

# ON THE AIR

*the beating of drums*

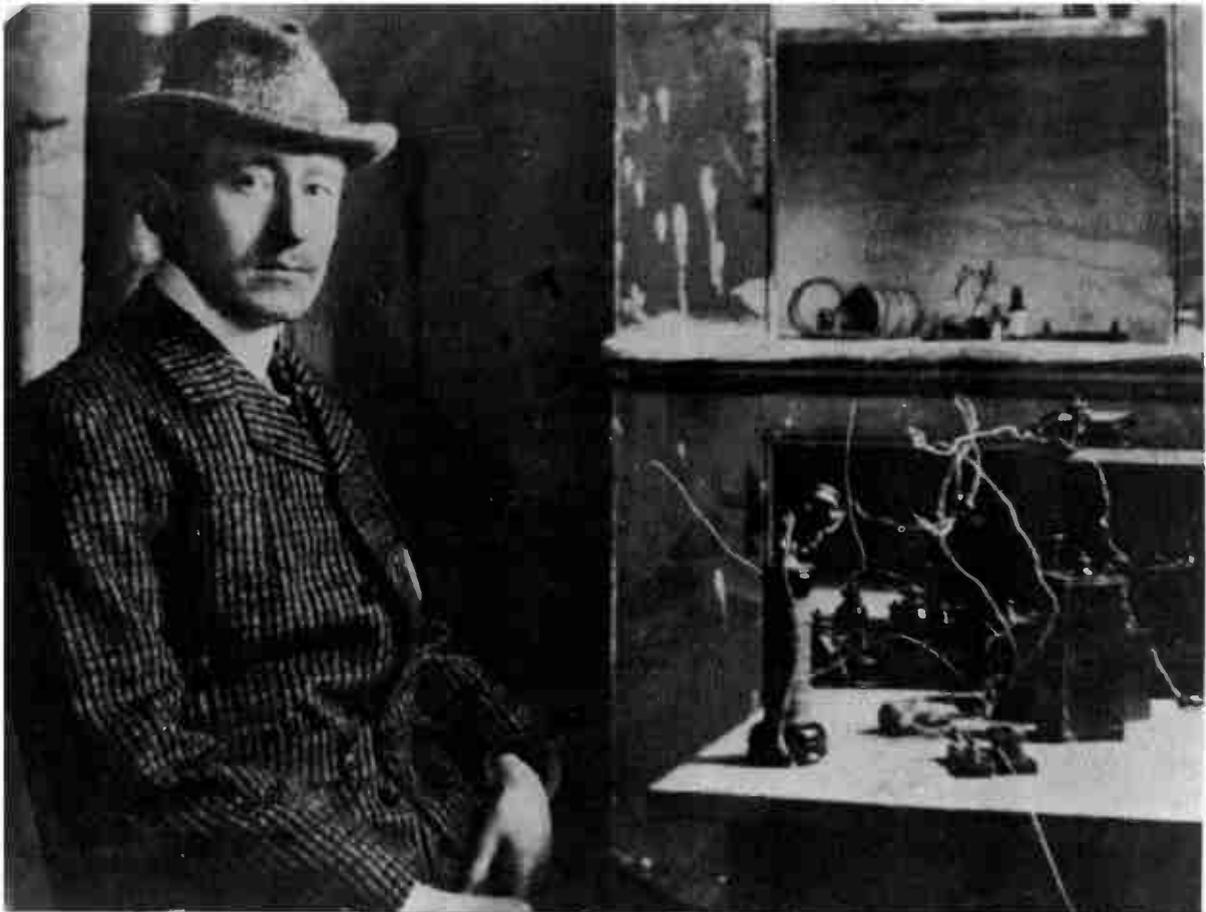
*the tolling of bells*

*the strident tones of the town crier*

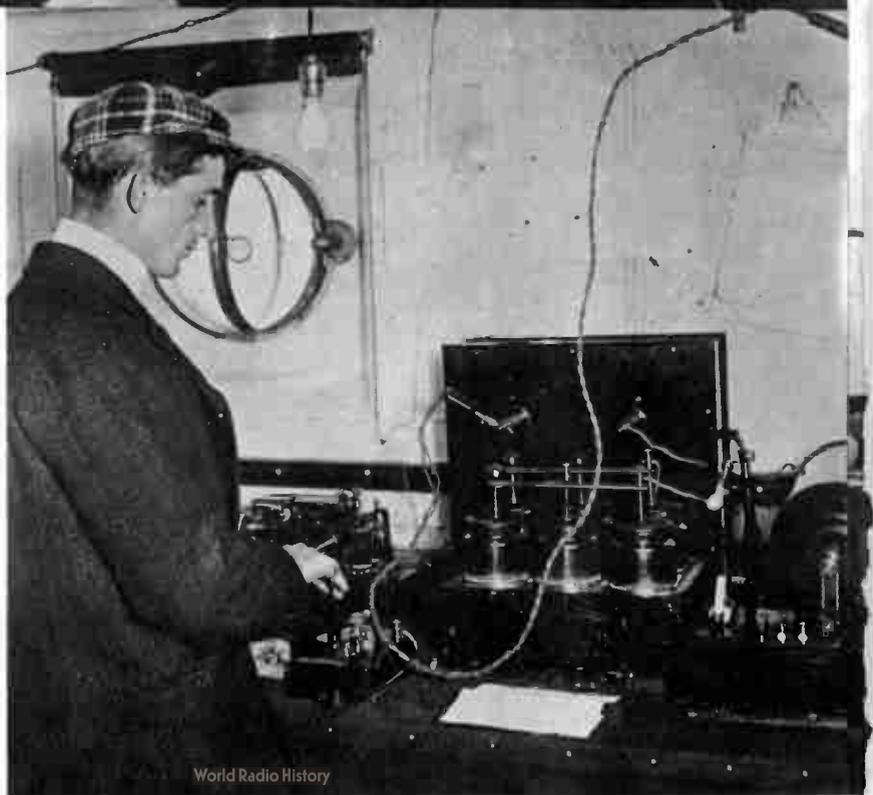
*the clatter of hoofs along the post road*

—these, for two thousand years were the accoutrements  
of communication. And then, in the Nineteenth Century  
came revolutionary changes in the transfer of news and  
thought from man to man in every corner of the earth;  
the telegraph, the telephone  
and, in the closing decade—

# RADIO



Above: Marconi and equipment with which radio signals were first received across the Atlantic in 1901.  
Right: One of the first ship radio transmitters.



**I**T IS peculiarly appropriate that an agency so universally serviceable to mankind as radio should have on the rolls of its earliest pioneers the names of men of many nations.

High in the list, is the name of James Clerk Maxwell, Scotch mathematician who, in 1876, predicted the new art in a treatise on electricity and magnetism. Then, in the Germany of 1887, Dr. Heinrich Rudolph Hertz actually demonstrated the electromagnetic waves foretold by Maxwell. There followed activity in France and England, in which Professor Edouard Branley and Sir Oliver Lodge, in 1892 and 1894 perfected new apparatus for the reception of these waves. Not long afterward Professor Popoff, a Russian, used the new devices to detect approaching storms and became, thereby, the first observer of "static."

But it remained for a young Italian, Guglielmo Marconi, to take all that diversified laboratory work and fuse it with ideas of his own to produce the first practical method of communication by radio, in 1896.

Radio came to America in 1899, when Marconi gave demonstrations to the United States Navy. Radio first spanned the oceans in 1901, when Marconi received signals from Poldhu, Cornwall, England at St. Johns, Newfoundland. Radio was firmly established in international commercial communication when the Radio Corporation of America entered the field in 1920.

Today, radio serves everyone—everywhere. It is the one universal means of communication. It comes into your home, whether in isolated cabin or city mansion, bringing cheer and culture; it accompanies you over the countryside in your car; it is with you if you leave the ground for the faster transport of the air. At home, radio bears your messages from one city to another; at sea, it guides your ship through storm and fog; in foreign lands, it links you with family and business associates at home.

