

Blue

RADIO AGE

RESEARCH • MANUFACTURING • COMMUNICATIONS • BROADCASTING • TELEVISION

4.7 - 1948



APRIL

1948

TELEVISION



RCA scientists—pioneers in radio-electronics—apply the “radio tube” to communications, science, industry, entertainment, and transportation.

This “magic lamp” makes Aladdin’s look lazy

You will remember the fabulous lamp—and how it served its master, Aladdin. Serving you, today, is a real “magic lamp”... the electron tube.

You are familiar with these tubes in your radio, Victrola radio-phonograph or television set... but that is only a small part of the work they do. Using radio tubes, RCA Laboratories have helped to develop many new servants for man.

A partial list includes: all-electronic television, FM radio, portable radios,

the electronic microscope, radio-heat, radar, Shoran, Teleran, and countless special “tools” for science, communications and commerce.

The electron microscope, helping in the fight against disease, magnifies bacteria more than 100,000 diameters, radar sees through fog and darkness, all-electronic television shows events taking place at a distance, radio-heat “glues” wood or plastics, Shoran locates points on the earth’s surface with unbelievable accuracy, Teleran adds to the safety of air travel.

Constant advances in radio-electronics are a major objective at RCA Laboratories. Fully developed, these progressive developments are part of the instruments bearing the name RCA, or RCA Victor.

When in Radio City, New York, be sure to see the radio, television and electronic wonders on display at RCA Exhibition Hall, 36 West 49th Street. Admission is always free. Radio Corporation of America, RCA Building, Radio City, New York City 20, N. Y.



RADIO CORPORATION of AMERICA

www.americanradiohistory.com

RADIO AGE

RESEARCH • MANUFACTURING • COMMUNICATIONS • BROADCASTING • TELEVISION



COVER

An RCA Image Orthicon Camera is focused on a play in the opening game of the 1948 baseball season at the Polo Grounds, in New York. All home-games of the N. Y. Giants are televised by NBC.

VOLUME 7 NUMBER 3

APRIL 1948

CONTENTS

	PAGE
TELEVISION OPENING NEW ERA <i>by David Sarnoff</i>	3
NBC PREPARES FOR CONVENTIONS	5
FIRST NETWORK VIDEO PACT	7
ELECTRON MICROSCOPE PROGRESS <i>by Dr. James Hillier</i>	8
RADIO RELAYS SURMOUNT STORMS	10
TRACES FM ADVANCES <i>by Dr. C. B. Jolliffe</i>	11
NEW LUXURY LINER IS RCA-EQUIPPED	12
PROGRAMS BY DOCUMENTATION	13
SCIENCE AT NEW CROSSROADS <i>by David Sarnoff</i>	14
MIDGET BROADCASTING STATION	16
TWO-WAY RADIOS FOR TAXIS	17
1,500 STUDENTS IN RCA INSTITUTES <i>by George L. Van Deusen</i>	18
TELEVISION—A POWERFUL TOOL IN MODERN EDUCATION <i>by William H. Knowles</i>	20
TOSCANINI TELEVISED	21
BRAND NAMES ARE TRUSTED <i>by Frank M. Folsom</i>	22
RIVER PILOTS LAUD RADIOPHONE	23
RCA REVIEW ENDS 2ND YEAR	24
ADMIRAL BUCK ELECTED PRESIDENT OF RADIOMARINE	25
MODERNIZED COMMUNICATIONS CALLS FOR TRAINED PERSONNEL <i>by Earl Zack</i>	26



Services of RCA are:

- RCA Laboratories Division
-
- RCA Victor Division
-
- RCA Communications, Inc.
-
- Radiomarine Corporation of America
-
- National Broadcasting Company, Inc.
-
- RCA Institutes, Inc.
-
- RCA Service Company, Inc.
-
- RCA International Division

RADIO CORPORATION OF AMERICA

RCA Building, New York 20, N. Y.

DAVID SARNOFF, *President and Chairman of the Board*

LEWIS MACCONNACH, *Secretary*

ARTHUR B. TUTTLE, *Treasurer*

Radio Age is published quarterly by the Department of Information,
Radio Corporation of America, 30 Rockefeller Plaza, New York 20, N. Y.

www.americanradiohistory.com



MAESTRO ARTURO TOSCANINI DIRECTING THE NBC SYMPHONY IN THE HISTORY-MAKING TELECAST OF THE ALL-WAGNER CONCERT ON MARCH 20, OVER WNBT AND THE NBC TELEVISION NETWORK.

Television Opening New Era

General Sarnoff Declares Television Will Speed Understanding of Issues Confronting the Country and Vastly Change Political Strategy — He Says Race of Science Is On Throughout the World.

TELEVISION will vastly change political strategy in this country and open an era of "more enlightened public opinion," Brig. General David Sarnoff, President and Chairman of the Board, Radio Corporation of America, asserted in an address at an Edison Dinner sponsored by the Newcomen Society in Washington, D. C., on March 19. General Sarnoff paid tribute to the great inventor for discoveries of importance to the ultimate development and merging of sound and sight as a great new service to the people. He added that Edison's "inventions and his universal influence for good in the Industrial Age might well guide the world in the Atomic Age, for his ways were the ways of peace."

Outside of the field of science, it may not be generally known, General Sarnoff said, that Edison provided the clue which ultimately led to the development of the electron tube—basis of the vast radio-electronic industry and as important to modern radio and television as the electric lamp is to lighting.

Edison More than a Lamplighter

"Edison was more than a lamplighter who turned night into day," he continued. "His many inventions and discoveries helped to light wide areas of the human mind. Fortunately for the people of our time, the 'Edison Effect' was not confined to a glass bulb. He passed his discovery on to others and through their development of radio and television, the 'Edison Effect' has spread through the whole fabric of civilization."

Before many years have passed, the majority of the 37,000,000 American homes now equipped with radios will have television, he said, declaring:



BRIG. GENERAL DAVID SARNOFF

"We have but to recall the tremendous effect of radio broadcasting upon the social and political life of the nation to look forward to the profound effect which television is certain to have on domestic habits and politics.

"Since the advent of broadcasting the electorate from coast-to-coast has listened to each succeeding president; the people have learned to know each candidate and to judge his sincerity and personality by the timbre of his voice and the style of his speech.

"Now, as the 1948 presidential campaign approaches, television will enable political candidates to achieve even more intimate contact with the voters. Extensive plans are being made to televise the national political conventions that will be held this summer, in Philadelphia. Candidates now are being seen on the air along the Atlantic Seaboard from Washington to Boston and upstate New York.

"More Americans have seen President Truman by television in one evening, than saw Lincoln during his entire term in the White House. In 1861, the population of this country numbered 38,000,000. Today more than that number of people live within the areas already covered by television.

Candidates More in Spotlight

"As radio compelled political candidates to alter their time-worn techniques and tactics, so too will television vastly change political strategy. The candidate is more than ever in the spotlight. He cannot hide behind a microphone with his eyes cast down on the printed manuscript. No longer is he a disembodied orator. He must look into the television camera and speak to the people face to face. His appearance, his smile, his gestures, combine with the sound of his voice to complete the transmission of his personality—and it is that complete personality with which the voter will become acquainted."

To illustrate the latest prerequisite of a political aspirant, General Sarnoff told how the wife of a candidate, watching her husband await the television camera, suggested that he "smile and be photogenic." "You mean telegenic!" her husband exclaimed.

As time goes on, General Sarnoff stated, there will be less necessity for candidates to travel. In his opinion, television will take them "directly into every city and every home." He continued:

"Of even greater import, however, is the fact that television opens an era of more enlightened public opinion. The people will be more adequately informed on issues confronting the country. They will see their legislators in action. The

logic of an argument is vastly more effective when it is presented by words and pictures than by words alone.

"Indeed, radio and television as vital economic and political factors in national life reveal how the inventor—the man of science—exerts a profound influence through the mysteries he shapes into servants for his fellowmen."

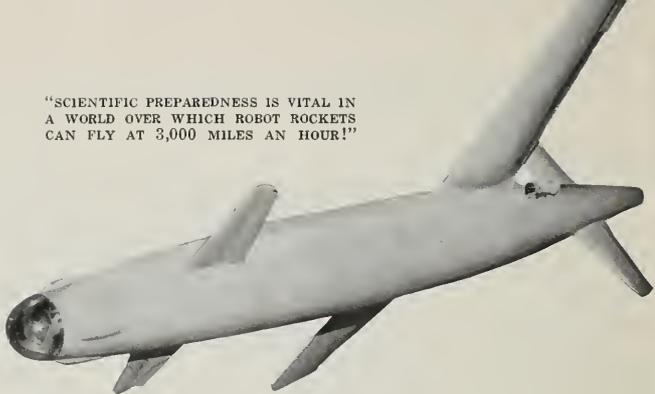
Security Depends on Science

General Sarnoff, asserting that at no time in history has science been so woven into the pattern of everyday life, said:

"Every country is aware that to advance — yes, even to survive — it must cultivate science. Our national security depends upon science . . . scientific preparedness is vital in a world over which robot rockets can fly at 3,000 miles an hour!

"A few years ago, the headlines featuring military preparedness stressed 'a race of armaments.' But the bitter lessons of war have taught us that science in many instances overcomes armament. Throughout the world the race of science is on, and the pace is fast. A nation that is slow to meet this challenge imperils its security."

"SCIENTIFIC PREPAREDNESS IS VITAL IN A WORLD OVER WHICH ROBOT ROCKETS CAN FLY AT 3,000 MILES AN HOUR!"



The Government is to be congratulated, he said, for the encouragement which it is giving to the advance of science through the scientific training of young men and women in colleges, universities and research institutions throughout the country. He remarked that if, out of the thousands of young men and women who are now pursuing scientific studies, there "emerges one Edison, then the millions of dollars being devoted to their training will be well worthwhile.

"Science in this era is public policy," declared General Sarnoff in

conclusion. "It is Government policy, for technology is the backbone of our national security. It is fundamental to our domestic economy, our progress and prosperity. Our destiny is linked with young scientists and engineers. Edison's experience furnishes a lesson for these young pioneers; it teaches them to look for an 'effect' and to determine its practical use. It is in the universal effect of science created by such men of goodwill as Thomas Alva Edison that youth finds inspiration and our country gains strength."

"OUR DESTINY IS LINKED WITH YOUNG SCIENTISTS AND ENGINEERS"



[4 RADIO AGE]



IN RECOGNITION OF HIS CONTRIBUTIONS "TO THE DEVELOPMENT AND ADVANCEMENT OF TELEVISION AS A SERVICE TO THE PUBLIC AND AS A MEDIUM OF ADVERTISING," R.M.G. GENERAL DAVID SARNOFF RECEIVED ONE OF THE ANNUAL ADVERTISING AWARDS OF 1947, SPONSORED BY ADVERTISING AND SELLING MAGAZINE. THE MEDAL, SHOWN ABOVE, WAS PRESENTED TO GENERAL SARNOFF AT THE WALDORF-ASTORIA HOTEL, MARCH 5, 1948.



SCENES SUCH AS THIS WILL BE PICKED UP BY TELEVISION CAMERAS AND VIEWED BY MILLIONS. BELOW: AN ENGINEER AT THIS BOARD WILL CONTROL THE 55 MICROPHONES LOCATED AMONG THE DELEGATIONS.



NBC Prepares for Conventions

Through Radio and Television, Political Conclaves at Philadelphia Will Set New Record in National Coverage

THROUGH the widespread service provided by radio and television, the two major political conventions, which are to be held in Philadelphia this summer, will reach the largest audience in radio history. Not only has the total of radio listeners reached an all-time high but this year, through the expansion of television and television networks, close to 2,000,000 video viewers on the East Coast will watch the full public activities of both parties on more than 200,000 sets in New York, Philadelphia, Washington, Baltimore, Schenectady and Boston. In addition, other thousands will see motion picture accounts of the gatherings as they are telecast by stations not yet linked in the East Coast network. Plans call for NBC to be on the air—providing television programs to its six East Coast affiliates—every minute of the public sessions at Convention Hall.

