its range of tones, through the air, something else was needed. This something else was the

Contrast Marconi's wireless set with the master control board of a large modern network!



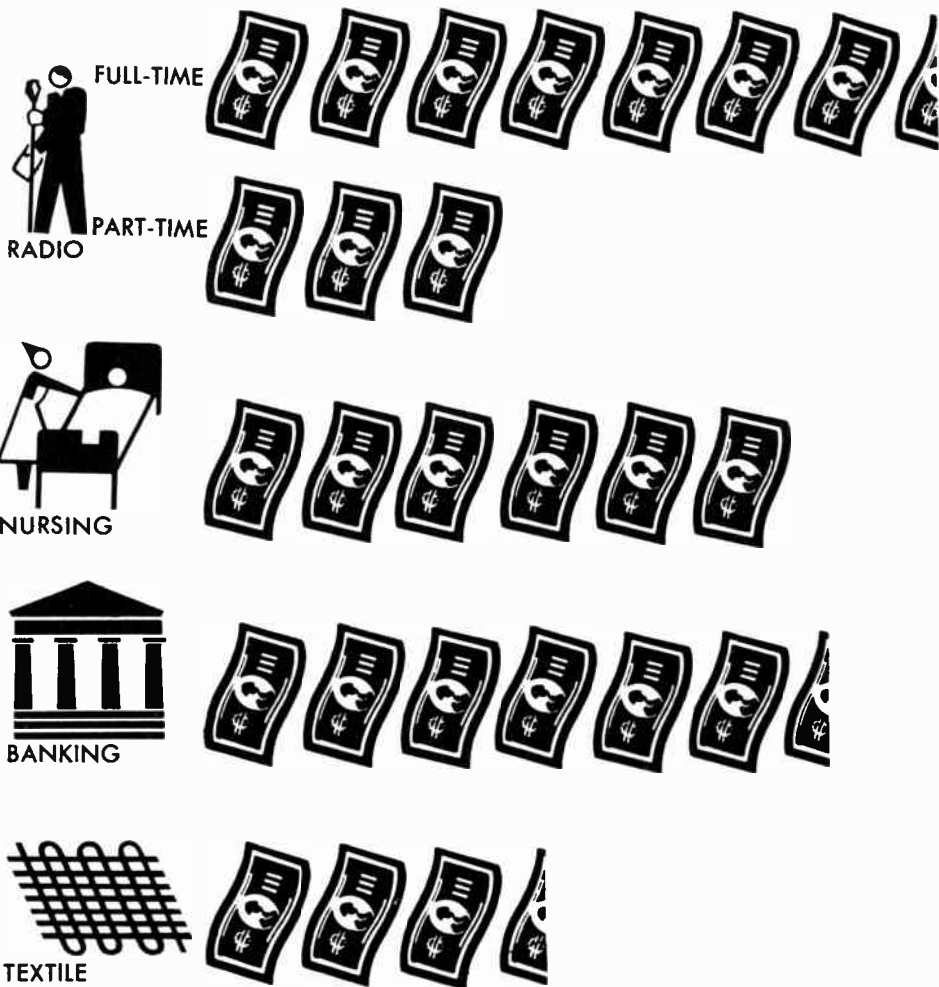
vacuum tube, which Lee De Forest invented in 1907. In that year the Atlantic Fleet of the United States Navy put De Forest radio telephones on every ship. As long ago as that, the essentials of radio were ready.

It took fifteen more years to give radio to the public. Half of those years were spent in getting ready for and fighting the World War of 1914-1918. Radio was an important instrument of warfare and it was taken over to serve war purposes. Even boys who made their own code-sending and receiving sets were watched carefully by government agents. Eventually, amateurs had their stations closed down for the duration of the war. Only after the war was radio freed for public use.

At first we listened to little crystal sets with earphones. When the engineers found ways to make vacuum tubes cheap enough for us to have them in our home receiving sets, we were able to have loudspeakers. The first sets were awkward. The speaker was like a victrola horn and the tubes and wires were all open on a panel board. Many families said they did not want such messy contraptions around the house.

As interest in public broadcasting grew, the manufacturers found that they had a market for home radio sets. As the sale of home sets grew, the need for good programs grew. In 1926 one large

RADIO'S WEEKLY PAYROLL COMPARED WITH OTHER PAYROLLS (1936)



Each bill represents 5 dollars

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manufacturer, the Radio Corporation of America, started N.B.C. (National Broadcasting Corporation), the first radio network to send programs out for local stations to use. A second N.B.C. network and the C.B.S. (Columbia Broadcasting System) network started in 1927, and in 1934 the Mutual network was started.

So the production of programs and the manufacturing of sets have grown at the same rapid pace. Now advertisers buy radio time to advertise many products. They buy a little more than one-third of all radio time and pay the costs of programs to which they hope we will listen so that we will buy their soap, cigarettes, gasoline, bread, milk or automobiles. Some of these companies pay large sums out of their advertising budgets for popular artists, entertainers and orchestras. They pay high rentals for the good “spots” on the air—the best hours to catch listeners. The rental for an hour at ten o’clock on Sunday evening on a complete coast-to-coast network is \$23,625. A daytime hour on the same network is \$16,814.

There were, in 1938, over 61,000 retail stores selling radios; over 15,000 radio service men and a small army of workers manufacturing radio sets. In 1939 they made 1,200,000 automobile radios. That same year, manufacturers made over 90,000,000 radio tubes.

Today 88% of American families own radio sets and listen to them an average of five hours a day. In fact 28,700,000 families own

44,000,000 sets. In the twenty years since the beginning of public broadcasting in the United States, radio has moved from a Pittsburgh garage to 814 broadcasting stations. Radio now tops the movies in the size of its pay roll. In 1938, radio spent \$45,600,000 in salaries. The average pay for full-time workers was \$45.20 per week.

As radio becomes more and more a part of our lives, it is likely that a large number of radio workers will be needed. Young people with creative talent as performers, engineers, announcers, directors, writers and research workers will be called upon to help keep up the rapid pace of development that radio has shown in the first quarter-century of its public life.



Handling mail
from the radio audience.

ON THE AIR

We're in one of the huge N.B.C. studios of Radio City. There is an air of quiet tenseness. It is two minutes before ten. On the stage is seated a symphony orchestra of over 100 players.