Just as radio offers these many services, so does RCA serve every phase of radio. The intricate equipment that gives split-second precision to the National Broadcasting Company's Radio City plant is but a single evidence of the technical excellence which results from RCA'S unremitting effort to improve every aspect of radio.

Marconi and assistants preparing to fly the kite which supported receiving antenna in the historic transatlantic experiments in 1901.



The RCA Building, Radio City, New York, home of the Radio Corporation of America and hub of the many RCA radio activities.



## FROM GARAGE TO SKYSCRAPER

The rich background of RCA'S pioneering radio knowledge enabled broadcasting to rise quickly to its present position. For, although the art now affects vitally the daily lives of millions of persons, it is still young.

Broadcasting was born on November 2, 1920, when station KDKA of the Westinghouse Electric & Manufacturing Company began its regular daily service to listeners. It was on this date that KDKA broadcast the returns of Harding's election to what was then a very limited number of listeners—mostly amateurs.

From that beginning, the great American broadcast structure has grown with amazing rapidity to its present place of world leadership, which is fittingly exemplified in the RCA Building, Radio City, nerve center of the far-flung NBC networks and hub of all the diversified activities in which RCA is engaged. The contrast between the 1920 garage and the 1935 skyscraper symbolizes the rise of a new industry and a new art.

In 1921, WJZ went on the air, followed a year later by WEAJ. These stations now head the two coast-to-coast networks of the National Broadcasting Company, which was founded by RCA in 1926 as the world's first great network system.

The two NBC nationwide hook-ups now include 88 stations, linked together by specially engineered telephone lines, which form the "networks." Programs originating in the Radio City studios, or elsewhere, are sent out over these miles of high-efficiency wires to the stations affiliated with the National Broadcasting Company, which in turn broadcast them throughout their own areas.

One of the NBC studios in the RCA Building, Radio City.





## WHO PAYS FOR RADIO PROGRAMS?

The American system of broadcasting differs from that of most foreign countries. Abroad, in the majority of cases, radio is controlled by the government, while in the United States it is a private enterprise.

In stating the difference between the two systems, it is usually emphasized that in this country broadcasting is supported by advertisers, whereas in other nations it is supported by taxes levied against the owners of receiving sets.

This is, of course, true, but it is not the chief difference, from the point of view of the listener. It is the listener who pays for radio in this country also; pays with one of his most valuable possessions—his time. The shillings, marks or francs which foreign listeners spend for licenses are of trivial worth compared to the time spent in listening.

And in this lies the vital difference. The listener abroad, spending both his time and his money, has no direct control over broadcasting; the listener in the United States, through his time alone, has absolute control. American broadcasting is competitive. Rival networks, stations and advertisers all strive for the attention of the listener. If a program does not please the audience, it soon disappears from the air. Thus, American listeners get what they like from the air; under governmental operation they get what the government wants them to have.



Above: Master control desk, nerve center of broadcasting in the RCA Building, designed and built by RCA Engineers. Left: Control board of the studio air conditioning plant.



## WORLD'S LARGEST "AIR CASTLE"

The Radio City headquarters of the National Broadcasting Company is the world's largest broadcasting plant. It was designed and constructed under the direct supervision of RCA engineers and embodies all of the most recent improvements in the technical equipment of the radio art.

Looking to the needs of the future, as well as to those of the present, the engineers and architects of the company have built to meet further developments in the art of broadcasting as they occur.

For example, while they cannot predict the date of the advent of practical television broadcasting, they have made extensive plans for its arrival. The studio section of the RCA Building is honey-combed with ducts through which the wiring for "sight" programs can be run, and the lighting equipment is capable of carrying the extra load which television will require.