In radio, NBC will not attempt to cover all proceedings but will be constantly on the alert to switch from regularly scheduled broadcasts to Philadelphia when convention activities warrant the shift. It is expected that 30 to 40 hours

of specially scheduled programming will originate in Philadelphia during the period of each conclave.

Network Booth is Nerve Center

According to George McElrath, director of NBC Engineering Operations, the nerve-center of NBC's radio coverage of the conventions will be the network booth located on the stage overlooking the convention proceedings. Additional facilities include studios in convention headquarters at the Bellevue Stratford Hotel, and in the offices of KYW, NBC's Philadelphia affiliate.

The stage booth will be ten by thirteen feet, only slightly larger than an RCA Building elevator, yet when the convention is in session, the room will house an engineer with his control equipment, the special events director and his assistant, a commentator, an announcer, telephone operator and switchboard, a short-wave engineer, a teletype machine for the latest news reports for use by the commentators, plus the director of Program Engineering. The booth will be mounted nineteen feet above the rear of the stage giving its

occupants a clear view of the proceedings on the convention floor.

The telephone switchboard will be connected through five out-going lines to similar boards in the news rooms and offices at Convention Hall and the Bellevue Stratford Hotel, to the Traffic Director's location in the KYW studios, then through the main NBC telephone board in New York to the master control desk, Traffic Supervisor, news and special events desk, day and night program offices and the announcers' supervisor. This spider web of communication circuits will provide the Special Events Director in the NBC booth with immediate contact with all personnel assigned to convention operations in Philadelphia and to all the operational offices in New York involved in network operations. With these facilities, it will be possible for the director to shift program organizations instantly and to rearrange the national network for maximum coverage.

Controls 55 Microphones

Seated next to the chairman of the convention on the rostrum at the end of a narrow stage protruding from the main stage, will be an NBC engineer. His is a major role in the convention's proceedings, both on and off the air. Under the chairman's direction, the engineer will control 55 microphones

[RADIO AGE 5]



INTERIOR AND EXTERIOR VIEWS OF CONVENTION HALL IN PHILADELPHIA, FROM WHICH TELEVISION WILL CARRY THE ACTIVITIES OF THE TWO MAJOR POLITICAL CONVENTIONS IN JUNE AND JULY.



installed on the convention floor, one for the head of each delegation. Then, when the chairman announces from the rostrum: "I recognize the delegate from Arizona," the engineer will push the Arizona button, thereby automatically connecting the spokesman of that state's delegation with the public address system, sound broadcasting and television networks, sound movies and independent broadcasting stations. The floor microphone system will be installed by NBC and the cost shared by the four major networks as a service to the convention.

Microphones at Important Spots

In addition to the fixed microphones on floor and rostrum, others will be installed in the NBC booth and on the speakers' platform for commentators and announcers, and in front of the bandstand, for musical pickups. A parabola microphone in the gallery will be used to pick up demonstrations from the floor. Sound pickups will also be made available to television, sound newsreels and independent stations.

NBC is the only network organization with experience in televising political conventions, an advantage that will be invaluable during the heat of oratorical flights and the excitement of electioneering demonstrations.

The only other political convention to be televised on-the-spot was the Republican gathering in Philadelphia in 1940. That event, which marked the first use of the coaxial

cable for networking a television program, was seen in New York, Philadelphia and Schenectady, by owners of approximately 5,000 sets.

In 1944, NBC filmed the highlight of the two conventions in Chicago and rushed the reels by planes to New York where, after processing, they were televised immediately over WNBT.

Assisting McElrath in convention plans and operations are Gerald Hastings, NBC Staff Engineer, who is designing layouts and supervising installations, and Thomas Phelan, NBC division engineer in New York, who will direct operations during the convention. Irving Eney, KYW's chief engineer, will supply control room and switching facilities.

William F. Brooks, NBC Vice President in charge of news and international relations, will supervise network activities at Philadelphia, assisted by Francis C. McCall, manager of operations, news department, and William R. McAndrew, assistant to the Vice President in charge of the Washington office.

Chicago Television Station To Go On Air Sept. 1

Television Station WNBQ, Chicago outlet of the National Broadcasting Company, will be on the air by Sept. 1, 1948, four months ahead of a previously announced schedule, according to I. E. Showerman, vice president in charge of the network's Central Division. When completed, WNBQ, together with WTMJ-TV (Milwaukee), KSD-TV (St. Louis) and WWJ-TV (Detroit), already in operation, will form the central regional television network. Other NBC-affiliated television stations in the midwest are expected to be in operation soon and will further extend the network.

WNBQ's transmitter will be located in the Chicago Civic Opera Building.

Originally listed as bearing the call letters WNBQ, the station sign-off was changed, with permission of the FCC, because of the possibility of confusion created by the similarity between the projected call letters WNBQ and those of WMBS, a local broadcasting station.

First Network Video Pact

KSTP-TV and NBC Sign Pioneer Contract Assuring Television Program Service to Twin City Viewers

THE first station affiliation contract in the history of television was signed March 17, by Frank E. Mullen, executive vice president of the National Broadcasting Company and Stanley E. Hubbard, president and general manager of Station KSTP-TV, St. Paul-Minneapolis. Under terms of the contract, both the NBC Television Feature Service—consisting of all unsponsored NBC Television network programs,—and television network sponsored programs were made available immediately. KSTP, parent station of the television outlet, is a pioneer member of the NBC sound broadcasting network.

"All the far-flung facilities of the NBC Television network will bring into the homes of St. Paul-Minneapolis the world's best television service," Hubbard said. "In extending the network to the Twin City area, we are supplementing our great sound broadcasting public service with the finest sight-and-sound programming that the country has to offer.

"Our network service will be supplemented by a complete program-

ming of local features, and I have every assurance from the National Broadcasting Company that outstanding events from the territory surrounding Minneapolis and St. Paul will be shown from time to time on the network.

Will Provide Programs on Films

Mullen explained that in advance of interconnecting facilities to the midwest by radio relay or coaxial cable, NBC Television will provide a program service on film, as well as by script—and possibly with live talent, too—to KSTP-TV. When such connecting facilities become available, the station will receive the network programs direct from their origination point.

At the same time, Mullen also said that all NBC Television Feature Service programs will be made available to stations for cooperative sponsorship.

KSTP-TV is on the air now and expects to provide regular commercial program service before the end of April. Under the direction of Hubbard, one of the founders of KSTP and now president and gen-

eral manager, KSTP maintains studios in both Minneapolis and St. Paul. In March, 1944, the station opened a new Minneapolis Radio City.

In addition to the five-station network which NBC is now operating on the East Coast, the company also is providing television service to four mid-western outlets. By mid-May the eastern network is scheduled to reach from Boston to Richmond, and before the end of the year, NBC's owned-and-operated television stations in Los Angeles and Chicago will be on the air. It is expected that Chicago will be interconnected with the East Coast network by January 1, 1949.

Many Television Sets On Farms

The importance of television service to the midwest area was emphasized by Mullen during a recent visit in Chicago. In announcing that the International Livestock Exposition, which is to be held in that city next fall, would be televised, he stated that a substantial number of the 750,000 or more television sets that are expected to be in use by the end of the year will be in farm homes.

Supplementing Mullen's statement, William Drips, NBC director of agriculture and agricultural television, said that the new medium will "revolutionize state-sponsored extension and educational work. Where today it requires literally thousands of experts to cover farm regions with up-to-the-minute methods, tomorrow the whole job can be done with one television demonstration, thus providing the present field staff with more time for other work."

FRANK E. MULLEN, NBC EXECUTIVE VICE PRESIDENT (LEFT) AND STANLEY E. HUBBARD SIGN CONTRACT WHICH MAKES NBC TELEVISION PROGRAMS AVAILABLE TO KSTP-TV, IN THE TWIN CITIES.



DIVIDEND DECLARED

Following the meeting of the Board of Directors of the Radio Corporation of America held on February 6, in New York, Brig. General David Sarnoff, President and Chairman of the Board, announced that a dividend of 87½ cents per share had been declared on the outstanding shares of \$3.50 Cumulative First Preferred stock, for the period from January 1, 1948 to March 31, 1948.

[RADIO AGE 7]

Electron Microscope Progress

Review of Developments Since 1938 Reveals Expanding Versatility of Instrument as New Techniques are Mastered by Trained Technicians.



by Dr. James Hillier
*RCA Laboratories Division,
Princeton, N. J.*

IN introducing the electron microscope to fellow scientists, most of the early workers, including the writer, had difficulty restraining their enthusiasm over its research possibilities. Our estimates were based more on intuition and faith than on available scientific evidence. Today—less than ten years later—so numerous are the contributions of this instrument that it is difficult to select the most important one. This should provide some idea of the progress achieved.

Findings vital to life and industry are being made. New techniques and new advances in the electron microscope itself are extending its usefulness in probing unseen worlds far beyond the reach of the ordinary microscope. Knowledge being obtained is proving of immense value to medical research, particularly in the study of viruses. Many of the viruses can now be viewed for the first time in the history of medicine. In addition, it appears that electron microscopy will encounter few problems in chemistry, physics, biology, metallurgy, and geology that it cannot help to solve.

First Model Introduced in 1940

Only in America has there been uninterrupted production of electron microscopes since before World War II. These have been designed

and built by the Radio Corporation of America, which introduced the first commercial model in 1940. Used extensively in war research, the instruments were continuously improved. Now more than 200 are employed in the United States, Britain, France, Holland, China, Russia and Latin America.

As soon as the RCA electron microscope had reached a point where sufficiently high magnification of specimens could be obtained, it was applied to the examination of various types of virus. For the most part the early work sought to determine the size and, later, the shapes of the viruses.

Since most of the smaller viruses are spherical, the chief contribution of the electron microscope at this time was the verification of shape and size. Afterward methods were devised to rearrange the patterns of groups of particles in order to continue the study of structure. Considerable attention has been given recently to the studies of tobacco mosaic virus particles. It had been known for some time that old purified solutions of tobacco mosaic viruses had particles which showed a wide range of length. On the other hand, some particles under special treatment were found to have uniform length. It is now established that the infective unit of the tobacco mosaic disease is a particle having a constant length.

Discover Bacteriophage Details

In studying the virus problem some interesting work has been done in connection with the infection of bacteria by bacteriophage. Electron microscopists have been able to ascertain the size and shape of the bacteriophages which could never before be established definitely by other methods. Identification of bacteriophage particles has thus become rather easy, and they are regarded as ideal subjects for electron microscope examination.

Concentrated efforts are being made to observe the mode of growth of bacteriophage particles in the bacterial cell because of the importance of this knowledge to medical research. Techniques for preparing bacterial specimens have been improved to an extent that it is now possible to examine the organisms at any definite time after infection and under conditions in which the specimen is not disturbed.

At this writing there appear to be no basic technical limitations preventing observation of the complete life history of the bacteriophage particles in the bacterial cell, and unless some unforeseen difficulty arises this important problem may be solved in the near future.

Improvements in devices and techniques have gradually increased the resolving power of the electron microscope to its present-day magnification of more than 200,000 diameters—which is in the order of 200 times that of the usual light microscope. While this is an effective power, the theoretical possibilities of magnification are by no means fully utilized.

One of the most important differences in the result provided by the electron microscope in comparison with the light microscope is found in the structure of images. In the light microscope the image exists

BEAN VIRUS MAGNIFIED 50,000 TIMES
BY THE ELECTRON MICROSCOPE.



by virtue of the selective absorption and scattering power for light imposed by physical properties. In the electron microscope the situation is simpler. Electrons passing through the specimen are affected in varying degrees, according to the density and composition of various parts of the specimen. This leads to a more direct interpretation of the image.

Most Problems Within Range

Electron microscopy has made it possible to observe the structure of solids in a range of dimensions down to 10 Angstrom units, or the equivalent of about twenty-five millionths of an inch. It is unfortunate that such a simple statement, accurate though it may be, gives no suggestion of the true magnitude of the knowledge that electron microscopy can play in any science which concerns in some way the structure of solid materials. The fact is, in my opinion, that there appear to be few problems in chemistry, physics, metallurgy, mineralogy, geology, biology and medicine, among other sciences, in which the electron microscope cannot be used. It is obvious that the electron microscope has yet to play a widespread role in general science. But the reasons for this are quite clear.