The last sounds of instruments being tuned die out. The musicians sit erect and ready. An announcer in evening dress stands at one side before a microphone. In a glass paneled booth sit the engineers who will connect this studio with the network when the signal comes from the master control room. They will also control the volume and tone of the music as it comes from the studio microphones. The program director is also in the booth. He is standing, waiting for the ten o'clock signal from master control, ready to start the program. His eyes are on the large studio clock. The hands of the clock swing noiselessly toward 9:59 . . . 9:59½ . . . The director lifts his arm, the announcer straightens up at his microphone, a red light appears over the clock . . . ten o'clock—
ON THE AIR.

The program director points to the announcer. The announcer speaks into the microphone, "Ladies and gentlemen of the radio audience, the National Broadcasting Company has the privilege of presenting the first of a series of concerts played by the N.B.C. Symphony Orchestra under the baton of Arturo Toscanini."



A small frail-looking, white-haired man steps from the wings and walks briskly to the center of the stage. The audience bursts into applause. Toscanini bows quickly, steps upon the podium, swings around to face the waiting musicians and raises his baton. The announcer holds up his hand to the audience to quiet their applause, the studio is hushed and the first strains of music are heard.

Six blocks away and across Times Square, another studio audience awaits ten o'clock in a C.B.S. theatre. Back of the drawn curtain instruments are being tuned; the program director is giving last minute directions to a group of actors. He speaks to the orchestra leader about the speed of the last bars of music for the close of the play. The hands of the large clock swing to 9:58. The director speaks quietly to the sound effects men and goes into the glass paneled control room. The curtain is raised.

The audience sees on one side of the stage the row of actors, quietly seated, scripts in hand. After a six-hour rehearsal they are ready. As the characters they represent appear in the play they will step to the microphones, carry on their parts, and then sit down until they are again in the scene. On the other side of the stage sits the small studio orchestra. The orchestra leader takes a last look through the music, makes a note about timing for the last musical bridge. The announcer silently reads through his script—

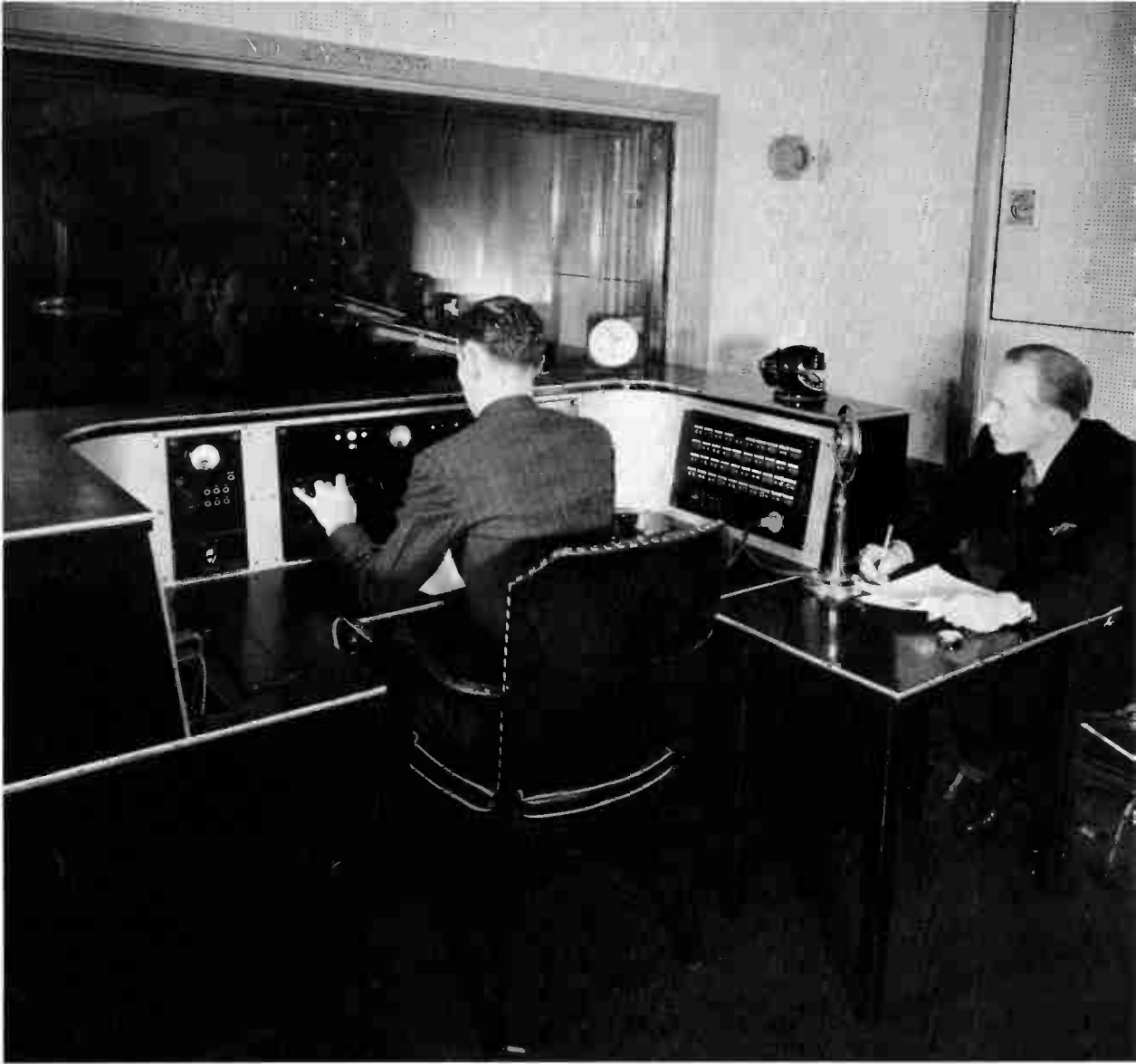


Left, a radio drama from the C.B.S. Playhouse. Below, a musical program with Andre Kostelanetz. This program includes orchestra, soloist and chorus.



the commercial announcement he will make, his introduction of the play, the closing announcement. At the side of the stage stand the sound effects men. They are placing victrola records on turn tables, getting them ready in order to reproduce sounds that will be needed in the play—bird songs, dogs barking. A wooden door on a heavy frame stands nearby, ready to be used at those points in the play where a door is opened or closed. On a table is an odd collection of things—a saw and hammer, milk bottles in a rack, coconut shells. On the floor is a flat box full of sand. During the play the noise of some one walking in sand is needed and at that time the sound effects man will step up and down in the box.