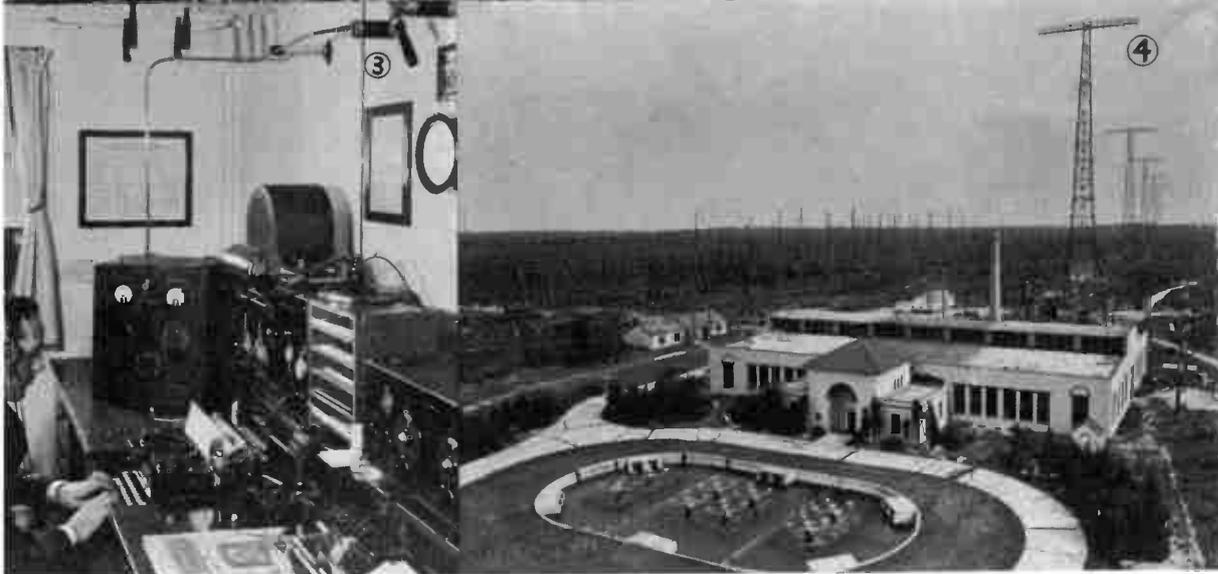
In addition to the studios and control rooms, NBC's Radio City headquarters contain a complete experimental laboratory, where tests are constantly being conducted in an effort to improve existing equipment and develop new and better technical devices.

## THE WORLD THROUGH A LOUDSPEAKER

International broadcasting is almost a commonplace today. It causes no comment when the voices of men speaking in London, Caracas or Sydney are heard in homes throughout the United States. We have become so accustomed to electrical and mechanical wonders that we take them for granted.

RCA's earliest experiments in the reception of foreign programs for broadcast in this country were conducted in 1925. During 1934 the National Broadcasting Company broadcast a total of 324 pick-ups from 35 different foreign countries. These programs were "imported" for NBC by another member of the RCA family, which specializes in international and domestic radio communication. R.C.A. Communications, Inc., transmitted and received for American broadcasting networks during 1934 a total of 715 international programs, to and from this country. The programs from foreign lands were handled with the same split-second precision that marks network broadcasts of domestic origin.

- 1—RCA Building at night.
- 2—RCA Velocity Microphone.
- 3—Reception Hall, NBC studios.
- 4—Demonstrating sound effects to guest tourists.
- 5—The power room.
- 6—One of the studio control rooms.



## NBC RADIO CITY FACTS AND FIGURES

The National Broadcasting Company produces about 50,000 network programs each year, involving 500,000 individual appearances before the microphones.

Five hours of rehearsal are required, on the average, for each hour of broadcasting, which accounts for the large number of studios needed.

There are 27 studios in the NBC Radio City headquarters. All studios are built like boxes within boxes, raised from the building floor by felt-covered steel springs. Walls and ceilings are constructed of thick rock-wool covered with perforated asbestos board and cloth, for the purpose of sound insulation.