The first deterrent to widespread

use of the electron microscope is the lack of information among scientific workers who might make full use of its capabilities. A second shortcoming is that early difficulties encountered with the instrument and with some of the associated techniques have caused the more conservative research workers to wait until these difficulties have been overcome. One of the most important controlling factors in the general use of the electron microscope is the lack of suitable techniques for specimen preparation. Considerable progress, however, is being made to solve this latter problem.

The study of external structure is being achieved by what is known as the replica technique, which is being applied successfully to metals, ceramics, parts of plants, colonies of bacteria, teeth, hair, skin and blood cells, among other specimens. Study of the internal structure of more delicate bacteriological materials has been achieved by slicing specimens to infinitesimal thinness. But problems remain due to the difficulty of preventing distortion in the tissue.

Shortage of trained personnel represents an extremely important factor in limiting the speed of growth in the use of the electron microscope. While this shortage has existed for several years in all fields

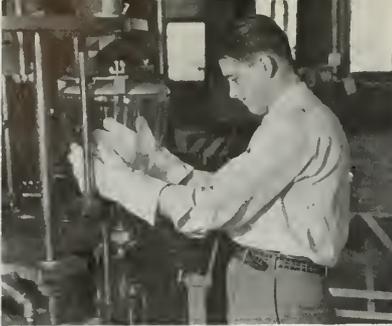
of science, it has been particularly acute in this work. Most laboratories, while recognizing the need for an electron microscope to solve the many problems arising in research, have been aware that it would consume valuable time to teach their scientists the techniques of electron microscopy. At the present time the necessary training has been available only through actual experience with the instrument. It generally requires about two years. This situation may be remedied since a number of universities are conducting graduate courses in electron microscopy.

Trained Technicians Essential

The personnel of a well-organized electron microscope laboratory should include a trained microscopist and a technical assistant. The most successful electron microscopists today are individuals who have had education or experience equivalent to a doctorate degree or better in physics, stressing optics or light microscopy. It is extremely important that the microscopist have a thorough understanding of the general problems of the laboratory. It is obvious that the selection of the appropriate individual for this position is a step toward the successful utilization of the electron microscope by any laboratory.

THREE ENLARGEMENTS OF THE TOBACCO MOSAIC VIRUS AS PRODUCED BY THE ELECTRON MICROSCOPE. UPPER VIEW AT RIGHT BELOW SHOWS THE VIRUS ATTACKED BY ANTIBODIES. APPROXIMATE MAGNIFICATION IN ALL SPECIMENS, 45,000 TIMES.





ABOVE: A 12-INCH KINESCOPE GOES THROUGH A FINAL STEP IN ASSEMBLY AT RCA VICTOR PLANT. RIGHT: A BATTERY OF NBC TELEVISION CAMERAS FOCUS ON THE ACTIVITIES AT AN OUTDOOR SPECIAL EVENT.



of radio equipment. It had to be compact and light, yet withstand the rigors of high aviation speeds and severe changes in atmospheric conditions. These demands led to many revolutionary devices, prominent among them new types of miniature tubes, some as small as acorns. RCA, which originated the miniature tube, had used them in the pre-war camera-size "personal" radios, and to meet the demands of radar and other wartime equipment, RCA manufactured 20,000,000 of these tiny tubes from 1942 to the end of the war. As a result of wartime experience in the practical application of these Liliputian tubes, many new uses are foreseen for them. They should bring to a world at peace new pocket-size radios, handie-talkies and walkie-talkies, and receiving sets as small as a package of cigarettes, or a lady's compact.

Some Radio Highlights of 1945

These are some of the highlights of radio in 1945—the radio that enabled the U. S. Army Signal Corps to send a nine-word radio teletypewriter message completely around the earth in $9\frac{1}{2}$ seconds, surpassing the previous record of $3\frac{1}{2}$ minutes.

In 1945, RCA Communications carried more than 200,000,000 words of international radiograms, over circuits linking the United States with 56 foreign nations. With thirty-five of these countries, radio program service is maintained, bringing overseas broadcasts to American listeners. This

service multiplied five-fold during the war, with a 50 percent reduction in rates.

Radiophoto service to twelve overseas nations doubled during the war, again with a 50 percent rate reduction.

One by one, the radio stations of Europe and Asia, which were cut off from the United States during the war, have been restored to service. Radiograms are again the speediest messengers in international service. By the use of new error-proof high-speed 7-unit multiplex apparatus, perfected during the war, eight channels of communication are now used on a single radio frequency, offering an almost unlimited expansion in instantaneous world-wide communication.

Mariners, as well as the aviators, who sail and fly across a world at peace will find radar a new service that increases safety and speeds transport. Adapting radar, loran, the electronic depth-meter and new radiotelephone devices to peacetime use on ships of all sizes, the Radiomarine Corporation of America—a service of RCA—is adding them to its postwar line of marine radio and navigation apparatus, which includes direction finders, lifeboat sets and various types of communication transmitters and receivers. Practically all coastal stations have returned to commercial service.

Progress in Radio Developments

At the same time, experimentation in other radio fields has produced achievements that promise

revolutionary help for American industry. New progress has been made in the application of heat generated by radio, and in the application of electronic devices to industrial operations that call for the utmost precision. Electrons have been put to work to accelerate processes, increase safety and provide automatic controls as well as counting and sorting. New wonders are promised in the use of supersonic vibrations and infra-red rays. Research in fluorescent materials has produced a greater variety and finer phosphors, with increased capacity for receiving and retaining electronic images—the basic functions that make television and radar possible.

The Year Ahead

Now let us look forward to 1946. Civilian radio production is under way. Home and automobile receivers again are coming into the market, along with the new and improved Victrola phonograph. With "the music you want when you want it," the phonograph steadily climbs in popularity. A new non-breakable record, the most revolutionary development in phonograph records in forty-five years, has been introduced by RCA Victor to mark a new milestone in the recording and reproduction of music by the world's greatest artists.

Science has made television practical for the home. All elements of a satisfactory television system are available. Television networks are in prospect as automatic radio relay stations are being built to relay

television from city to city. At the same time the coaxial cable, another artery of television, is being extended; already New York is linked with Washington by means of this new cable, and it is moving into the South toward Dallas, Texas. Gradually, radio relays and coaxial cables will grow out across the country to link coast with coast—and to provide a nationwide service of sight and sound.

Before nationwide television is possible, however, there must be hundreds of transmitters to supplement the nine commercial stations now on the air. These transmitters will begin to be generally available late in 1946 and by the end of 1947 considerable activity in television broadcasting may be expected.

Television will be widely utilized throughout commerce and industry. Department stores will use it so that the public may shop by television; through inter-store television, merchandise will be displayed throughout the stores at "telesite" salons. Gimbels - Philadelphia, in cooperation with RCA Victor, have demonstrated this idea with great success and have received public acclaim for a new service and convenience.

Uses of Radio in Industry

Industry too will find considerable use of radio sight as "eyes" in factories—the means of coordinat-

ing and controlling complicated manufacturing processes, observing and directing operations from start to finish. Industrial television will furnish the means for looking into chemical reaction chambers and other areas of production, dangerous or inaccessible to the human eye.

In the field of air navigation, RCA has devised a complete system for preventing collisions, controlling traffic, performing instrument approaches and in the general navigation of aircraft. Unique in its combination of television and radar techniques, this new system is called Teleran.

The miracle of radar and the advent of postwar television, make 1945 a year to be remembered as beginning the third cycle in the evolution of radio: First, there was wireless telegraphy; second, broadcasting of the human voice and music, and now the world enters the third cycle—the era of radio sight.

New Adventures in Exploration

America's men of science and its great industrial research centers, such as RCA Laboratories, brought true glory to the Nation in a war that called upon science to defeat the enemies that had sought in vain to pervert science to destroy civilization. The greatest and most efficient fighting forces ever assembled had science at their side on every

battlefront. Victory gave to the United States the place of leadership in science among the older nations of the world, all of whom had cultivated science throughout the centuries.

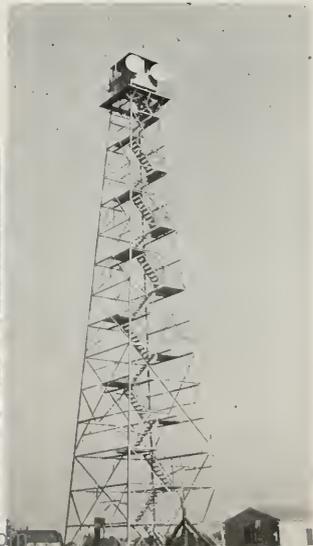
Opportunities for Youth

Today, American ingenuity is at the forefront. Here is the great opportunity for youth. Encouraged to pioneer in research and to follow science as a career, it will furnish the leadership to make this country unsurpassed in every realm of science—electricity or electronics, chemistry or physics, radio or atomic energy. America accepted the challenge of war. It now accepts the challenges of peace.

If a nation is to expand to gain new resources, comforts and freedom for its people, it must not neglect progress in science. Exploration today does not mean conquest of people, nor lust for territorial expansion. The rewards in science can be much richer and far more productive for mankind.

Science has given man a key to atomic energy, to radio-controlled rockets and to television-eyed pilotless planes. The fate of civilization depends upon the use to which man puts them. Our national security, our progress in peace and our future as a Nation depend upon science, which has lifted war and peace into a new dimension by the annihilation of Time and Space.

BELOW, LEFT TO RIGHT: ELEANOR STEBER, OPERATIC SOPRANO, DEMONSTRATES THE NEW RCA VICTOR UNBREAKABLE PLASTIC PHONOGRAPH RECORD; DR. ALBERT ROSE HOLDS THE IMAGE ORTHICON, THE NEW SUPERSENSITIVE TELEVISION CAMERA TUBE; ONE OF THE TOWERS IN THE RCA-WESTERN UNION MICROWAVE RELAY NETWORK WHICH HAS BEEN PLACED IN OPERATION BETWEEN NEW YORK AND PHILADELPHIA.



modulation," and the Institute's Morris Liebmann Memorial Prize for 1948 to Stuart Wm. Seeley "for his development of ingenious circuits related to frequency modulation."

150 FM Transmitters Delivered

He disclosed that RCA, as one of the leading manufacturers of FM transmitters, receivers and studio equipment, has delivered more than 150 FM transmitters, and has received orders for 170 more. At the same time, it offers ten different models of home radio receiving sets containing FM.

Against such a record, indiscriminate charges that RCA, FCC and others have "retarded" FM, "opposed" FM, or have given it the "silent" treatment, fall by their own weight, Jolliffe declared.

On the Resolution—proposed on January 20, 1947, by Rep. William Lemke of North Dakota, to authorize and direct the Federal Communications Commission to assign a section of the 50 megacycle band to FM—it is the position of RCA and NBC that it should not be approved by Congress, Dr. Jolliffe stated. He pointed out that for more than 20 years it had been one of the basic functions of the FCC and its predecessor, the Federal Radio Commission, to allocate frequencies in the radio spectrum. He said that of all the duties performed by the Commission the allocation of frequencies is "one of the most complex tasks of Government," and declared: "In our opinion it would not be sound for Congress to take over that task."

RCA Was Pioneer in FM

In concluding his statement Dr. Jolliffe said, "RCA is interested in the fullest development of all radio services. It has led the development of broadcasting into a service that is a part of the very lives of our people. It was a pioneer in FM and it was a pioneer in television. We do not take a stand in favor of one of these services as against the other. We favor both. And we are convinced that the needs of both can be accommodated without a feud between the two. The two services can help each other to develop and grow."

[12 RADIO AGE]



THE PRESIDENT CLEVELAND LEAVES SAN FRANCISCO ON HER MAIDEN VOYAGE TO THE ORIENT, FULLY EQUIPPED WITH RCA RADIO AND ELECTRONIC DEVICES.

