RADIO AGE

RESEARCH · MANUFACTURING · COMMUNICATIONS · BROADCASTING

RCA

ANUARY

1946

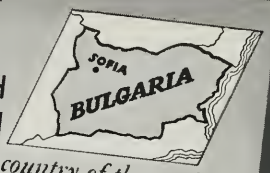
TELEVISION

Restoration of
RADIO-TELEGRAPH
COMMUNICATION
with the Liberated Countries of the World
No. 8... AUSTRIA

NO 1 ITALY
NO 2 FRANCE
NO 3 BELGIUM
NO 4 HOLLAND
NO 5 NORWAY
NO 6 PHILIPPINES
NO 7 CZECHOSLOVAKIA
NO 8 AUSTRIA

UNTIL FURTHER NOTICE SERVICE IS LIMITED TO GOVERNMENT, MILITARY AND PRESS MESSAGES

Inauguration of
DIRECT
RADIO-TELEGRAPH
COMMUNICATION
with a liberated country of the world



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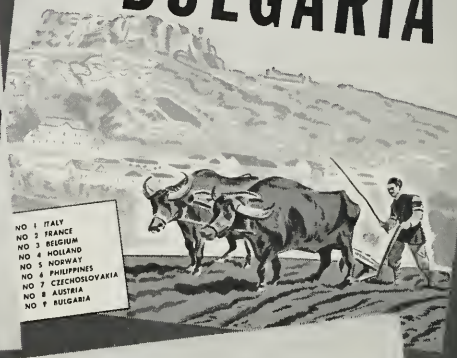

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NO 9 BULGARIA

Restoration of
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with the Liberated Countries of the World
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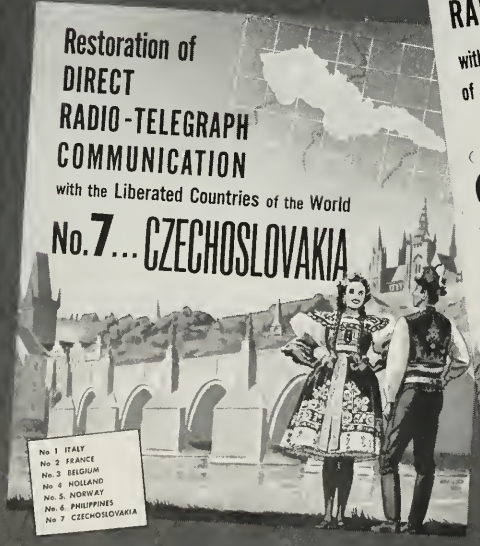

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No 7 CZECHOSLOVAKIA

Restoration of
RADIO-TELEGRAPH COMMUNICATION
with the Liberated Countries
of the World
No. 10
(VIA MANILA)
SIAM

NO 1 ITALY
NO 2 FRANCE
NO 3 BELGIUM
NO 4 HOLLAND
NO 5 NORWAY
NO 6 PHILIPPINES
NO 7 CZECHOSLOVAKIA
NO 8 AUSTRIA*
NO 9 BULGARIA
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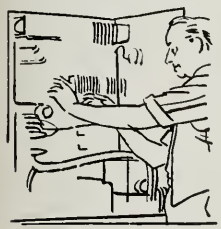
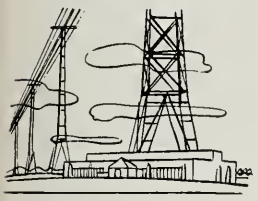
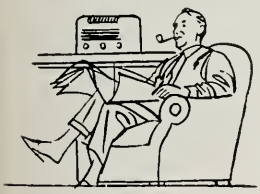
RCA

RCA COMMUNICATIONS, INC.