Eleven carloads (500,000 pounds) of rock-wool were used, and the walls and ceilings are covered with 244,908 square feet of decorative textile fabrics.

Because the whole studio section is windowless, for purposes of sound-insulation, a huge air-conditioning plant supplies all the air for the studio section of the building, forcing it through the studios at the rate of 15 miles an hour. Twenty million cubic feet of purified air are used hourly.

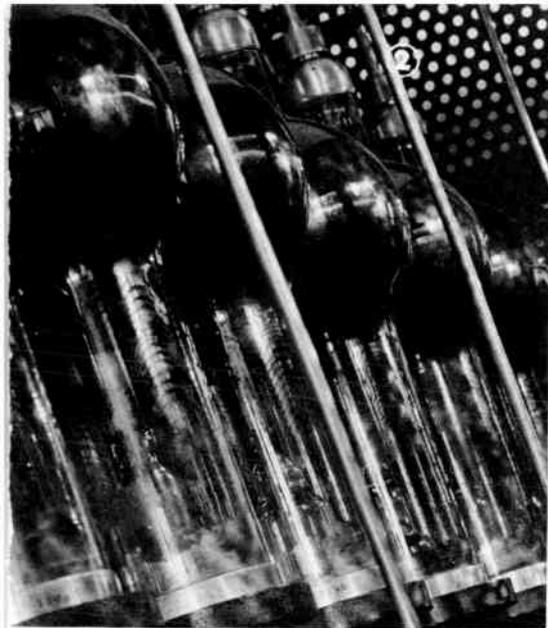
Twelve hundred miles of wire was used in connecting up the technical equipment in the studios and control rooms. There are about 10,000,000 wires, of varying length, each of which had to be connected by hand.

The Auditorium Studio is the biggest broadcasting studio ever built, measuring 78 x 132 feet, and is three stories in height. It will accommodate a 400-piece orchestra and an audience of a thousand people at the same time.

Phil Harris conducting a program in one of the NBC studios.

- 1—RCA Manufacturing Company plant at Camden, New Jersey, Home of RCA Victor Radio and other famous RCA Products.
- 2—RCA Transmitting Tubes. The "big brothers" of RCA Radio tubes for your Receiver.
- 3—RCA Shipboard Radio installation.
- 4—RCA international communication station, Rocky Point, Long Island.