New Luxury Liner RCA-Equipped

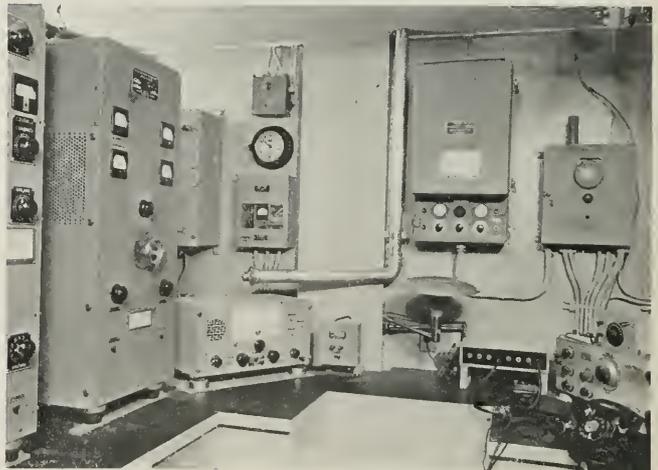
Radio and electronic devices designed and installed by the Radiomarine Corporation of America are in use aboard the liner *President Cleveland*, America's largest post-war-built passenger ship now on her maiden voyage to the Orient from San Francisco.

The RCA installations include a loran long-range navigation receiver, a radio direction finder, an automatic radio alarm, an intermediate and low frequency receiver,

and four types of radio transmitters.

The 23,500-ton luxury craft carries a type of RCA loran receiver which incorporates the best features of several devices used on airplanes and surface vessels during World War II.

The ship was outfitted at the Bethlehem-Alameda Shipyards in California for the Maritime Commission and the American President Lines.



ONE CORNER OF THE PRESIDENT CLEVELAND'S RADIO ROOM.

Programs by Documentation

New NBC Series Uses Modern Dramatic Techniques to Carry Nation's Problems to Citizens

IN carrying out its role as one of the most dependable mediums for informing the public on important issues, radio has experimented with numerous methods of presenting this educational information in an effective and painless manner. One way which has produced the desired results, while withstanding the closest scrutiny of critics, is the documentary program, an approach which forms the framework of the new program series, "Living—1948," produced by the NBC public Affairs and Education Staff. The purpose of the series is to arouse listeners to intelligent action on subjects or trends affecting their daily lives and the nation's welfare.

Each "Living—1948" drama-document is an amalgam of music, drama, narrative, human interest, attractively proportioned to attract large segments of the listening public.

Among the subjects treated are: "Silver Cords and Apron Strings," an examination of the increasing influence of women in American life.

"Of Rats and Men," a look at the problem of the nation's 150,000,000 rats that are consuming enough grain to feed half of hungry Europe.

"From a Gentleman in Mufti," a dramatization of General Eisen-

hower's final report as Army chief of staff.

"Broken Homes," a view of one facet of the divorce problem.

"They Rolled Away the Stone," a discussion of the relation between folk music and disaster.

"The Mental Health of the Nation," presented as a psychiatrist's-eye view of the situation.

The American Institute of Public Opinion and its director, Dr. George Gallup, are cooperating with NBC in over-all planning of "Living—1948" and in certain phases of research. Occasionally, Gallup appears on the program to contribute pertinent facts and figures.

Critics Approve Documentaries

Radio critics generally have approved the new drama-document series. Newspapers and trade journals have greeted it with phrases like "fascinating radio fare," "exciting and at times wonderful radio," and "a surprisingly thorough job."

Variety not only called the series a "big-time excursion into public service programming," but added that "The network has set itself a lofty and ambitious goal in this series—an over-all documentation of the problems facing Americans as citizens in a democracy. It's a tall order; as tall, in fact, as any-

thing being attempted in contemporary radio."

The *New York World Telegram* critic wrote in a full column review: "Its ambitious aim is to mirror the moment; to hold up for inspection the historical present. The first installment, 'Signs of Our Times,' was in the nature of a prelude, and it did a surprisingly thorough job of sketching a background—the temper of the times—against which the series will be projected."

The *New York Daily News* calls the series "fascinating radio fare." The *New York Morning Telegraph* said, "This is nothing less, it appears, than an attempt to encompass the whole sum and substance of human experience, an effort to find out what way we're heading, to point out the signs of the times, and to post warnings and advices along the way."

Ben Grauer, one of NBC's best-known announcers is narrator for the series.

Music for "Living—1948" is under the direction of Milton Katims, who has won distinction both as conductor and violist.

Veteran Staff Handles Series

The NBC Public Affairs staff producing the documentary series includes Wade Arnold, supervisor; Jane Tiffany Wagner, technical advisor; James Harvey, director; Lou Hazam, scriptwriter, and Nancyann Woodard, research specialist.

Arnold, Omaha-born, is a graduate of Knox College with a wide and varied background in journalism and as a scriptwriter, teacher and producer.

Mrs. Wagner has been supervisor for many important NBC programs, particularly "Home Is What You Make It."

A graduate of McGill University, James Harvey joined NBC in New York in 1945. Since then he has directed many of the network's major programs, including "Your United Nations," and "Home Is What You Make it."

The idea for "Living—1948" was conceived by Ken R. Dyke, NBC Administrative Vice President in Charge of Programs.

MILTON KATIMS (LEFT) ORCHESTRA CONDUCTOR; PROGRAM DIRECTOR JAMES HARVEY AND NARRATOR BEN GRAUER DISCUSS A FORTHCOMING PRODUCTION IN THE SERIES OF "LIVING-1948" DOCUMENTARY BROADCASTS.



Science at New Crossroads

*New Era of Invention Foreseen By President of RCA in Boston University Address —
He Envisages Capsules of Nuclear Energy Making Possible Pocket-Size Radio
and Television Sets.*

MERE specks of radioactive material from nuclear fission may serve as the power for radio and television receiving sets, as well as for broadcasting stations in the future, David Sarnoff, President and Chairman of the Board, Radio Corporation of America, declared at Boston University during Founders' Day ceremonies, on March 12. The honorary degree of Doctor of Commercial Science was conferred upon General Sarnoff.

In an address entitled "Science at New Crossroads," he said that the potentialities for scientific development and beneficent use of atomic energy are unlimited.

"A miniature power supply in capsule form may make possible radio receivers no larger than a wrist watch, and tiny television sets to be carried in the pocket like a camera," he declared. "When this day comes, people also may carry pocket-size radiophones that will enable them to communicate with home or office, no matter where they are."

Although these fascinating possibilities are not just "around the corner," General Sarnoff pointed out, we shall see these promises fulfilled if the world is at peace and science is unfettered. Beyond today's horizon, he said, automobiles, tractors, airplanes, locomotives and ships also may be powered by small capsules of nuclear energy.

Opportunities in New Era

"So clear are our opportunities in this new era—if we intelligently accept the challenge," declared General Sarnoff, "that they promise to dwarf the wonders we have witnessed in the past fifty years. Yes, in the past five centuries! Inescapably, the future of the world and of civilization is linked with atomic energy. When science releases that power, and society learns how to control it properly, it will start a universal chain reaction that is bound to affect significantly the political, social and economic life of people everywhere."

Changes are destined to come in the Atomic Age, he said, that will make the revolutions caused by steam, electricity and electronics seem simple by comparison.

"Atomic energy is not merely a new laboratory domain of the scientist," he continued. "It will spread into many phases of our life; into the human body and the home, as well as into industry. Therefore, every citizen should be interested in it; every student should learn all he can about this great new force and educators should impart to the public mind the importance of the atom and its possibilities. An informed and active public opinion by freedom-loving people can help to direct the new forces of science toward peace and prosperity.

"Science is at new crossroads. We, the people, stand there, too. Humanity and the destiny of future generations depend on the turn we take at this crucial fork in the road of Time."

General Sarnoff sounded a warning, asserting that mankind has reached the point where it cannot afford "the costly consequences of skepticism and indifference" with respect to inventions and discoveries of science, lest such a discovery as atomic energy be turned to evil rather than constructive purpose.

"The big black headlines, which in 1945 introduced the world at large to atomic energy," he said, "remain vivid in the memory of all of us. While war raged, this new force came upon the world packed in a bomb that blasted and shattered two cities. Atomic energy at the outset was linked with death and destruction. Its potentialities for good were overshadowed by the terror that it struck.



SCIENTISTS AT RCA LABORATORIES REMOVE A VIAL OF NUCLEAR MATERIAL FROM A SHIPPING CONTAINER FOR USE IN RESEARCH PROJECTS.

[14 RADIO AGE]



"Since the fighting ceased, thousands of scientists have been devoting their talents to harnessing atomic energy for the peaceful purposes of health, agriculture, transportation and industry. All of us wish to see these purposes fulfilled. But more than wishing is required. Laymen, too, must keep themselves informed on this important subject and reflect their interest in a manner that compels attention. Knowledge will increase the power of the public to speed progress on the political and social level as well as in the laboratory."

Stressing the fact that our opportunities to succeed as individuals and to advance as a nation were often found in tiny clues, hidden amid simple surroundings, General Sarnoff asserted: "The steam engine was born in a tea kettle; the airplane came out of a bicycle shop; the automobile first sputtered and moved in a small carriage factory, and broadcasting started from an amateur station in a private garage."

Each of these inventions was, at the outset, confronted by skepticism, he continued, adding:

"The public was indifferent and a long period of time elapsed between their introduction and their popular acceptance. This span has been shortened greatly by the new implements of science and the modern means of exploitation. But the former indifference must not be replaced by another apathy—a lack of concern by the public as to the use made of new inventions and discoveries. There is danger in either attitude and more so today than ever.

Alert Public Opinion Needed

"Failure to appreciate the significance of inventions may retard our technical progress and threaten our National Security. And failure to guard against the evil use of technological developments may destroy our capacity for social progress. We need an informed and alert public opinion to stand guard against both dangers."

For fifty years, the basic inven-

tions related to electricity and electronics have been passing through a process of evolution, he said, declaring that, at the moment, we are busy with basic improvements and new applications, while science seemingly tries to catch up with itself.

"In radio and television," he said, "the electron is the new and magic force. In aviation, it is jet propulsion; in medicine, it is penicillin and streptomycin. Like the original discoveries and inventions in these fields, each is a new key to further developments which will make our present-day conceptions of science seem as crude as the first feeble wireless signal, or the first short flight of the airplane."

Science Has Changed Itself

General Sarnoff emphasized that science is no longer the exclusive province of lone scholars or inventors. He explained it this way:

"Science, while changing the world, has changed itself. It has accumulated knowledge so vast as to be beyond assimilation by a single human mind.

"Where one scientist toiled alone fifty years ago, hundreds work together today in cooperative effort. Research institutions of education and industry have brought them together and provided them with matchless facilities for exploring the unknown, for creating the new and improving the old.

"Upon the foundations created by the pioneers of science, now stand splendidly equipped research laboratories. Within them are assembled men of ideas who use the tools of science to broaden and extend the trails blazed by pioneers and to open new horizons. These laboratories hold the promise of the future; they are the bulwarks of our national security, for war has taught us that science is a nation's greatest fortification, as well as the fountainhead of its progress and its research for enduring peace."



GEORGE MCELRATH, DIRECTOR OF NBC ENGINEERING OPERATIONS POINTS OUT FEATURES OF "RADIO MIKE" AS JARRETT L. HATHAWAY, WHO HELPED IN ITS DEVELOPMENT, LOOKS ON.

Midget Broadcasting Station

New "Radio Mike" Weighs Less than Six Pounds but Can Transmit Signals Over Distance of Several Miles

OF the wide assortment of equipment now being assembled to make it possible for millions to see and hear the two major political conventions in Philadelphia this June and July, a favorite of NBC engineers is the new "radio mike," a midget broadcasting station complete from microphone to antenna. According to George McElrath, director of NBC engineering operations, the present unit is an outgrowth of a transmitter developed by the National Broadcasting Company in 1935 called the "Beermug," so named because of its shape. The new unit includes the features of a high-quality microphone and a high-quality transmitting station. Including its four tubes and batteries it weighs less than six pounds and is no larger than the smallest models of portable radio receivers. During the conventions, commentators will carry radio mikes around the floor of Philadelphia's Convention Hall for interviews and close-up descriptions of activities. It weighs 5 pounds 11 ounces complete, and measures only $4\frac{1}{4}$ " \times $3\frac{1}{2}$ " \times $9\frac{3}{4}$ " high. It is a complete miniature radio transmitter, including built-in microphone, audio and radio amplifiers, antenna, and power supply.