In the control room sits an engineer, listening through ear-phones to the program just going off. He is waiting to switch the microphones of this studio into the radio network circuit. During the broadcast he will regulate volume, toning down or bringing up voices and sound effects. The assistant program director, who is studying to be a director, has a timed script ready and his stop watch out. At the final rehearsal he has timed the scenes and has written in the margin of his script the minute and second when a scene should be over. The program must close “on the nose” (on time) because radio programs must go exactly by the clock. One of the most important jobs of the director is to keep the program



In the studio control room with an engineer and a production man (program director). The engineer is tuning and regulating the sound as it comes from the studio. The program director, stop watch in sight, checks the timing of the script.

on time; to see that it ends just on the right second.

The clock says 9:59½. The director stands in the control room. All watch him. The announcer stands in front of his microphone. The orchestra leader raises his baton. The first characters in the play step quickly and quietly to another microphone. Ten o'clock! The engineer gets his signal from master control room. He connects the studio with network. Over the clock flashes the lighted sign, ON THE AIR. The director points to the orchestra leader, whose baton drops, and the orchestra begins to play. Slowly, the director drops his arm, the music fades. The director points to the announcer. The announcer reads his announcement, introduces the play. The actors at the microphone watch the director carefully. As the announcer completes his part the director points to the first actor, the actor speaks and the play is on!

So all over the country—on the hour, the half-hour, the quarter-hour, programs go on the air. Exactly on time, switches thrown, wires connected, complicated machinery running, radio broadcasts go on all day and most of the night.

All we do is throw our switch and find a spot on the dial to hear the program we want of the many radio brings us. Back of each program is a staff of workers. Who are they? What do they do? How do they get their training?

AVERAGE WEEKLY WAGES OF WORKERS IN BROADCASTING STATIONS, 1935



EXECUTIVES AND
SUPERVISORS



ANNOUNCERS

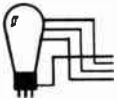


ARTISTS

(FULL-TIME)



(PART-TIME)



TECHNICIANS



CLERKS AND
STENOGRAPHERS



OTHERS (SALESMEN)



Each bill represents 5 dollars

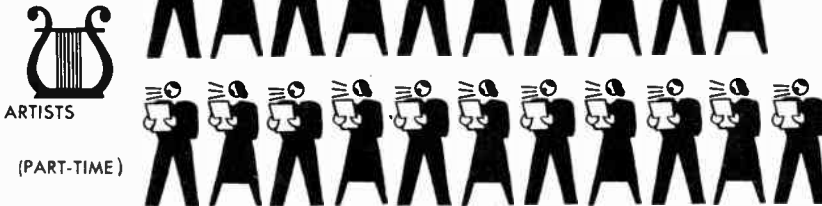
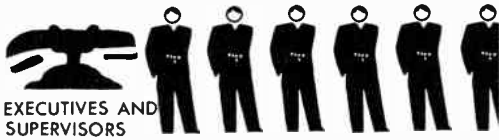
PICTORIAL STATISTICS, INC.

BROADCASTING WORKERS

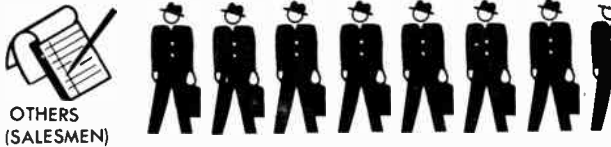
The number of workers in a broadcasting station depends on the size of the station. Powerful stations in the larger cities employ an average of 90 workers. Small, less powerful stations employ an average of six. In the smaller stations the workers often have to carry on two or three jobs. In the large stations a person is likely to have one type of work in which he specializes.

EXECUTIVES AND SUPERVISORS are needed in any size station. They must handle the business and management of the station. In a small station the manager may have to do all of this work. In large stations and in the networks there are a number who share the executive and supervisory work. The president is responsible for the general supervision of all policies and activities. He is assisted by a number of vice presidents, each of whom has special responsibilities. One may be in charge of programs. Another may have charge of time sales. Still another may be in charge of the internal business arrangements of the company or the relations between stations and the network. The vice presidents are assisted by heads of the various departments, such as program, news, education, publicity, engineering, sales, artist management. Under each department head there may be a supervisor who sees that the work of the department is carried out. Executives and supervisors have

WORKERS IN BROADCASTING STATIONS



(PART-TIME)



Each figure represents 200 workers

PICTORIAL STATISTICS, INC.

had long experience and training in business methods or in their special work. Beginners in the field of radio rarely get these jobs.

THE PROGRAM DIRECTOR is the person who is responsible for putting a show on the air. On pages 18 and 22 we saw something of the work of the program director at the time of the play broadcast. But he had had much work to do before the show could go on. He had to study the script and make suggestions for rewriting certain scenes, changing certain characters, adding sound effects, perhaps cutting or lengthening the play to fit the half-hour program. He talked with the casting director about the actors who had been selected to play the rôles. It is the job of the casting director to select capable actors and actresses to fit the rôles, but the program director may disagree, or may want to discuss the work of an actor with the casting director. He discussed with the music director and the orchestra leader the type of music that would create the mood of the play. He went over the plans with the sound effects experts. He planned with the engineers the number of microphones needed and their location on the stage.

The program director had done these and a number of other duties before he met with the members of the cast, the orchestra, the sound effects men and the announcer for rehearsals of the play. For six hours he directed rehearsals. Six hours of group work for



Above and below, Roger Bower, Mutual director, signals from the control room:

"Everything is going well!"

"Give the station call letters."

"Two minutes to go."

"Too loud! Quiet it down!"

"Play the final theme music."

"On the nose! Exactly on time. Good job."

Right, the actors in Pepper Young's Family follow the sign language of director Ed Wolf.



a half-hour on the air!

More important than the hours of rehearsal is the ability of the director to get the most out of the play, the cast and all of the workers on the program. He must be both a creative artist and a psychologist to be a good director. He must have patience mixed with firmness, and be able to imagine the whole of the program as the radio audience will hear it. He must know how to bring out the best in young, timid actors as well as older, experienced, but mike-frightened stage or movie stars. He must have a good background of information and experience in drama, music, history, human affairs and radio engineering.