A SERVICE OF RADIO CORPORATION OF AMERICA







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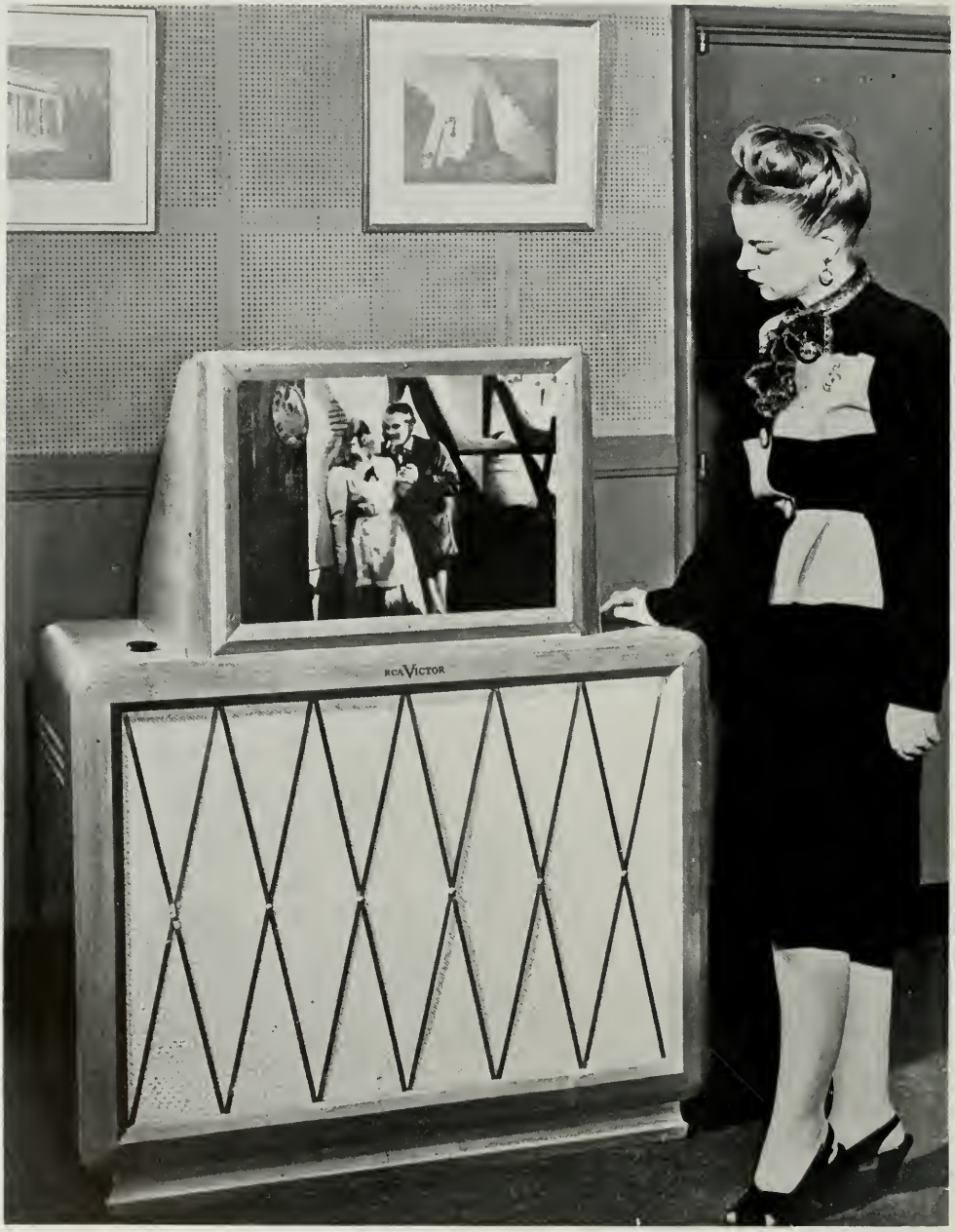
COVER — Studio scene at RCA Laboratories, Princeton, N. J., during press demonstration of latest developments in television.

Radio Age, published quarterly by the Department of Information of the Radio Corporation of America, RCA Building, New York, N. Y., for the RCA services: RCA Laboratories, RCA Victor Division, RCA Communications, Inc., Radiomarine Corporation of America, National Broadcasting Company, Inc., RCA Institutes, Inc., RCA Service Company, Inc., RCA Patent Division and RCA International Division.



LARGE, BRILLIANTLY LIGHTED PICTURES WITH DETAIL AND CONTRAST COMPARABLE TO THE BEST HOME MOVIES ARE PROJECTED ONTO THE 18 x 24-INCH SCREEN OF RCA TELEVISION CONSOLE.

RCA Demonstrates Latest Developments in Black-and-White Television

GENERAL SARNOFF OUTLINES POLICIES AND PLANS AT MEETING OF PRESS AT PRINCETON, N. J.

THE latest developments in television, including vastly improved black-and-white pictures and color pictures in three dimensions, were demonstrated to the press on December 13 at RCA Laboratories, Princeton, N. J. The black-and-white pictures were transmitted by radio from WNBT, the National Broadcasting Company station atop the Empire State Building in New York, a distance of 47 miles. The color pictures were transmitted by radio from RCA Laboratories to the Princeton Inn, two and a half miles away.

The black-and-white pictures, produced by the RCA all-electronic system, featured greater detail, brilliancy and contrast than ever before achieved in television — all of which have been made possible by receivers containing new and greatly improved Kinescopes, or picture tubes. These television pictures were bright enough to be seen in a fully lighted room.