In field tests carried out during the last stages of its development, the little unit lived up to the expectations of its designers. One test was made over a distance of $3\frac{1}{2}$ miles, from a point across the Hudson River to the Empire State tower. Observers reported that the received signal was of broadcast quality. In another try-out, the transmitter was carried inside a steel building and up five flights in an elevator. A receiver located across the street received the transmitted signal at all times even from within the elevator.

Radio Mike Helps in Interviews

Since its introduction, the radio mike has proved a valuable tool to radio and television broadcasters. It facilitates sidewalk interviews, interviews with sports participants, and in some cases actual broadcasting of sporting events by contestants. Championship trotting races have been broadcast directly from sulkies, and in one instance, one of these miniature transmitters was strapped on a jockey in a race, permitting him to broadcast his own version of the thrilling drive around the turn and down the stretch. Another especially valuable application of the radio mike is in connection with the broad-

casting of a disaster where time or distance prohibits the use of conventional microphones with their connecting cables.

The radio mike is the result of long experimentation and research by the development group of the NBC Engineering Department, under the direction of George M. Nixon, group manager, and his assistant, Jarrett L. Hathaway.

Most Powerful FM Signals Radiated in Camden Tests

The most powerful FM signals ever radiated in this country in the new FM channels, measured at over 300 kilowatts of effective power, were successfully employed for the first time during test broadcasts conducted at Camden, N. J.

The tests were carried out over RCA's experimental FM station, W2SXR, by feeding the output of the new RCA 50-kw FM transmitter, first commercial transmitter of this power to be designed for operation in the 88-108 megacycle band, to a four-section Pylon antenna, which multiplies the effective power six times. The transmitter actually fed 60 kilowatts of power into the antenna, producing a radiated signal with an effective power of 360 kilowatts.

A combination of the RCA 50-kw FM transmitter and the four-section Pylon antenna, located on an elevated site, engineers disclosed, would provide coverage of an area up to 200 miles in radius, making possible the expansion of FM service to distant rural communities. Even wider coverage could be obtained, it was pointed out, by using an eight-section Pylon antenna with the 50-kw transmitter. This antenna, with its power gain of twelve, would provide 600 kilowatts of effective radiated power.

The four-section Pylon antenna was installed on the roof of the RCA transmitter assembly building, immediately above the 50-kw transmitter used in the tests, and the necessary RCA audio facilities, including transcription turntable, microphones, amplifiers, and transmitter control rack, were set up and used within a few yards of the transmitter.

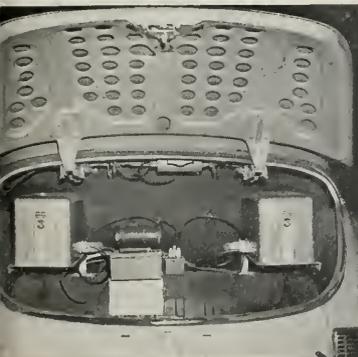
Two-Way Radios for Taxis

System Installed in Camden Cabs Speeds Up Service to Public and Increases Income of Fleet



MAIN CONTROL DESK WHICH HANDLES ALL CALLS TO AND FROM TAXICABS.

THE DRIVER LIFTS A SMALL HAND-MICROPHONE TO ESTABLISH CONTACT WITH THE DISPATCHING OFFICE.



TRANSMITTER, RECEIVER AND POWER SUPPLY ARE PLACED IN THE CAB'S REAR COMPARTMENT WHERE INSPECTION MAY BE MADE QUICKLY.

TWO-WAY radio service between taxicabs and headquarters of the Camden, N. J., Yellow Cab Company was inaugurated recently, following the completion of an initial installation of RCA equipment by engineers of Raymond Rosen and Company, RCA distributors in that area. The system, in effect, makes each cruising car its own "electronic cabstand."

According to Clewell Sykes, President of the Yellow Cab Company, service to the public is materially improved under the new system by making it possible to route cabs with maximum dispatch and efficiency to locations where they are wanted.

The improved service, the company reports, already has had a beneficial effect on its relations with patrons. As many as 25 letters have been received from riders in one day, expressing approval of the time-savings made possible by the fast action on calls telephoned to the cab office.

In other ways, too, the system has proved its value in public service. A woman rider discovered after reaching her destination that she had left her bag, containing a sum of money, in the taxi. The dispatcher's office made contact with the

driver who searched the cab, found the missing property and restored it to the owner. The entire procedure was completed in five minutes. Another driver happened on a holdup and notified the dispatcher, who was the first to relay the facts to the police. Accidents observed on the highways have been reported to the proper authorities in the same manner.

With the new radio system in operation, the dispatcher can maintain constant communication with the fleet of cabs cruising greater Camden and surrounding communities, representing 250,000 people. While only 16 cars of the fleet are now using the system, records show that they are handling nearly half of all calls.

Transmitter on 12-Story Building

Dispatcher's calls are broadcast from an RCA transmitter on the 12-story Wilson Building, at Broadway and Cooper Street. The broadcast control equipment is located in the dispatcher's office.

Camden is the fourth community in which the Rosen firm has completed taxicab installations of RCA two-way radio equipment in recent months. The others are Philadelphia, Darby (Pa.), and Baltimore.

LETTERING ON THE SIDES OF EACH RADIO-EQUIPPED TAXI CALLS ATTENTION TO THE EXTRA-SERVICE PROVIDED BY THE TWO-WAY SYSTEM.



1,500 Students in Institutes

Large Enrollment, with Veterans in Majority, Requires Faculty of Nearly Sixty Expert Instructors



By George L. Van Deusen
*President
RCA Institutes, Inc.*

THIRTY-FIVE years ago in the early days of "wireless" the American Marconi Company opened a school in New York for the training of operators. Incorporated later as RCA Institutes, this school has continued to lead the field in the training of operators and technicians in all branches of radio. From a small beginning it has grown into an institution with nearly sixty instructors in its faculty, and with a student enrollment of approximately 1,500. Three-fourths of the

present student body are veterans of World War II receiving instruction at Government expense under the "G.I. Bill of Rights".

The close association of RCA Institutes with all the manifold activities of RCA has made it possible for this school to keep abreast of scientific progress and to offer a variety of courses which meet the needs of young men entering the industry. Its Board of Directors, headed by Brig. General David Sarnoff, is composed of men who have been closely identified for years with the various phases of modern radio. A Board of Technical Advisers, of which Dr. Alfred N. Goldsmith is Chairman, includes senior engineers from the various members of the RCA family, each being familiar with the special technical problems of his own company or division.

Move to New Building

The rapid expansion of RCA Institutes in recent years has made it necessary to seek larger and more suitable quarters. On April 4, the Institutes moved to 350 West Fourth Street, New York City.

Two floors of a modern mercantile building have been altered and equipped to meet the special needs of the school. More than twenty lecture and laboratory rooms are available. The laboratories are designed for maximum convenience, while the equipment is installed for effective teaching and to familiarize students with representative types of equipment in industry. Separate laboratories are provided for instruction in the following subjects:

Physics, radio physics, electrical technology, transmitters, receivers, ultra-high frequencies, audio and video circuits, television, telegraph code and drafting.

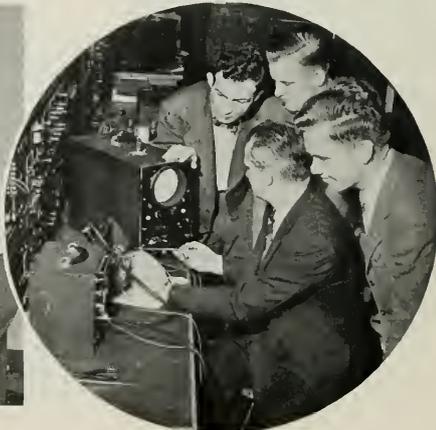
Normally, all courses are given to both day and evening students. Day classes meet every week-day except Saturdays and holidays. Evening students attend classes an average of 2½ evenings per week.

The courses now offered by the Institutes are the following: V-3 (Radio Servicing) Course. This is a three term (nine months) course for day students. It is designed to turn out a competent service man on all types of radio receivers including television. The first term is devoted to a study of radio, physics and mathematics, the second term to radio receivers, and the third term to the installation and servicing of television and FM receivers.

AN INSTRUCTOR OUTLINES AN EXPERIMENT IN THE INSTITUTE'S AUDIO-VIDEO LABORATORY.



STUDENTS WATCH THE DEMONSTRATION OF A PIECE OF TEST EQUIPMENT.



[18 RADIO AGE]



A GROUP STUDIES THE FUNDAMENTAL UNITS OF A SMALL RADIO TRANSMITTER.

The V-5 (Radio Operators) Course is the modern counterpart of the original "Wireless Operators' Course" in which many of today's leaders in the radio industry began their successful careers. Also a three-term course, the first and second terms being identical with the V-3 Course. The final term is devoted to the study of basic and CW transmitter circuits and the laws and procedures governing CW operating.

The V-4 Course in the International Morse Code is offered to those who wish to improve their code speed or to learn the code independently of other instruction. Code practice is also a part of the V-5 Course.

Qualifies Student as Technician

The V-6 (Radio Broadcasting, Sound) Course runs for four terms (twelve months). It extends the field of training beyond that of the serviceman with a view to qualifying the graduate as a radio laboratory aid or as an operator or technician in radio communication or broadcasting. The first three terms are the same as in the V-5 Course; the fourth term covers AM and FM transmission, studio and pick-up equipment, broadcasting laws and operating procedure.

The V-7 Course adds the operation of radio television broadcasting

equipment to the subjects covered in V-6 and requires six terms. The fifth term is devoted to television receiver circuits; the sixth to television transmitters, remote pick-up and relay equipment.

The T-3 (Advanced Technology) Course is the most advanced course offered by the Institutes. It is intended to prepare the student for entrance to one of the many branches of electrical communications, such as a studio or transmitter technician with a radio broadcasting company, testing or field servicing, research or laboratory work, transmitter or receiver operating in radio communications, as well as other positions in which a comprehensive knowledge of electrical communications is required. Satisfactory completion of a four year high school course is a prerequisite in order that the average student may cover the wide range of this course in two years of day classes. Receiving training during the first year in mathematics, physics and electrical technology, the student progresses in his second year to the application of these fundamentals to the more specialized techniques of audio, video and radio frequencies.

High School Refresher Course

For the prospective student who lacks the prerequisites for entrance to the Advanced Technology Course, the T-1 (Technology Preparatory) Course is available. Since only one term is devoted to this course it is designed for the graduate of a four year high school course who needs certain additional or refresher training in high school mathematics and physics.

Although RCA Institutes makes no promises as to employment after graduation, the school assists its graduates in contacting prospective employers. The qualifications of its graduates are brought periodically to the attention of the radio industry. All reputable companies are invited to interview prospective graduates with a view to filling positions in their organizations.

RCA Institutes, while proud of its record, its present staff and its facilities, promises no easy road to advancement and is not seeking

students who expect one. Rather, it is looking for men who recognize that proper preparation and hard work are essential to success in any occupation.

Twenty RCA Radar Units Purchased by Coast Guard

PURCHASE by the United States Coast Guard of twenty 3.2-centimeter shipboard radar units for installation on patrol cutters was announced recently by Walter A. Buck, President of the Radiomarine Corporation of America.

The installations consist of standard Radiomarine commercial radar models, with the addition of special accessories specified by the Coast Guard for use in experimental work destined to develop a new radar beacon system for the benefit of ships' navigators.

Included in the equipment is an RCA radar beacon unit to retune the shipboard radar receivers so that they can receive radar beacon signals from special transmitters located ashore or aboard lightships. This unit is designed to help the Coast Guard obtain good factual experience on radar beacon reception.

Equipped with 12-inch Scope

In addition to the 3.2-centimeter super-high-frequency band which provides a high resolution in range and bearing, Mr. Buck reported, the RCA radar units are equipped with a standard 12-inch viewing scope, an echo box to create artificial targets for testing purposes, and a variable range marker which electronically calculates and registers on a dial the exact range of a selected target from 0.2 to 20 nautical miles from the radar-equipped ship.