Today's radio program directors have received their training in different ways. Some have been directors in theatres. Some have been very successful radio writers who are also capable of working well with people. Some have worked with directors as apprentices or students and learned from them. Some have taken work in dramatics and radio-directing in college.

If you are interested in becoming a director you should do what you can to get experience directing school plays and radio programs. Many local stations welcome plays put on by high school students. This offers a good opportunity to learn about radio and to try out your ability as a director.



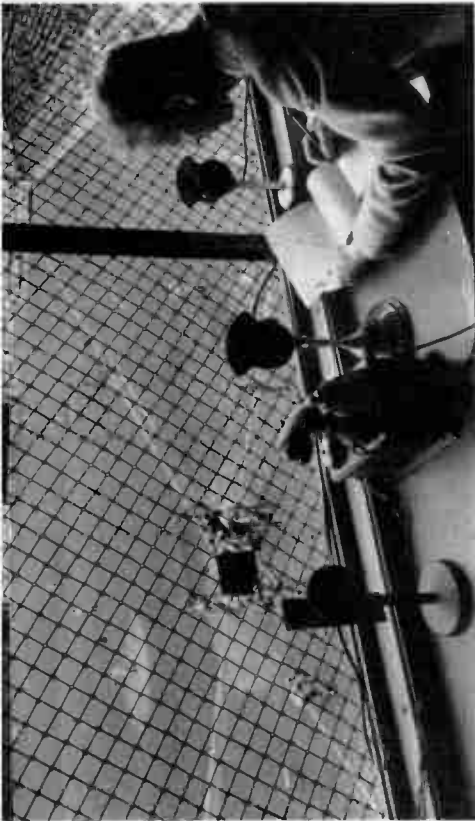
Above, director George Zachary (at the right) directs a rehearsal of a Columbia Workshop play. Below, Earle McGill, casting director and also a program director for C.B.S., gives last minute instructions at a dress rehearsal. For audience broadcasts actors sometimes appear in costume.



THE ANNOUNCER is a person the listener knows better than he does the director. In small stations the announcer usually has several jobs to do. He makes the regular announcements of programs, he gives the time, he often plays the piano or organ, he may be an actor or perhaps the master of ceremonies for the dance orchestra. He may also have to be a kind of office manager.

In large stations and in the networks like N.B.C., C.B.S. and Mutual, announcers usually have only announcing to do. In regular announcing the announcer is given a certain number of programs each week. It is his job to have the announcement ready, to be in the right studio at the right time and to know his announcement so well that he won't stumble in his reading. He will also be assigned a certain number of times when he will give the station call—break in at the end of fifteen or thirty minutes and say, "This is station WLW." New announcers, starting with this kind of work, are just voices to the listeners. The listening audience does not know who they are. In the more important programs announcers give their names. They do this usually at the end of the program, saying something like, "This is the American School of the Air, Niles Welsh speaking."

Some announcers develop particular voice personalities and are selected to do special work. Graham McNamee and Ted Husing



Above, reporting a baseball game from Ebbets Field in Brooklyn, N. Y.

Center, reading routine station announcements.

Below, Frank Singiser getting ready for a broadcast.

became special sports announcers because they had good snappy voices and knew a lot about sports. Milton Cross had a musical voice, knew a great deal about music and became the announcer for special music broadcasts like the Metropolitan Opera. These special announcers often get good salaries from the sponsors of the broadcasts, while regular announcers get regular but usually lower salaries direct from the broadcasting company.

Many announcers now in radio grew up with it. Others have studied in college courses for radio workers. Some have taken special courses in radio schools. The important thing is for the announcer to have a good voice. It must be clear and have good ringing tones. It must be natural. Being natural is very important because a voice must sound sincere. Another important thing is that the announcer, like all other radio workers, must be prompt and regular in his work. The radio audience won't wait two or three minutes for the late announcer.

If you want to be an announcer, concentrate on public speaking. Take public speaking courses, or work on public speaking in your English courses. Learn to throw your voice well, to place it well; and practice speaking enough so that you will not be self-conscious when you speak. Well-known news analysts like Elmer Davis, Raymond Gram Swing, H. V. Kaltenborn and Gabriel Heatter are inter-

Bill Stern announcing
a boat race.



Clem McCarthy (*left*)
reporting a horse race.



Graham McNamee at the
1930 World Series.



esting because they are themselves, and their voices give the impression of distinct personalities. Too many young people lose more than they gain by trying to imitate well-known announcers.

If you apply for an announcer's job at one of the big stations, you may be asked to make an extemporaneous speech in order to show how well you speak, how much force you have and how well you can think on your feet.

For the first twenty years men announcers have been the favorites. Women's voices, unless they are trained for radio work, are likely to be high and squeaky. Women announcers who have been tried from time to time somehow did not go over. A very few succeeded. But now television is coming and women are being trained to be announcers, for, in television, the announcer will be seen as well as heard.

RADIO ACTORS AND ACTRESSES are on the air for more than one-tenth of the radio time. They act in children's programs, serials and special dramatic broadcasts. A large number of actors are on call for regular work for the broadcasting companies. Many other actors and actresses are called in for special plays. Then there are a number of well-known stars like Jean Hersholt, Helen Hayes and Don Ameche who come from stage or screen work to give single performances or series of performances over the air.



Above, Lowell Thomas ready to read his comments on the news.

Center, Elmer Davis broadcasting his analysis of the news.

Below, Gabriel Heatter is on the air.

Radio acting calls for special ability in acting with the voice alone. Listeners get their impressions of the character entirely through hearing. They must *hear* the smiles, or frowns, or gestures that they would see on the stage or screen. So, actors must be able to put their characterization into their voices.

Some of the best known performers in radio have had their training and experience on the stage and in the movies. A few have been in radio for some years and have gained experience as radio has developed. Others have had training in dramatic and special radio schools. Some have trained in small theatre groups and summer theatres.

If you want to be a radio actor you should get into dramatics and you should also work on radio techniques. You can do some of this in high school, especially where the local station lets the high school put on radio plays. You can get more of it in college. A few of the special schools for radio talent are good. Some are not. Before going to one of these special schools find out how many of their graduates have really good jobs in radio.