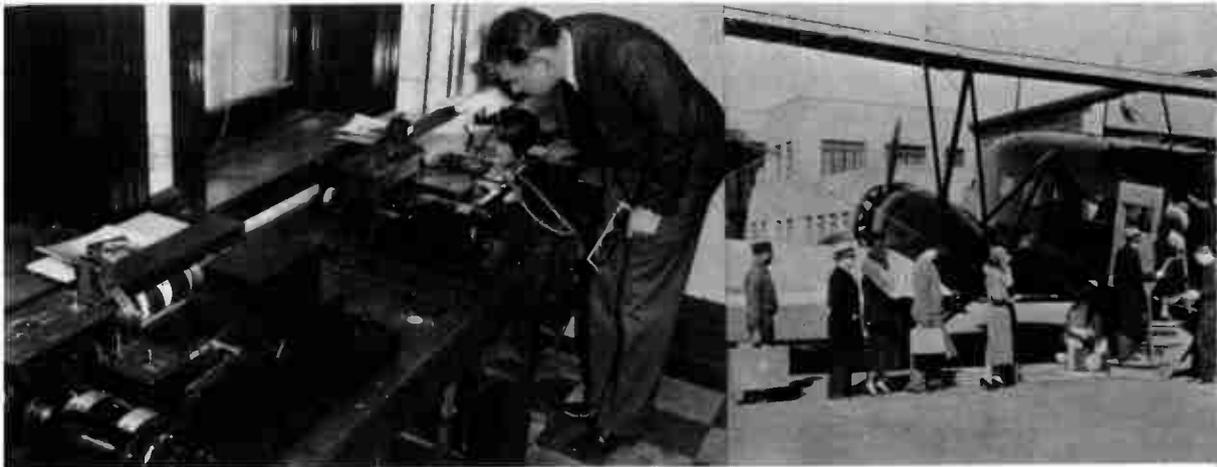


## BACK OF NBC BROADCASTING

At the NBC studios in Radio City there are half a thousand engineers planning, developing, constructing and operating this tremendous center of entertainment. Sound effect engineers set radio's sound "scenery." Traffic engineers clear and order 35,000 miles of connections to eighty-eight network stations. Studio engineers monitor the program as it is captured by its microphones. Others at the master control board, amid a glittering array of lights, switches, buttons and dials, dispatch the programs thousands of miles to broadcasting stations throughout the nation. And the equipment through which these, and the manifold other operations incident to modern broadcasting are performed, is bewildering in its complexity.

This great broadcasting achievement is neither miraculous nor accidental. It occurs as the logical result of RCA research and the commercial application of resulting inventions. RCA, with its associated companies, is not only a pioneer radio organization in the United States, not only the largest radio organization in the world, not only a builder of fine radio sets and radio equipment, but a builder, in fact, of *complete radio systems*. And it is the only organization which does build complete radio systems.

To illustrate: RCA manufactures, installs and services broadcasting transmitters; it makes the transmitting tubes; it supplies talent for the programs; it broadcasts the programs; it manufactures the sets and tubes with which to receive the programs; it trains operators and service men; and it supplies the latter with tools, accessories and technical data which make possible the satisfactory installation and servicing of radios in the home.



Consequently there is no phase of broadcasting about which some division of RCA does not have the expert knowledge that only experience can bring. This experience covers every step in the customary radio cycle, from the microphone in the studio to the loudspeaker in your home.

Nor does RCA's participation in radio end with broadcasting. That is but one of RCA's extensive activities. There are many others, and all of them are definitely related to one or the other of the three fields in which the company operates—broadcasting, communications and radio equipment.

While the services of the RCA companies are noncompetitive, they are all technically related. No one company, therefore, could operate as economically or as efficiently if it did not have the facilities made available through an integrated RCA organization.

Above: RCA equipment used in exchanging pictures by radio with Europe and South America; RCA radio aids aviation. Right: Radio City Music Hall, RCA equipped.



## IN EVERY PHASE OF RADIO

The RCA Victor "Magic Brain" radio—and all of the long chain of RCA Victor radio achievements—are a result of the RCA'S broad radio experience. The same is true of the other products of the RCA Manufacturing Company, Inc., which include transmitting and receiving radio tubes, police radio, aviation radio, public address and centralized radio systems. Many of the airplanes you hear on your all-wave radio, communicating by voice and code, with the home office or airport, are RCA equipped; many of the police radios that are the modern community's efficient protection against crime, bear an RCA label.

In the field of communications, "Via RCA" stands for the world's great radio communication system. Through R.C.A. Communications, Inc., RCA is in daily contact with 47 countries around the globe. The RCA inter-city radiotelegraph service now links Boston, New York, Philadelphia, Baltimore, Washington, Detroit, Chicago, New Orleans, Los Angeles, San Francisco and Seattle, with other cities to be added. RCA is likewise engaged in marine radio. Through the Radiomarine Corporation of America it furnishes transmitting and receiving apparatus and direction finders for ships and maintains a radiotelegraph service. RCA also serves the Government by supplying special radio equipment for naval and military services.

Central operating office  
R.C.A. Communications, Inc.,  
New York City.



## ... AND IN OTHER FIELDS, TOO

In still another allied field RCA's manifold experience stands it in good stead. As the manufacturer of the famous RCA Photophone High Fidelity sound recording and reproduction equipment, its influence in the moving picture realm is great, and it in turn derives from that connection still further knowledge of the art of sound—knowledge which may be, and is, applied to the further improvement of Victor Records, radio-phonographs and electrical transcriptions.