These radar units have operating ranges of 1½, 5, 15 and 50 miles, as well as close-in ranges as low as 80 yards, Mr. Buck said. The high-frequency beam hugs the surface of the water and picks up buoys or other small objects so that a clear and detailed scope picture of the surrounding area results.

Television - a Powerful Tool in Modern Education

*Universities and Public School Systems Study Ways to Use
New Medium Effectively*



By William H. Knowles

*General Manager
Educational Sales Dept.
RCA Victor Division*

TELEVISION is potentially one of the most effective educational tools yet developed. Young as it is, this dramatic medium of sight and sound has already proved itself to be an instrument which can contribute to the educational and cultural elevation of the American public.

Many leading universities have already initiated exploration of television as an educational agency. School systems, broadcasters, civic bodies, and eminent individuals in educational circles have made valuable contributions to our knowledge of how to use television most effectively as a teaching implement. Nevertheless, the study has only begun.

Educators are thinking more and more of television in terms of its application to the school field at the present time, not in terms of a teaching tool available only for future generations. A year ago, it would have been in the realm of prophecy to discuss television programs for classroom reception and for extra-curricular viewing, because only a few centers of the nation had television service. Today there are twenty-six television

broadcasting stations on the air. It is expected that this figure will be more than doubled by the end of the year. By the end of 1950, most of the major cities in the United States should be linked by television.

The American public has demonstrated beyond doubt its desire for television. The adventure and entertainment provided by television, and its educational and social aspects have securely captured the public imagination. Educators are quick to realize that educational programs effectively planned for television offer tremendous potentialities for reaching and teaching both juveniles and adults.

The television audience not only is growing rapidly in size but viewers are giving close attention to what is seen and heard on the programs. This attentiveness is an important factor to the educator, particularly since a large proportion of daytime audiences will be made up of school-age viewers.

Educational Aspects Twofold

Speaking generally, educational applications of television fall into two major categories. One is extra-curricular or enrichment program material; the other is "in-school" or self-originated programs.

As to the extra-curricular type of program, educators can confidently look to broadcasters to supply public service programs featuring major events of national importance — the opening of Congress, Presidential pronouncements such as President Truman's recently televised "State of the Nation" message, and the National Presidential Conventions which will be telecast this summer. These programs will be televised because of their general interest to viewers of all ages. They offer timeliness, a sense of actuality, a first-hand view of history in the making. They can greatly augment and enrich the

student's classroom study of history, economics, national affairs, and other topics.

Public service programs of educational interest to both home listeners and in-school audiences can also be expected. Two important new programs of this type have just been inaugurated by station WFIL-TV, Philadelphia. One is a series of telecasts explaining how the teaching of music is carried on in schools. Another is a science program demonstrating what the Board of Education is doing to train students for careers in science, including, among others, the fields of physics, plastics, chemistry and mechanics.

The primary objective of these programs is to demonstrate to parents how instruction proceeds in the classroom. As television facilities are extended within public and parochial school systems, the series is expected to be made available for in-school, classroom use in the instruction of students.

School Use Expands Rapidly

Use of television by schools and colleges is expanding rapidly. Temple University in Philadelphia with its Television Forum is believed to be the first university discussion program to be televised on a regular schedule. This program, featuring members of the University Debate Council, is presented weekly on an evening spot and is relayed to Baltimore and Washington.

In cooperation with WFIL-TV, Temple University also recently put on a model Republican Convention staged by Philadelphia secondary school students under the auspices of the Civic Forum League. The mock convention gave television audiences an idea of what is in store next summer when the two national conventions are held in Philadelphia.

In Chicago, a popular half-hour juvenile program called "Junior Jamboree" is being aired over station WBKB. In Detroit, the school system sponsors a discussion program, "Young Ideas", among high school students over station WWJ-TV. Over New Jersey's new station WATV, in Newark, the school sys-

(Continued on Page 21)

TOSCANINI TELEVISED

Music Critics Acclaim First Television Performance of Maestro and NBC Symphony as Revealing Great Possibilities of New Medium—More than 300,000 Televiewers "Attended"

All-Wagnerian Concert and Performance of "Beethoven's Ninth"

ACCLAIMED by the television audience and music critics alike as revealing the great possibilities in telecast presentations of musical performances, Arturo Toscanini and the NBC Symphony Orchestra were televised for the first time on March 20 in Radio City, New York. A television audience estimated at more than 300,000 persons along the Eastern Seaboard, from Washington to upstate New York, saw as well as heard the all-Wagner concert. So great was the response that, Maestro Toscanini and the NBC Symphony were televised again, two weeks later, during their performance of Beethoven's Ninth.

In introducing the program to the television audience, Brig. General David Sarnoff, President and Chairman of the Board of Radio Corporation of America, said:

"Tonight, for the first time in our history, we are televising the great music of Wagner, the great interpretive genius of Toscanini and the skilled playing of his gifted artists in the orchestra. Never before, in the history of the world, was such a triumph possible. This represents the realization of a dream; a dream we have dreamed for 25 years or more. And so tonight, the magic of science combines with the glory of the arts to bring to countless people in their own homes, over the wings of the radio waves, this program of great music and all it means. What a joy it is that this can be done while our beloved Maestro Toscanini is still a young man!

"It seems to me significant that, while the atmosphere throughout the world is clouded with anxiety, the radio wave can pierce this fog and speak to people everywhere in the universal language of music.

"Those of us who have been privileged to attend in person these concerts at this studio, may be interested to know that the total number of people who have attended over the

entire period of the last ten years represents less than ten per cent of the number of people who will be able to see and hear Maestro Toscanini and the NBC Symphony Orchestra during the following one hour. And this is only the beginning!"

Three Television Cameras Used

Fully aware of the difficult problems facing them, NBC's engineering staff had made extensive tests before putting the first of those historic program on the air. Favorable positions for two RCA Image Orthicon cameras were selected in the auditorium balcony. Another was placed on the right side of the stage behind the tympani section. Each camera was equipped with special lenses to bring closeup views of the Maestro in action. Additional floodlights and spotlights were installed to give sharp contrast to all members of the orchestra.

Much of the success of the event as a television feature was credited to the control-room engineers and production men for their skill in directing the cameras. Following the score closely, they brought into focus individual groups of musicians as the latter took up one theme and then another. And finally, in a scene which proved to be one of the inspired highlights of the visual program, the engineers superimposed a closeup of Toscanini on a view of the full orchestra thereby illustrating impressively how the Maestro conveys his dynamic leadership to the musicians.

For the first time, also, television made it possible for many thousands who had never seen him before to witness the mannerisms of the 81-year-old conductor. They saw his ever-changing facial expressions during important passages of the music and the expressive gestures of his hands and baton as he drew the desired interpretations from his

men. They gained the impression of a musical genius wholly absorbed in his work, yet relaxed and natural in his occasional moments of repose.

Music and radio critics were enthusiastic in their praise of the two television programs.

Said Olin Downes, music critic of *The New York Times*:

"... television has a great and wonderful task to do. It will bring music by visual as well as audible means nearer to people than has ever happened before in history. This will apply to all species of musical performance, and develop more intimacy between the interpreter and the listener than would otherwise be possible."

To support his belief that music as an art should not be "disassociated from other phenomena, visual as well as auditory, sensory or cerebral of existence," Mr. Downes added a quotation from an American poet: "The seen is proved by the unseen and the unseen is proved by the seen."

Jack Gould, *The Times'* radio editor, called the Wagnerian concert the "finest program yet offered by television, a superb and exciting demonstration of the medium's potentialities as an original art form. As if by magic, television suddenly and truly came of age."

John Crosby, radio critic of the *New York Herald Tribune*, wrote: "This all-Wagner program was an exciting and satisfying performance not only as a concert but as television."

In the *N. Y. Daily News*, Ben Gross, radio columnist, said that the program "combined imaginative touches with musically sensitive perception. But, above everything else, Toscanini showed himself to be a great television actor. His face mirrored every mood of the music."

Television in Education

(Continued from Page 20)

tem plans to put on a "Junior Town Meeting of the Air".

American University in Washington, New York University, Syracuse University, Yale University, and others are planning educational telecasts. Catholic University in Washington already has had dramatic plays televised over the NBC television network.

Brand Names are Trusted

Consumers' Faith in Established Trade-Marked Products Will Remain Unshaken, Folsom Says, Only as Long as Products Maintain Reputation for Excellence.



By Frank M. Folsom

Executive Vice President in Charge of RCA Victor Division

Excerpts from Address by Mr. Folsom at Symposium Conducted by Brand Names Foundation.

FAITH is not an intangible thing. It is something tangible, something definite and concrete, whether it be faith in brand name product, brand name advertising or in a religious concept, in democracy, in free enterprise. Faith is belief. It is the fruit of our experience and knowledge.

Consumers' faith in brand name products is based on favorable experience with those products and services. Only by maintaining that favorable experience can we hope to maintain the brand name buying habit in the American public. Only by continuing that favorable experience enjoyed by consumers can we hope to reinforce America's faith in brand names and brand name advertising.

Test Shows Brand-Name Power

Last year, Lit Brothers of Philadelphia advertised a sale of "famous make" mattresses. Forty-eight Simmons mattresses were displayed. Half of them bore the Simmons label. From the rest, the Simmons label was removed and a fictitious label, "Dreamland" was substituted. Both were priced at \$39.50 and both given equal display prominence. At the end of the day, 23 Simmons mattresses were sold compared with six Dreamlands. The next week, the

store cut the price of the Dreamlands to \$34.50, five dollars less than the Simmons-labelled mattresses. In the first four hours, customers bought 32 Simmons against four Dreamlands. The Dreamlands were then marked down to \$29.50. Before the store closed, 14 more Simmons were sold as against 13 more Dreamlands at ten dollars less for exactly the same product. Here is a clear-cut demonstration of the American consumer's faith in brand name products.

Let me give two other instances. Immediately after the war ended, quantities of unknown brand radio sets hit the market. Because of the pent-up consumer demand, sales were good. But, as soon as brand name sets began to flow into the stores, the unknowns backed up drastically and dealers who had stocked up on them scrambled to unload.

Faith Built Battery Market

For a final illustration I would like to mention RCA's experience with radio batteries. Up to two years ago, RCA had never sold batteries. But because we were in the radio business, it seemed logical for us to enter this allied field. We did so, and we packaged the product to feature prominently the well-known RCA brand name. In two short years we were doing excellent business in batteries. Although it was a new product, consumer faith in the RCA brand name created high acceptance for the batteries.

Our country's founding fathers, and Americans ever since, established and embraced the democratic form of government because of a strong and unswerving belief that it does the greatest good for its citizens. So long as that form of government continues to do that job, then America's faith in democracy will remain strong and unshakable. But if, for any reason, it should cease doing that job, then and only then will the American public think of casting democracy aside for a form of government that will. Our

answer to those few voices who would change our form of government is to see to it that democracy continues to work for the greatest good. In this way, America's faith in democracy will be reinforced.

Similarly, we accept the principle of a free enterprise system because it has demonstrated that its fruit is the greatest good for the greatest number of people. Under the free enterprise system, our country has made tremendous strides economically and socially, and today what has been termed the American way of life is indeed the envy of people around the world. The free enterprise system is a force for good, and America will continue to embrace it as long as it achieves good.

The American public's faith in brand name products and in advertising will remain firm and unshakable just as long as they stand the test of experience, that they are as good as we say they are. Quality and value—these are the cornerstones upon which brand name products firmly rest. The brand name products we manufacture today have a heritage that in most instances go beyond our own span of years. As manufacturers we are entrusted with the responsibility of maintaining and advancing that product heritage.

Expands Radar and Radio Service in Gulf Area

Radar and radio service has been expanded in the Gulf of Mexico area by the Radiomarine Corporation of America through the opening of a new service station at 239 Tartar Street, Pasadena, Texas. According to George F. Shecklen, Executive Vice President of Radiomarine, this latest addition to the Company's chain of twenty-three service stations in the Gulf and Mississippi areas is equipped to provide installation, maintenance and inspection of all types of radiotelegraph, radiotelephone, direction finder, radar and loran marine apparatus.