Indoor studio scenes of live talent in action were picked up directly by the RCA color television camera, and transmitted through the air. The action was reproduced with all the hues and tints that would be viewed by the human eye. The television camera and receiver employed mechanically driven color filters.

Stereoscopic pictures in color, with depth of background, clearly portrayed young women wearing bright-hued dresses and scarves. The perspective of the pictures was emphasized when the models held out flowers as if offering them to the audience. Cigarette smoke drifted toward the audience as if to waft out of the picture. A cane, pointed toward the audience, protruded with amazing realism. Special polarized filters in the camera and receiver, and polaroid glasses worn by the spectators produced the three-dimensional effect.

Although the pictures reproduced by the mechanical color system show promise, RCA engineers pointed out that color television is still distinctly in the laboratory stage of development, with obvious shortcomings. Much technical development, they said, needs to be completed before a practical color television system will be ready for home service to the public. They estimated that this will require about five years.

On the other hand, the demonstration of the RCA black-and-white all-electronic television system clearly showed its readiness for the home. It presents sharp pictures on a screen as large as a newspaper page, with brilliancy, definition and contrast equal to motion pictures.

A Post-war Progress Report

Brig. General David Sarnoff, President of Radio Corporation of America, describing the demonstration as "the first of a series of progress reports on the advance of television," said that the accomplishments as revealed by the demonstration were the result of years of research and the expenditure of millions of dollars in pioneering and development.

"Our research men and engineers have built a practical all-electronic television system for the transmission and reception of excellent pictures in black-and-white," said General Sarnoff. "There is every reason why television should go ahead as a service to the public. Frequency allocations, rules and regulations for commercial television service have been approved by the Federal Communications Commission. Any further technical advances—and they will be continuous —will bring new benefits in television to the public. If we wait for all the new developments of the future, the American people will always be waiting for the enjoyment of television and will be denied its thrills in the present."

Stating the television policies of Radio Corporation of America and its subsidiaries, General Sarnoff said:

1. The RCA organization will continue research and devel-

ENTERTAINERS FACE THE CAMERA DURING THE RECENT TELEVISION DEMONSTRATION AT THE RCA LABORATORIES, PRINCETON, N. J.

GENERAL SARNOFF OUTLINES RCA TELEVISION PLANS AND POLICIES TO 100 NEWSPAPERMEN AND SCIENCE WRITERS AT PRINCETON DEMONSTRATION.

opment in all phases of television. Technically, this includes black-and-white, color, three dimensional views, transmission, reception and network distribution. Artistically and educationally, this means development of program technique through use of motion pictures, live talent, outdoor scenes, news events, sporting events and other features of local and national interest.

2. The RCA Victor Division—a pioneer in television engineering and design — will manufacture the finest possible television equipment for sale to broadcasters and the public.
3. The National Broadcasting Company — a pioneer in television broadcasting—will continue development of television broadcasting and program service to American homes and schools, and will develop plans for the establishment of a nationwide network of independent television stations.
4. The Radio Corporation of America will continue to make available to its licensees all of its inventions in this new field of television as it has done in broadcasting and other fields of electronics.

Television Introduces Problems

"Television as an art and a new service naturally introduces new economic and artistic problems," said General Sarnoff. "While they are by no means easy to solve, many of them are similar to those which confronted the pioneer broadcasters. American ingenuity solved the problems of sound broadcasting and can solve the problems of television.

"We are confident that this progress report is the forerunner of further achievements. We shall continue pioneering in all phases of television. We shall move television forward from a local to a regional basis, thence to a national service and eventually, we hope to see it function on an international scale."

Obsolescence Means Progress

Warning that obsolescence in television is a necessary part of its progress, General Sarnoff pointed out:

"In a science, art and industry so vast in scope and possessing possibilities for unlimited growth as television, obsolescence is a factor which the public and the broadcaster must always face as a guarantee of progress.

"There will be obsolescence in television systems, transmitters and receivers. The purchaser of a receiving set, or the licensee of a transmitter, buys his receiver or installs his transmitter with the knowledge that he is pioneering in the development of a new service. Obsolescence will and must take place. When and how soon obsolescence occurs will depend upon the ingenuity and creativeness of the scientists and engineers within and outside of the radio industry.

"Similarly, the network operator makes an investment in the new art as part of his obligation to the public. He must not hesitate to pioneer and improve his network's service if this country is to lead in television and the American people are to reap its benefits in entertainment and education, as soon as they are available. The time has come in television when the networks must assume the responsibility to introduce and to advance the new art of sight-sound broadcasting and to make their television programs available by whatever means may be found technically and economically feasible to the independent stations associated with their networks.