These are a few of RCA's contributions to the development of the radio and entertainment arts. There are many others, and all of them are definitely related. The net result is that RCA is most favorably equipped to follow future trends with speed and authority.

In carrying on operations through its wholly owned companies, RCA directs and coordinates research, engineering and operations in such a way that the developments of each company are made available to the others. Although their commercial utilization may be effected through RCA units operating in distinctly separate fields, all RCA products and services are based upon the work of the RCA research laboratories, which continue to improve and expand the radio art and industry, and to create new services for the public.

RCA Photophone equipment being employed in an RKO production.



# RCA RESEARCH IN TELEVISION

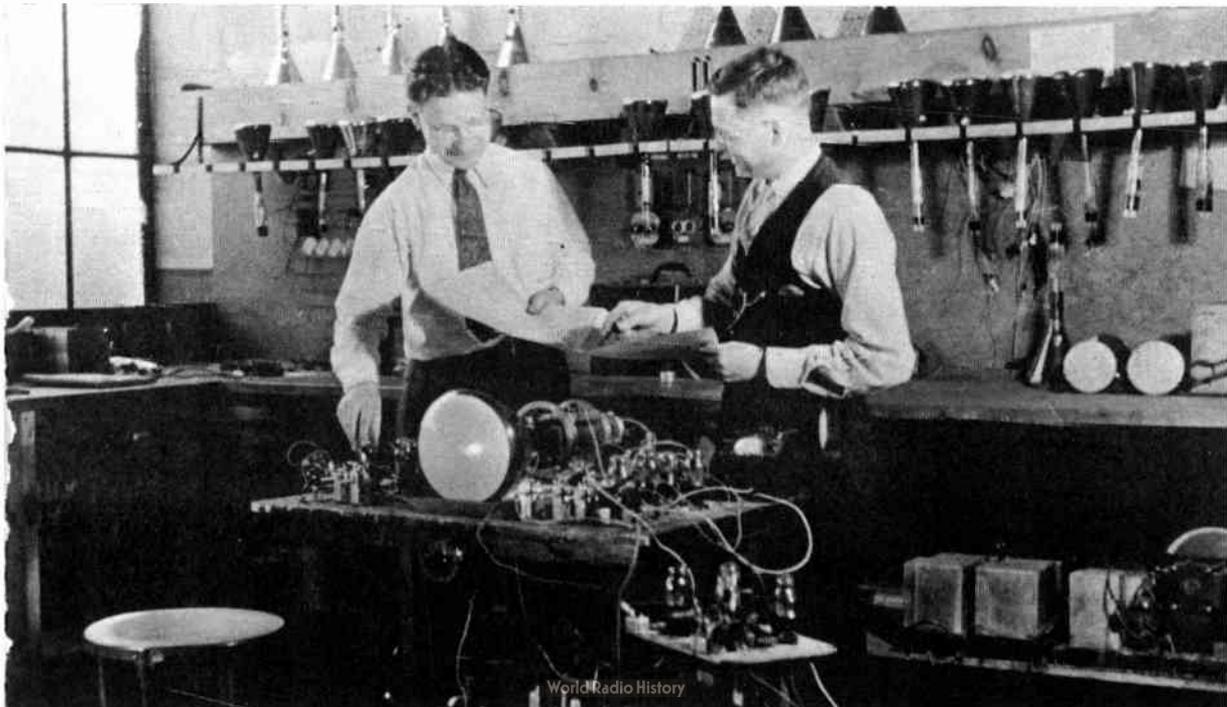
RCA believes that the United States is further advanced scientifically in the development of television than any other country in the world.