The new station is ideally situated in the heart of the Gulf shipping area, midway between the oil refineries at Baytown and the freight warehouses at Houston, to serve tankers, cargo vessels and rivercraft.

River Pilots Laud Radiophone

Mississippi Boat Captains Broadcast Comments of RCA Service Over National Network

INTERVIEWS by radiotelephone with river captains aboard vessels on the Mississippi and two of its tributaries have demonstrated to a coast-to-coast audience of the Mutual Broadcasting System the importance of the new 1000-watt transmitter and companion receivers at the St. Louis, Missouri, station of the Radiomarine Corporation of America.

The special broadcast, recorded for the network at the RCA station, brought to listeners the voices of skippers as far away from St. Louis as Greenville, Mississippi, 700 miles down the river. It revealed not only the tremendous range of the new facilities, but showed dramatically how radiotelephone service has ended the hazardous isolation of craft plying America's inland waterways in storms and darkness.

Radio Operations on River

Announcer Jack Bennett, of KWK, St. Louis, started the program by interviewing Robert Ugel, Radiomarine Service Engineer, who described how the radiotelephone system was assisting river operations.

"Before the development of the radiotelephone," said Mr. Ugel, "vessels on the Mississippi and other rivers often encountered serious communications difficulties, particularly in bad weather. For instance, to make an urgent telephone call it was necessary to find a land-

ing, dock the vessel, and go ashore. But with radiotelephone it now is possible for the captain to pick up his telephone aboard ship and call us here at St. Louis. We are able to connect him with any telephone operator in the United States."

The announcer inquired as to the range of Radiomarine's new facilities with respect to service on the Mississippi and its tributaries. Mr. Ugel replied that the St. Louis station readily communicated with vessels as far distant as St. Paul, Pittsburgh, and New Orleans.

Ship-to-Shore Calls Made Easily

"If you are aboard a vessel anywhere on the inland waterways and you desire to talk to someone in Kansas City, for example," Mr. Ugel explained, "you would call us by radiotelephone, using the proper wavelength, and give us only the telephone number of the party you wished to contact, and we would be able to connect you directly by landline to the Kansas City operator. On the other hand, persons on land can contact those aboard river vessels in two ways—either by telegraph or direct telephone. By telephone it is only necessary to contact your long-distance operator and ask for the St. Louis marine operator. We do the rest."

Among the skippers interviewed were Capt. Marks, of the *Huck Finn*, proceeding up the Illinois River some 182 miles north of the

mouth; Chuck Lester, of the *Sohio Fleetwing* (a Standard Oil Company of Ohio vessel), proceeding north about 190 miles from St. Louis; Capt. Warner, of the *F. B. Warner*, about 104 miles from Cincinnati; and Capt. Striegel, of the *Elisha Woods*, proceeding south from Greenville.

The interview with Capt. Marks was typical of those with river captains. A portion of it follows:

ANNOUNCER: Ladies and gentlemen, we are about to talk to a man out on the Illinois River. Captain Marks, of the *Huck Finn*. How are you, Captain?

MARKS: Oh, just fine, how's yourself?

ANNOUNCER: How are you receiving, Captain?

MARKS: Very good.

ANNOUNCER: Tell us, Captain, where are you?

MARKS: 182 miles north of the mouth of the Illinois River.

ANNOUNCER: How is the weather up there?

MARKS: Pretty warm today. It's about 50 degrees, ice is melting.

ANNOUNCER: Where is your home?

MARKS: My home is in the little town of Evanston, Illinois.

ANNOUNCER: Where are you bound for now?

MARKS: We are bound for Peoria . . . with three oil barges.

ANNOUNCER: Are they breaking the ice up there?

MARKS: Yes, the channel still has ice—approximately 4".

ANNOUNCER: How long have you been using radiotelephone communications on the river?

MARKS: Well, this is kind of a new experience to me. I have used it about two months.

ANNOUNCER: What is your opinion of radiotelephone as a means of communication on the rivers?

MARKS: I believe it is the best means of communication that we have; it is a great thing.



ROBERT UGEL, RADIOMARINE SERVICE ENGINEER (LEFT) IS INTERVIEWED BY KWK ANNOUNCER JACK BENNETT ON THE IMPORTANCE OF RADIOTELEPHONES IN RIVER OPERATIONS.

RCA Review Ends 2nd Year

*Magazine Regains Pre-War Standing in Electronic Field,
Supplemented by Publication of Important Books on FM,
Television, and Patent Procedure*

IN the two years that have passed since the RCA Review Department was established as a part of the RCA Laboratories Division, Princeton, N. J., the publication has regained the position it held before World War II as a widely accepted and authoritative technical journal of radio and electronics research and engineering. In addition, the department has expanded its activities to include the publication and distribution of volumes on Television, FM, Patent Procedure and several indexes. Publication of the *Review* was suspended in 1942 when distribution of technical information was restricted by wartime security regulations.

The basic purpose of the *RCA Review* is in line with the policy of the Radio Corporation of America, for, since its formation in 1919, the Corporation has supported the principle that research and engineering knowledge and techniques must be shared if their full worth and usefulness are to be eventually realized. Furthermore, the establishment by RCA of a "technical publishing company" within its own ranks is an extension of the active support which has been given to professional societies and their technical journals.

RCA Review Started in 1936

When it was first established, twelve years ago, *RCA Review* was published by RCA Institutes Technical Press as one of the activities of RCA Institutes, Inc., the oldest radio and electronics school in the country. From 1936 until publication ceased temporarily in 1942, twenty-four issues of the journal had appeared. Papers in these six annual volumes were written by RCA scientists, engineers and executives and covered such subjects as television, broadcasting, electron tubes, communications, acoustics, antennas, electron optics, facsimile,

wave propagation, measurements and tests, circuits and components, and special equipment, together with papers in physics, mathematics, chemistry and other fields which relate closely to radio and electronics.

In the same pre-war period, four volumes of the RCA Technical Book Series also were published. These were: *Television*, Volumes I (1936) and II (1937); *Radio Facsimile*, Volume I (1938) and *Radio at Ultra-high Frequencies*, Volume I (1940). These books, for the most part, consisted of reprints of papers published in various technical journals, and the compilations met with wide acceptance as valuable reference works.

Activities Moved to Princeton

In 1945, the activities of *RCA Review* were shifted to Princeton. George M. K. Baker (Lt. Comdr., U.S.N. (Ret.)) was appointed Manager of the new department and

Editor of *RCA Review*. In March 1946, the first post-war issue was published. Within a short time, the acquisition of a paid subscription list double that of pre-war years testified to the fact that the *Review* had resumed its status as one of the leading technical journals, being extensively referenced, abstracted and quoted by indexing services and other technical journals.

Early in 1947, the first two post-war volumes of the RCA Technical Book Series were available—*Television*, Volume III (covering the period of development from 1938 to 1941) and Volume IV (1942-1946). The third volume in this Book Series—*Frequency Modulation*, Volume I (1936-1947)—has just appeared, and additional volumes are already in the formative stage.

In the fall of 1947, the RCA Review Department inaugurated a new RCA Engineering Book Series to provide material less technical than that contained in the Technical Books. Subjects of the Engineering Books are to be selected on the basis of interest and value to scientists and engineers. The first volume—*Patent Notes For Engineers*,—written by C. D. Tuska, Director of the RCA Patent Department, already



PUBLICATIONS OF THE RCA REVIEW DEPARTMENT
SINCE ITS FORMATION IN 1946.

[24 RADIO AGE]

has demonstrated its value to technical and legal authorities, not only in radio and electronics but in other technical fields. It has been purchased in substantial quantities by colleges and schools. Several titles are now under consideration as additional volumes in this Series.

An important service provided by the RCA Review Department is the preparation of Indexes to its RCA Technical Papers. These booklets list substantially all technical papers written by RCA personnel since 1919. Volume I (1919-1945) and Volume II-a (1946) appeared early in 1947. Since that date over 22,000 copies have been distributed. Similar distribution for Volume II-b (1947) is underway. The Indexes list the papers chronologically, alphabetically by author, and include a subject classification section to provide maximum usefulness. Yearly Indexes are planned for 1948 and 1949; in 1950 the sub-volumes are scheduled to be consolidated into RCA Technical Papers-Index, Volume II (1946-1950).

Extra Service to Subscribers

From time to time, *RCA Review* publishes or distributes various technical pamphlets, bibliographies, reprints, charts and miscellaneous material for scientists and engineers. Generally these items are gratis and are provided solely as an additional service to subscribers and others who request them.

Another function of the RCA Review Department which deserves mention is the editorial and publication assistance available to RCA authors. Under this arrangement, an author may obtain aid in the preparation of his paper, regardless of the medium for which it is intended. This service relieves authors of many details and has been greatly appreciated.

All material published by the RCA Review Department is carefully selected by a Board of Editors composed of recognized authorities in their fields. Particular attention is paid to the appropriateness, significance and timeliness of the texts. As a consequence, *RCA Review*, the various books and other material are considered authoritative sources of new and advanced information and provide important reference works of the greatest value.



WALTER A. BUCK

Admiral Buck Elected President Of Radiomarine

Rear Admiral Walter Albert Buck, U. S. Navy (Ret.), former Paymaster General and Chief of the Bureau of Supplies and Accounts in the Department of the Navy, has been elected President of Radiomarine Corporation of America. David Sarnoff, President and Chairman of the Board of Radio Corporation of America, made the announcement on March 15.

Voluntarily retiring on March 1, Admiral Buck ended a distinguished career of thirty years in the Navy. He had served as Paymaster General and Chief of the Bureau of Supplies and Accounts from October 1, 1946, to his retirement. For his wartime services, he was awarded the Legion of Merit and other honors.

Admiral Buck is a native of Oskaloosa, Kansas. He was graduated by Kansas State College of Agriculture and Applied Science with a Bachelor of Science degree in Electrical Engineering in 1913 and received a Master of Science degree from the same college in 1916.

Commissioned an Ensign in the United States Navy on July 30, 1917, Admiral Buck served in World War I as supply officer on the *USS Canandaigua*. Following

the war, he received a variety of assignments, including four years in the Planning Division of the Bureau of Supplies and Accounts.

At the outbreak of World War II, Admiral Buck was a Commander, serving as force supply officer on the staff of Vice Admiral Arthur L. Bristol, USN, Commander, Support Force, Atlantic Fleet. For his war services on this assignment, he was awarded the Legion of Merit.

In February, 1942, Admiral Buck was attached to the Office of Procurement and Material, Navy Department, Washington, D. C., and in January, 1943, he was assigned for duty as supply officer of the Navy Yard in Philadelphia.

In 1945, Admiral Buck was Director of the Navy Materiel Redistribution and Disposal Administration and then Chief of the Property Disposition Branch, Materiel Division. Prior to his promotion as Paymaster General and Chief of the Bureau of Supplies and Accounts, he served seven months as Assistant Chief of that Bureau.

HAVANA OPENS ITS \$3,000,000 "RADIO CITY"

Opening of Cuba's \$3,000,000 "Radio City" in Havana will have a salutary effect on broadcasting throughout the Caribbean and Latin America, Meade Brunet, Vice President of the Radio Corporation of America and Managing Director of the RCA International Division, declared after returning to New York from a field trip on which he observed business conditions at first hand in Mexico and Cuba.

"Business in Cuba is excellent," he said. "A progressive spirit prevails. I was particularly impressed with the new RCA-equipped radio and entertainment center built by Goar Mestre. It drew high praise from a group of Latin-American broadcasters who attended the opening. I believe it will have a healthy effect on broadcasting in that area, as well as in other Central and South American republics."

Mr. Brunet said that Mexico recently had passed through a period of business adjustment in which some phases of commerce suffered. But, in his opinion, all current signs point to an improvement.

Modernized Communications Calls for Trained Personnel

*Supervisors, Operators and Office Staff Are Included
in Courses of Instruction at RCA Communications*



by Earl Zack
*Training Manager
RCA Communications, Inc.*

TO MEET demands created by the increased tempo of international business, news and political affairs, the world-wide radio communications services of RCA Communications, Inc., are operating today at new heights of speed and efficiency. How this modernization has been brought about by the adoption of new operating techniques and methods already has been revealed. But little yet has been told of the extensive plans for training and orienting the personnel who, despite modernization, are essential to a greater degree than ever for the accurate processing of the messages that move over radio channels between New York and more than 60 centers of the world.