The big studios have regular auditions to find good actors and actresses. When performers are given regular jobs at some stations they must join the radio actors' union. The union regulates the number of hours of rehearsal, the number of performances a week

Right, actors get the feeling of the parts into their voices.

Below, the organist plays the opening theme and the actors and actresses are ready for *One Man's Family*.



and the minimum pay of actors and actresses. At present the union's minimum pay is \$21.00 for each broadcast.

RADIO WRITERS do a number of different kinds of writing. Some edit and write up news broadcasts. Some write the comments and announcements that go with opera and musical broadcasts. The ones who have the most writing to do are the ones who write radio plays. Some write serials that go on once every week or perhaps every day. Others write serious drama for special broadcasts. Some write dramatic documentaries for educational programs. Those who write plays for the non-advertising or sustaining time are usually employed by the broadcasting company. Some are employed full-time. They write from two to five programs a week. Some are employed part-time. They may write a program only now and then.

Most radio writers are free lance writers who sell their work to the station or to agencies that handle advertisers' accounts. Some are paid by a sponsor to write plays for a whole series of programs. There is no definite price for scripts. The writer may receive \$5 or \$500 for a half-hour script, depending on its quality, the reputation of the writer and the size of the station.

A writer who went from free lance writing to a regular job with a network says, "Some people say the writer has the best job in the world . . . others say it is the worst. He may not have to work in

Large stations and networks have regular auditions for those with talent. At N.B.C. many of the young men who show ability are employed as ushers and pages. They study while they work and if they show real ability in an audition they are given a chance on the air.



an office from nine to five, he may work at home and finish the job in two hours. But he must deliver his completed manuscript on time, and this may mean 12 or 18 hours of writing at one stretch—and later perhaps hours at rehearsal and hours of rewriting. The free lance writer may work where and when he pleases and be well paid for his scripts. But when his contract is over and his program off the air, he may spend a lean period trying to sell another show and earn another contract.”

The best training and experience for radio writing is *writing*. Play writing and short story writing help a person to learn how to develop good plots, how to keep the action moving, how to write dialogue and how to handle the techniques that are necessary for good radio plays. Radio calls for some additional abilities. The writer must be able to imagine how his play will go when it is heard but not seen. He has to learn how to bridge over the changes from scene to scene by means of sound instead of by dropping a curtain. He must learn how to make the best use of the many sound effects that can be used. He must be willing to make changes on the advice of the director and the sound effects experts. Most of all he has to be original in his ideas.

The best way to discover whether or not you would be a good radio writer is to try your hand at writing short plays, short stories,



Above, editors write and re-write announcements, special news releases and scripts before they go on the air. *Left*, a writer struggles to get a good story idea.

and radio plays for school performances. If your school has a public address system, or a central radio in the office, you can actually broadcast to the students. If your play goes over well, the local station may put it on. If it succeeds there you might send it to the script director of a large station or network and ask what he thinks of it. Script directors are always looking for new ideas and good scripts.

RADIO MUSICIANS fill over half of the radio time. Singers, choirs, organists, choruses, string quartettes, concert orchestras, symphony orchestras, dance orchestras, bands and opera companies are in this group. Some of these are famous artists or groups who broadcast now and then. Often they are paid large sums by sponsors. Many musicians, especially those in studio orchestras, are regularly employed by the broadcasting company.

Larger stations have house orchestras—staff musicians on weekly salary. These men may play under a number of different conductors during a week. They may play in different sizes and types of orchestras. The same violinist may play in a quartette, may be in an eight piece orchestra to play the bridges and accompanying music for a play, may play in a symphony concert, all in the same week.

These musicians are paid a definite wage scale, determined by the musicians' union. There are separate rates for broadcast time,

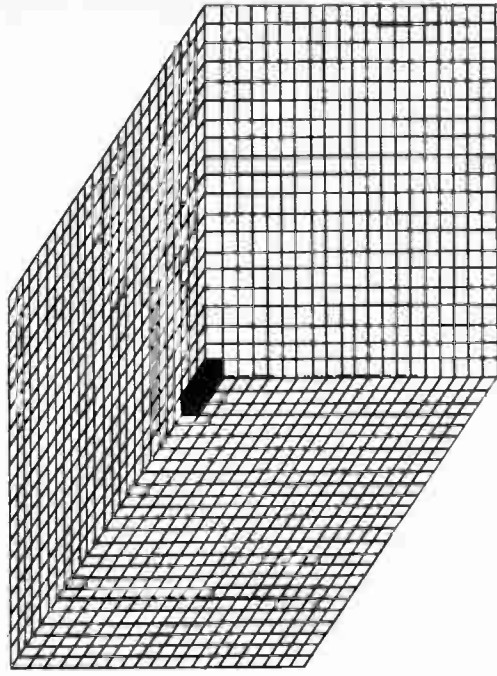


Members of the C.B.S. staff at their weekly script and continuity meeting to consider the purchase of material for the Columbia Workshop. All material brought to the meeting has been read by some of the staff and highly recommended.

In the center, Max Wylie, director of script and continuity, cigaret in hand, is talking to Nila Mack, head of the children's department.

The chances for a job in radio broadcasting are not very great. Only three out of ten thousand workers are in radio.

THREE IN 10,000 JOBS



rehearsal, recording and overtime. These rates differ with the size of the station. Union men are not allowed to play in an orchestra with non-union men, nor under a non-union conductor.

Many well-known dance orchestras started with groups of boys who played for their high school dances. This is a good way to get practice if you are interested in playing with a radio dance orchestra. If you are interested in other types of instrumental work or singing over the radio you should get the best possible musical training, gain experience with local audiences, try for opportunities to perform on a local station, where you can learn something about microphone technique and the problems of radio work. Perhaps you can get on one of the programs in which amateur musicians compete for musical scholarships and for places on network programs. Only excellent musicians have a chance.

If your work is excellent and is approved by good music teachers, you may apply for an audition in one of the big studios. If you have real musical talent, you may get a job through the audition. It is usually best for you to have a manager who knows the business end of musical work on radio.

SOUND EFFECTS EXPERTS do some of the most interesting work in radio. They must create the sounds that are called for in the program. They must know a great deal about the physics of

Studying a musical score with
a recording.



Making records of special
events for rebroadcasting.