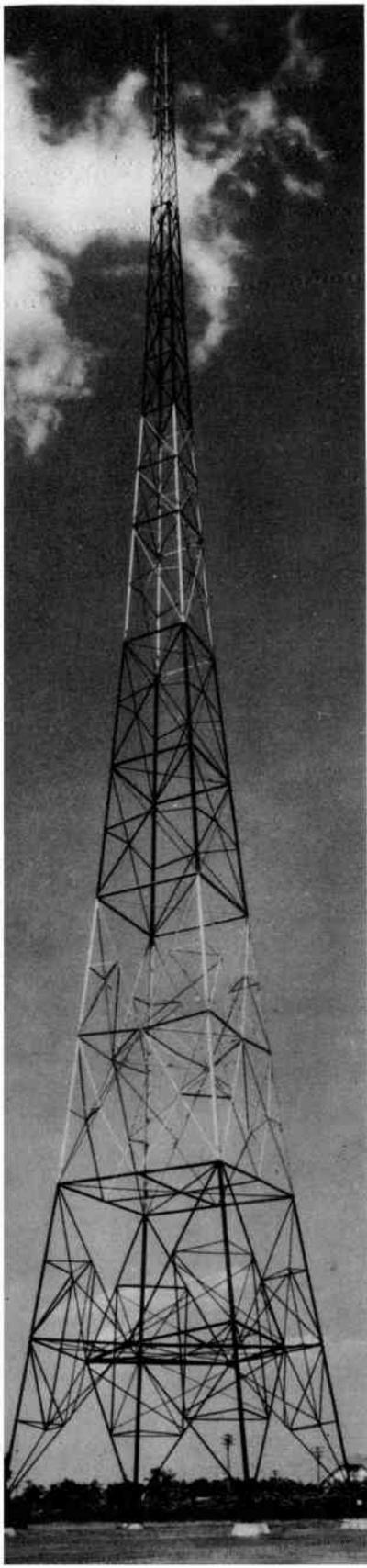
RCA is now engaged in a three-point plan, to take television out of the laboratory for its first comprehensive field tests. The steps of this plan are to establish the first modern television transmitting station in the United States, to manufacture a limited number of receivers for placement at strategic points of observation and to develop an experimental program service with the necessary studio technique to determine the most acceptable form of television programs.

Such a broad program of development, which will involve an investment of about \$1,000,000, is necessary because television bears no relation to sound broadcasting, and requires the creation of a complete system. RCA, with its coordinated units engaged in related phases of radio communication services, is outstandingly equipped to supply the experience, research and technique for the pioneering work which is necessary to the ultimate creation of a complete television system.

Television is not here, nor around the corner, but when it ultimately comes, RCA will be in the van of the new art, as it is today in the creation of ever better receivers and equipment relating to this country's great institution of sound broadcasting.

A corner of  
RCA's Television  
Laboratory.





## IT'S WHAT YOU GET THAT COUNTS

Radio is a two-way activity. At one end is the broadcasting station, and at the other end is the “receiving station,” consisting of your radio set, with antenna and ground, and yourself as operator.

Your “receiving station” is important—more so than the average “operator” seems to think. For unless it is equipped to bring you the full measure of enjoyment from today’s fine programs, the broadcasting art might as well have stopped developing back in the crystal-set era for all the good it does you. In other words, it isn’t what the broadcasting stations send that counts; it’s what you get.

There have been many fine radios, of various makes, on the market for a number of years. When these radios were manufactured they represented what was probably the last word in set building. But while they were good for their time, times have changed. Today’s improved all-wave radios will outperform sets of only a year or so ago in every particular—tone quality, selectivity, sensitivity, and operating convenience. In addition, they open up a whole new field of listening to which all other radios were deaf: short-wave broadcasts from London, Paris, Australia, all the world!

No set is better than its tubes. Because tubes wear out gradually, one’s ear, so to speak, “grows old” with the tubes and often fails to detect the sharp decline in tone quality and effectiveness that generally takes place after the tubes have been in use about a year. New tubes in the sockets will usually illustrate the marked change that has taken place, and restore to the radio its former high capacity for giving enjoyment. Then, when you listen to a program from Radio City, you can be sure you are missing nothing that broadcasting has to offer.



R C A VICTOR "MAGIC BRAIN"  
RADIO - MODEL C13-2

RCA's broad experience in every  
phase of radio explains its  
matchless performance.