Curriculum Limited at Start

From its small beginning in 1946, when the curriculum was limited to instruction in teletype and radio operating, the Training Division of the Personnel Department of RCA Communications, Inc., has been greatly expanded. At present, employees attend classes in supervision, mechanics, preparation for obtaining Federal operators' licenses, stenography and foreign languages. In addition, the Division conducts aptitude and intelligence tests and evaluates operational

skills. More recently, courtesy courses have been established for machine operators employed by customers, thus acquainting this important segment of RCA contracts with the most modern equipment and methods.

Need for Greater Skill

As traffic volume increases, the need for greater skill in the handling of radio and teletype equipment increases in proportion. For this reason, possibly the most important of the several existing courses emphasizes these subjects. Each student attends classes on his own time for a minimum of two hours a day. Close to perfect attendance is demanded. If he starts with a minimum of skill, the average student becomes proficient in three to five months.

Upon entrance to the school, the student is thoroughly oriented in the place the Operator occupies in the over-all communications system. He is given extensive briefing in such elements as message form and the parts and meaning of various types of traffic.

The student continues practice on the teletype or Page Printer until

he attains a speed of 40 words a minute, free of errors. Requirements call for an ultimate speed of 50 w.p.m. and an accuracy of 99.9%. Either special material prepared by the instructors or live traffic is used in this portion of the training. Once the first stage of proficiency has been reached, the student is moved in succession to the Typing Reperforator, the Package set, which is a compact transmitting and sending unit, and finally to the automatic equipment.

A case history is maintained on each student. In this record are noted his reactions to criticism, the ease with which he learns, his cooperation and adaptability. This information plays an important role when the personnel department considers promotions to advanced positions in the company. Upon graduation, a merit rating form is made out and sent with the student's records to the Placement Division for use when referring him to the New York Superintendent for assignment.

Since the Division started using them the value of these records as an aid in placement has become increasingly obvious to the Company and to the Union.

Another important facet of Training Division activities is the induction of new employees. The desirability of acquainting newcomers to the staff with the organization of RCA Communications, Inc.—what it is, what it does and its place in the RCA family—is obvious. But



CONFERENCE OF SUPERVISORS IN SESSION AT RCA COMMUNICATIONS

the lecture course was extended to include older employees when Personnel Coordinators reported that many long-time members of the staff had indicated their desire to be included. Two days is the normal time for this course.

The Training Program does not place all of its emphasis on the lower echelons of employees. This month RCA Communications inaugurated a series of conferences for Supervisors. The subjects for discussion include the place of the supervisor in the company, labor relations, essentials of leadership, indoctrination of new workers, maintenance of discipline, delegating responsibility and building morale. The use of carefully chosen visual aids and training films is an integral part of the program. It is hoped that this conference series will be supplemented later by another on "Modern Organization and Management."

As the company extends its communications circuits in coming years a knowledge of the most commonly used languages and of the customs of other peoples can be of substantial aid in gaining cooperation and the friendship of foreign contacts. To meet this need the Training Division, as an experiment, last year formulated courses in French and Spanish, first for executives and technicians and later for company employees in all categories. Fifty-four students registered in the first classes but many others were excluded because of the limited time at the disposal of the instructors.

Extra-curricular Activities

Any outline of the company's activities in the training of personnel would be incomplete without mention of some of its extra-curricular activities. It trains representatives of foreign governments in some aspects of personnel procedure. It guides and counsels employees, particularly in relation to personal problems requiring psychological analysis. When requested, the Division accepts machine operators of customers for special training. Experience in this category has convinced the company that the higher efficiency of the RCA-trained customers' men reduces message congestion on the tie-lines connecting the customer offices with Communi-

cations headquarters at 66 Broad Street.

The foregoing training phases represent only the beginning. More programs and activities are in prospect, and when they materialize, the training program at the end of this year should be as complete and productive as any in industry.

Training for training's sake is, of course, unjustified. The project must pay dividends or it should not be continued. The Personnel Department of RCA Communications is convinced that its plans will pay dividends that will show up as increased prestige in foreign markets, in better morale and employee efficiency and, most important of all, in greater revenue to the company.

Liquid Lens Enlarges Television Images

Television pictures received on seven- or ten-inch television picture tubes can be enlarged to the ap-

proximate size of those produced on a 15-inch picture tube, through the use of a magnifier developed by the Tube Department of the Radio Corporation of America.

When in use, the magnifier is set up about seven inches in front of the television picture screen, using two metal supports supplied with it. When made necessary by an elevated position of the television receiver, the lens may be suspended from the ceiling and securely anchored in place by tie-wires.

One of the newest applications of plastics in the optical field, the picture magnifier is a transparent Plexiglas lens filled with a clear oil having the same optical properties as the plastic material, a combination that produces a true optical lens.

Designed for use with all makes of direct-view home television receivers, the new lens also has proved its effectiveness in taverns, clubs, and other locations where larger television pictures are desired.



TELEVISION IMAGE MAGNIFIER IN PLACE IN FRONT OF THE SCREEN OF AN RCA VICTOR MODEL 8TS30.

MORE for your money—

with Radiomarine's 3.2cm

All-Purpose **RADAR**

1. PILOTAGE

In harbor entrances, on rivers or in restricted channels, the navigator sees on the radar scope the exact location of other ships, buoys, beacons and prominent land projections of the area.

Radiomarine 3.2cm Radar reveals low-lying buoys and channel markers as close as 80 yards from the vessel, under conditions of poor visibility.

2. POSITION FINDING

Lightships or other known objects whose position is shown on navigation charts can be used as targets to obtain a fix and determine the ship's position. The range and bearing may be taken directly from the radar scope.

The 1.8 degree horizontal beam and 0.25 microsecond pulse of Radiomarine 3.2cm Radar locates them with sharper definition and greater accuracy.

3. ANTI-COLLISION

In fog, darkness or storm, radar enables vessels to proceed on schedule and steer a safe course. The navigator watches on the radar scope the bearing, distance, and speed of approaching ships, the exact location of near-by hazards.

Radiomarine's 12 inch viewing scope shows 86 square inches of picture area. Pictures are clearer, larger and steadier.

4. STORM DETECTION

Many navigators use Radiomarine Radar to detect and plot the movement of storms, rain squalls and heavy cloud formations. This information gives the captain early warning to prepare for bad weather and, where possible, to avoid it.

In rain, Radiomarine's fast time constant switch gives the navigator vision through and within the storm area.

YOU GET ALL 4 NAVIGATIONAL AIDS WITH RADIOMARINE 3.2cm RADAR

Only with 3.2cm radar do you get all four of the aids to navigation described. Ship owners and operators prefer Radiomarine 3.2cm Radar. Its *all-purpose* application is the answer to faster, safer, more dependable navigation at sea, in harbor or inland waters. For complete information write: Radiomarine Corporation of America, Dept. RA-4, 75 Varick Street, New York 13, N.Y.



RADIOMARINE CORPORATION of AMERICA

www.americanradio.com SERVICE OF RADIO CORPORATION OF AMERICA

Toscanini conducts...



YOU ARE INVITED to hear the NBC Symphony Orchestra each Saturday evening at 6:30, broadcast over WNBC. Until Maestro Toscanini's opening concert of the Winter season on October 23, his orchestra will be led by a number of distinguished guest conductors.

AMERICA'S NO. 1 NETWORK



...the *National Broadcasting Company*

A service of Radio Corporation of America



An entire season of baseball action—from Opening Day to World Series—is yours with RCA Victor television.

You're right in the game — with Television

● Comes the shout "Play Ball!" and there you are . . . right on top of every play.

Through television developments in RCA Laboratories, all the action is yours — the crack of bat against ball — fast infield plays — even side-lights in bull pen, dugout, grandstand and bleachers.

At the ball park, RCA Image Orthicon television cameras — rivalling the

human eye in sensitivity—get all the action in day or night games. Shifts from over-all views of the field, to "close-ups," of individual players are swift and revealing . . .

And at the *receiving end* — your RCA Victor "Eye Witness" home television set gives you brighter, clearer pictures. You can see the ball that the batter misses, or you can watch his home run smash sail over the distant fence.

Today, because of the original and continuing work of RCA scientists, millions can enjoy sports, entertainment, educational and news events, on television. Research at RCA Laboratories — always a "step ahead" — enters every instrument marked RCA or RCA Victor.

When in Radio City, New York, be sure to see the Radio, Television and Electronic wonders at RCA Exhibition Hall, 36 West 49th St. Free admission. Radio Corporation of America, RCA Building, Radio City, New York 20, N. Y.



RADIO CORPORATION of AMERICA

Science in Democracy

BRIGADIER GENERAL DAVID SARNOFF URGES SCIENTIFIC PREPAREDNESS FOR NATIONAL SECURITY—REVOLUTIONARY CHANGES IN WARFARE AND COMMUNICATIONS FORESEEN.



By Brig. General David Sarnoff
President,
Radio Corporation of America

An address before the American Academy of Political and Social Science in Philadelphia on October 5, 1945.

AMERICA, to be first in Peace and first in War, must be first in Science.

To achieve this, we must have democracy in science as well as science in democracy.

The essence of science is freedom to question and to experiment, with an opportunity to draw conclusions, unrestricted by any forces that would hamper liberty in thinking. The realm of study, investigation and development, must be free. Whether in politics or in science, it is the keynote of democracy that people must be free to think, free to discuss, and free to try their ideas in practice. To impose the opposite is tyranny.

That is one of the great lessons of World War II. We should not embrace victory merely as a tri-

umph and let it rest as such in history books. We should study its lessons to cultivate progress and to safeguard the future. With peace comes the vivid truth that to be strong in this modern world a nation must have science ever ready to march with its Army, to sail with its Navy, and to fly with its Air Force. Indeed, some products of science, such as an atomically-powered missile, must be ready to fly through the air instantly, unattended by sailor, soldier, or pilot; guided to its target by push-buttons in a control room far away.

Such an alliance of science and military power can be achieved most effectively under the democratic form of government. The fate of Germany and Japan is evidence enough. Despite an earlier start by Germany in the creation and development of scientific weapons of war, the democracies were able to outdistance the enemy in this domain. If there be any doubt, let the doubter look to radar and atomic power. Developed and harnessed by democracy, they searched out the enemy and wiped out despotism. Our scientists gave their best voluntarily, while those of the Axis powers worked under duress. Democracy, unhampered by prejudices and obsessions about race and creed, was able to utilize the knowledge and brain power not only of its own scientists but of many who had been ruthlessly banished from their homelands by the dictators.

Freedom to Pioneer

For many years past, scientists from foreign lands have come to our shores and settled here so that they could study and experiment free from oppression, free from commands, and free from regimen-

tation. Prominent among them we find Tesla, Steinmetz, Pupin, Einstein, Michelson, Zworykin, Fermi, and many others. Here they found the environment conducive to study and research, to free exchange of ideas, to experiment and discovery. Our nation has profited by their endeavors, and science has advanced.

America, the cradle of liberty, is also the cradle of invention. The list of our native scientists and inventors is a shining roll of honor. As a result, thousands of wartime scientific accomplishments helped to turn the tide of victory for the United Nations and thus rescue democracy from those who would destroy it. Scientists in democracy must continue to pioneer on an ever-expanding scale. We must be as daring in peace as in war. We must follow our vision with the same confidence if we are to cross new frontiers of progress. Through new products, processes and services that science can create, we should gain a fuller life, increased employment, improved health and national security. We must cultivate our natural talents and resources to meet the promise of science if we are to develop its endless opportunities for securing a higher standard of living for the masses of people everywhere.

Vigorous Policy Needed

It is imperative, therefore, that the United States maintain a vigorous national policy for the promotion of science. Statesmen, philosophers and religious leaders have led in the past—now scientists must join them in the vanguard of civilization. In the future, freedom and science must walk together, hand-in-hand as the spearheads of peace.

For this purpose, every phase of

[RADIO AGE 3]