The N.B.C. music library.



sound and they must be clever in finding the materials or processes that will duplicate a needed sound. The real sound of fire over the microphone does not sound nearly so much like fire as does the crushing of cellophane in the hands of the sound effects man. Then, of course, there are some sounds that cannot be real—like the sound of stabbing a person. This sound is reproduced by stabbing a knife into a large potato, close to the microphone. Then there are sounds that cannot very well be brought into the studio—the sound of birds singing or dogs barking. Many of these sounds are recorded on discs or on film and the sound effects man plays them at the proper time in the play.

Most sound effects experts have engineering training but they have had to get their experience on the job. They have had to be clever enough to invent ways of working out many, many types of sound. For those who want to go into this work, engineering training and a good imagination are essential.

RADIO ENGINEERS are the ones who keep the sound coming over the air. There are engineers in the studio who connect up the studio with the network and regulate the volume and quality of sound. There are engineers in the master control room who keep the network programs coming in and going out to the local stations. There are engineers who keep the studio and control room



Sound effects men:
use rubber bulbs for the sound of milking
a cow;
crush wooden boxes for doors crashing in;
drop wooden pegs on a table for an army
marching;
twist a bundle of straw for noises in the
underbrush;
crumple cellophane for fire;
clap coconut shells together for horses on
a hard road;
use an egg beater for the sound of beating
eggs;
rattle wooden pegs for bones rattling.
Right, sound effects men and cast of *Gang-
Busters* on C.B.S.



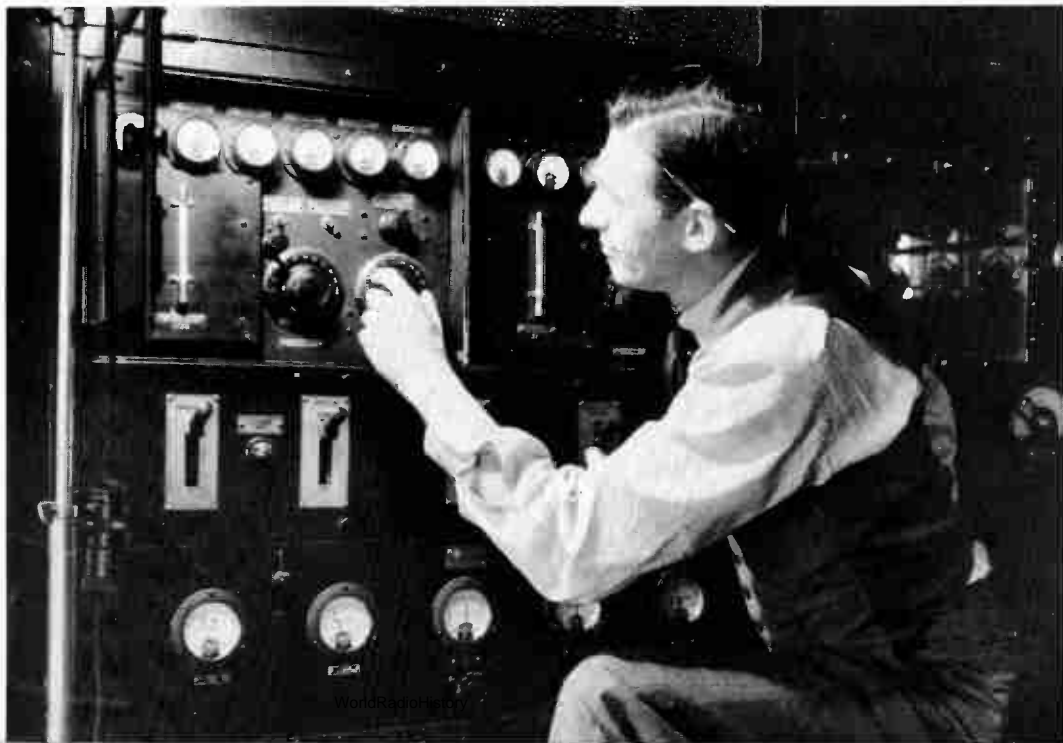
equipment in repair. Then there are engineers miles away from the studio at the transmitting stations. Programs carried here by telephone wires are sent out over the air by long wave or by short wave. These transmitting stations are out in the country where interference from city electricity and buildings will not affect the reception. It is inconvenient for performers to go so far out of town and so the program must be brought by telephone wires to the out-of-town sending station.

Engineers are also at work doing research in radio broadcasting. They work out better types of microphones. They improve the acoustics of broadcasting studios and theatres. They plan better placement of microphones. They invent better vacuum tubes. They are now perfecting television.

Engineers also go out with announcers and commentators when baseball and football games, boxing matches, speeches, boat arrivals and other special events are broadcast. Sometimes they have to take short wave transmitters and broadcast direct from the event. The broadcast is then picked up at the station and is rebroadcast. Radio engineering is taught in good technical schools and engineering colleges. For those who want to be radio engineers it is wise to get a good background in physics, chemistry and general engineering as well as in special radio engineering.



Above, a C.B.S. supervising engineer makes a listening test on a new organ. Each control knob on the panel regulates one microphone in the studio. By turning various knobs the engineer “mixes” the sound to get the best effects. The microphone is for talking to those on the other side of the glass panel in the studio. *Below*, an engineer is tuning the control unit.



AMATEURS

Amateurs or “hams” are Jacks-of-all-trades. They do radio work as a hobby. It is a hobby that gives “hams” much fun, excitement and a real chance to help others. The amateur has his own broadcasting station. He broadcasts through his own transmitter on short wave. It’s like talking over a party-line telephone because anyone with a short wave receiver can listen in, and anyone with a transmitter can join the conversation. You can hear the “hams” talking to each other on your own short wave radio. They may be just talking. They may be delivering messages. They may be relaying requests for help that they have heard.

Of the nearly 73,000 amateur operators in the world, 55,000 are in the United States. Each of these 55,000 has had to take a government examination. When he passed he got a license to broadcast and to use special call letters for his own station. He must obey rules when he operates his set. When the war broke out in 1939 all United States amateurs were asked by the Federal Communications Commission not to transmit any messages about the war and to report to their League in West Hartford any strange short wave messages that might be the work of spies.

The radio amateur never knows when his hobby may take on life-and-death importance. A disaster may wipe out all other means



Above, throwing the switches in the master control room. *Below*, changing a tube at the transmitting station. Tubes are very hot after use so the engineer wears asbestos gloves.



of communication. Then the “ham” goes into action. During a flood in 1936, a “ham” in Condersport, Pennsylvania, supplied the only direct communication to 4000 people. He sent more than 1000 messages in 130 hours. During a hurricane in 1938, a “ham” in Westerly, Rhode Island, risked his life to keep open the only communication between his city and the rest of the world.

You won't earn money by becoming an amateur operator. You are not allowed to broadcast commercially, but if you are interested in the engineering side of radio this is a good way to get experience. You can learn what short wave listeners or dx'ers are doing throughout the world by writing to Charles A. Morrison, president of the International Dx'ers Alliance, Bloomington, Illinois. He will be glad to send a copy of their short wave log. You can also write to the American Relay League, Inc., West Hartford, Connecticut, for a booklet on operating an amateur radio station.

THE FUTURE OF RADIO

The future of radio is hard to predict. It depends on how soon world peace comes. It depends on how soon television is perfected. But we know that in the United States radio is growing rapidly. Television broadcasts have already started. New types of radio programs are being devised. New uses for radio are being found. It

Technicians on duty at Columbia's International Broadcast Station WCBX.

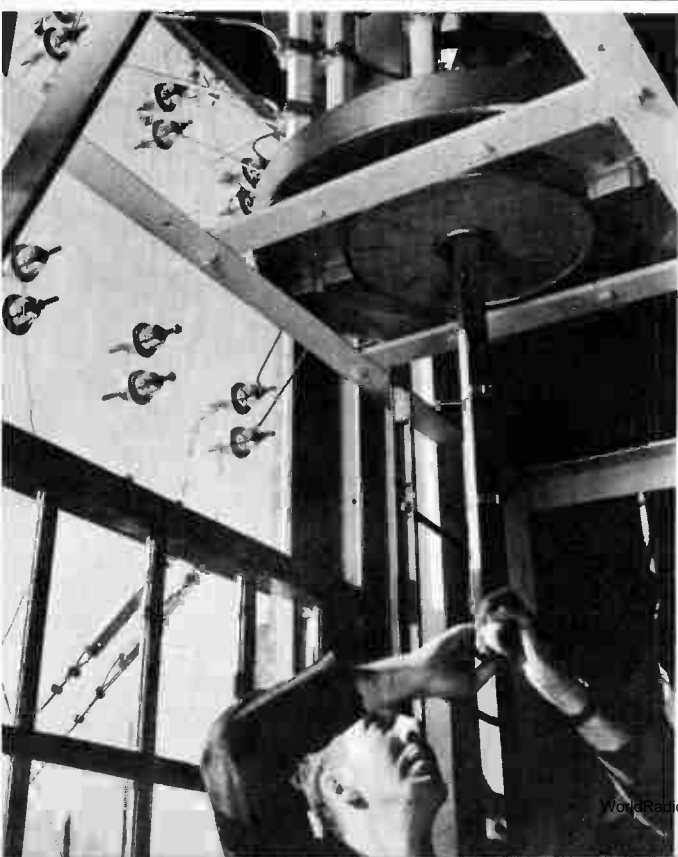
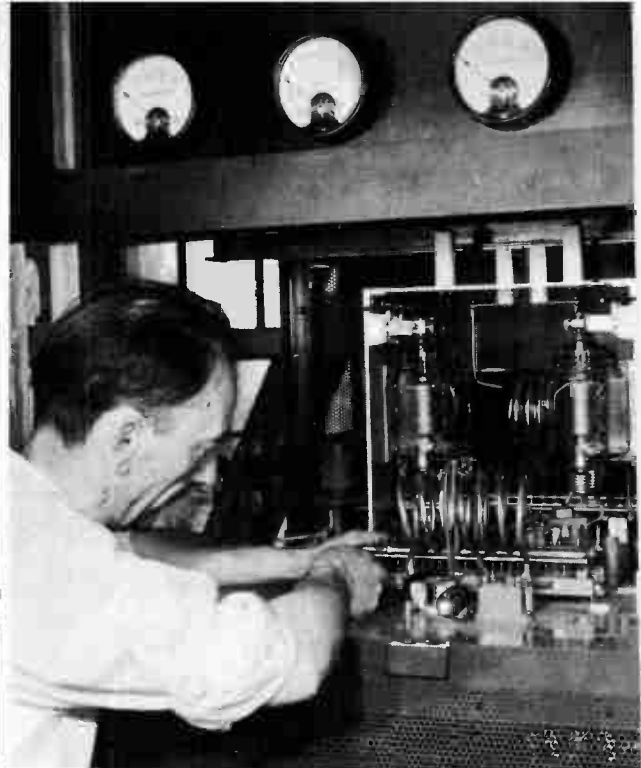
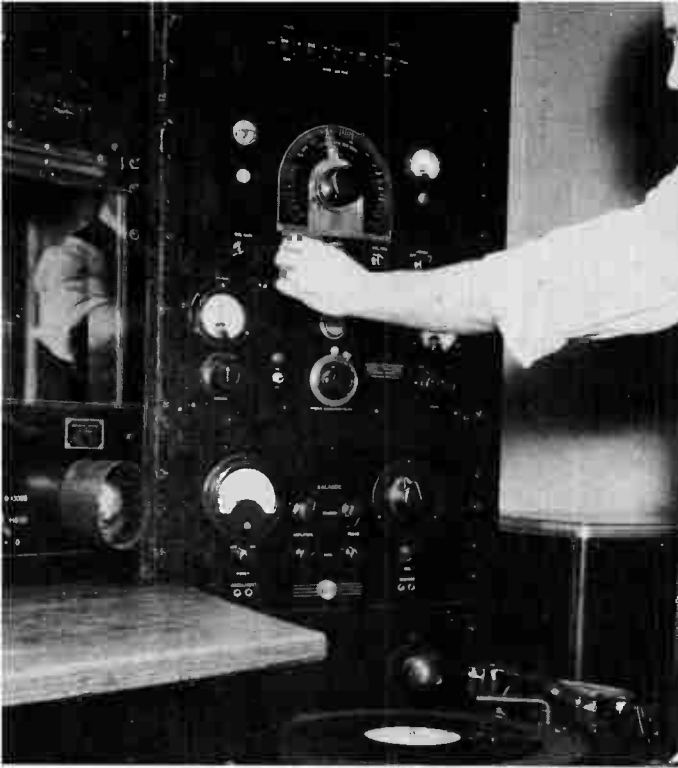


Placing a clip lead on the control apparatus.



Changing transmitter tubes.

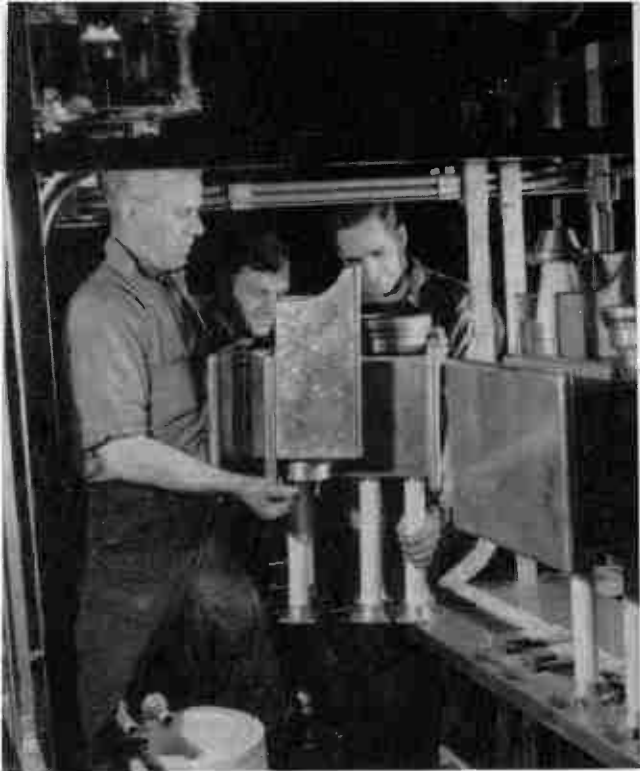




Engineers at the transmitting stations are on the job all the time. They must constantly test and repair or replace equipment. They must control the sound as it comes in and goes out. They must work out better ways of planning their equipment.

Radio engineers have to meet many emergencies. Fierce storms may put transmitters out of order. They must be repaired swiftly so that the program can go on. Snow and sleet often form ice on the wires and cause trouble. Engineers are working out ways of heating the wires to prevent this.

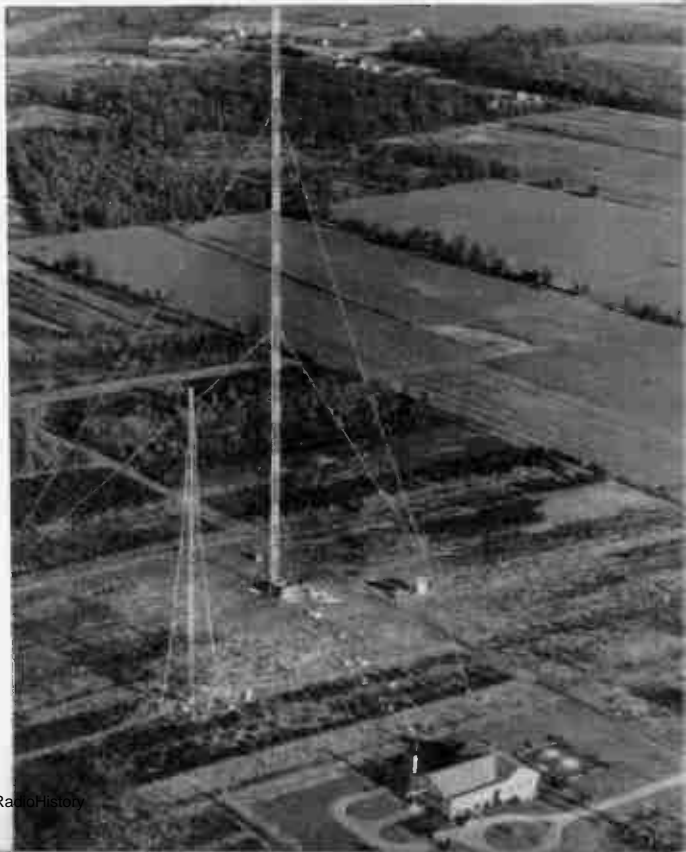
The engineers have one problem they have not been able to work out,—sun spots! Electrical dis-



turbances from sun spots may cause such bad static that short wave radio and telegraph are both put out of commission. This happened on Easter Sunday in 1940. Perhaps you will be one of the radio engineers who will work out a way to solve the problem of the sun's interference with our radio reception.

On the left the engineer is selecting directional antennas at WCBX, Columbia's short wave outlet at Wayne, N. J.

On the right is a bird's eye view of WJZ's antenna. *Above, left to right*, part of the measuring equipment at WCBX, two repair and replacement jobs, and testing the tubes.



may not be long before planes, while flying over floods and fires, will be able to send maps and pictures by television to their home base. There is already a machine for printing newspapers in home radios during the night. Workers who have creative ability and imagination will be needed to develop the great possibilities in radio that man has not yet foreseen.

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pages 9, top and bottom; 19, top and bottom; 29, top and bottom; 35, center and bottom; 43, top (courtesy Farrar and Rinehart); 47, center; 49, top; 53, top; 54, top left and bottom. (All C.B.S. pictures copyrighted by C.B.S.).

To MUTUAL BROADCASTING SYSTEM for pictures:

pages 27, top and bottom (photos by Walter Engel, courtesy Newark Sunday Call); 31, top, bottom (photos by Kaston) and center; 45, center (photo by Walter Engel).

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pages 5; 7, sides and bottom; 11, bottom; 15; 17 (photo by William Haussler); 21; 27, center (photo by Sydney Desfor); 33, top, center and bottom; 35, top; 37, top (photo by Sydney Desfor) and bottom; 39, top and bottom (photo by Sydney Desfor); 41, top; 45, top and bottom (photo by Sydney Desfor); 47, top and bottom; 49, bottom; 51, top and bottom (photo by Sydney Desfor); 53, center and bottom (photo by Sydney Desfor); 54, right; 55, top and bottom.

To Paramount Productions, Inc. for picture bottom page 41.