"We do not fear obsolescence; we welcome it," said General Sarnoff. "That is why American industry continues to research and to make progress. Every new development in radio, whether it be a gadget or a system, involves some obsolescence of former methods. A television receiver or a transmitter is no exception. Every new art or business based upon the technical sciences must deal continuously with the factor of obsolescence.

"Assuming that a television receiver bought for $250 becomes obsolete in five years, the price the owner pays for obsolescence is less than 2 cents an operating hour, if he has program service from 2 or more stations; for a $150 receiver, less than 1 cent an operating hour. In New York, for example, there will be seven channels from which to choose programs.

"Research and development in television must not be looked upon as a process of obsolescence. Rather it should be regarded as an evidence of progress through which a new service of sight and sound with constantly improved instruments and programs are made available to the American people."

RCA Victor Plans

Frank M. Folsom, Executive Vice President in Charge of the RCA Victor Division, announced that orders are now being accepted for new television transmitters which will be available in the autumn, 1946. RCA will manufacture tele-

vision transmitters for large and small broadcasters.

"Aside from the program itself the most important element in the television system insofar as the public is concerned is, of course, the receiving set," Mr. Folsom said. "Improvements in receivers are comparable to those made in transmitters and cameras. Pre-war reproduction of television pictures in the home was limited to the face of the Kinescope tube; the size of the picture depended upon the size of the tube. To overcome this limitation, RCA developed and demonstrated prior to the war a new projection-type receiver for the home that reproduced a black-and-white picture 15 x 20 inches. Today, the brilliancy of these large-size pictures is such that they can be viewed under ordinary room lighting conditions."

Home Receivers Ready in 1946

Home television receivers, Mr. Folsom stated, will begin to come off the RCA Victor production line in the late spring or early summer of 1946, according to present plans. These instruments, he said, will be table models of the direct viewing type, that is, the observer will see the pictures directly as they appear on the face of the Kinescope, or picture tube. These sets retailing from less than $200 to $300, will have screens ranging in size from 4½ x 6 inches to 6 x 8 inches, and they will feature black-and-white pictures of improved contrast and brilliancy. Larger models in this line will also provide standard broadcast reception.

"Sometime later," said Mr. Folsom, "television receivers featuring pictures projected by lenses and mirrors on at least 15 x 20-inch screens will be available for about $500. These deluxe consoles will provide standard and FM broadcast programs as well as worldwide shortwave reception. The instruments will be all-electronic in operation with no moving parts. They will be as simple to operate as present-day sound broadcast receivers."

Trammell States NBC Plans

Niles Trammell, President of the National Broadcasting Company, announced the plans of NBC in regard to television as follows:

1. NBC will install early in 1946 a new and improved transmitter at its pioneer television station WNBT, atop the Empire State Tower in New York City. . . . NBC also will build a station in Washington, D. C., in 1946, followed by stations in Los Angeles, Cleveland and Chicago; subject to the FCC granting licenses for which applications have been filed.

2. NBC will operate a network between New York and Washington in 1946 . . . and a New York-Boston network in 1947. As soon as practicable other regional networks will be established, using Chicago, Cleveland and Los Angeles as key stations.

3. NBC will improve and enlarge its program service in New York, which currently includes on-the-spot views of news and special events alternated with major sports events and a wide variety of studio programs.

4. NBC will solicit the support and cooperation of sponsors and their advertising agencies in producing programs to serve the television audience.

5. When a color television system has reached the stage of practicability and availability that is now true of the black-and-white television system, NBC will bring color to the American home.

Dr. Jolliffe On Techniques

Dr. C. B. Jolliffe, Executive Vice President in charge of RCA Laboratories, said that color television always has been a goal of RCA scientists and engineers, and added:

"The possibilities of producing color television were first demonstrated by RCA to the Federal Communications Commission on February 6, 1940, at Camden, N. J. A year later, on February 20, 1941, NBC broadcast through the air the first color television pictures from its transmitter atop the Empire State Building. A color system, using a projection type receiver producing a picture 15 x 20 inches was shown to the FCC by RCA in December 1941.

"War then stopped television research for civilian purposes. Research efforts were concentrated on the war applications of television techniques. The many new electron tubes and techniques developed during the past five years for ultra-high-frequency military uses now are available for television and other phases of radio communication."

The mechanical color demonstrated at Princeton, Dr. Jolliffe continued, "has been accomplished through constant development and improvement of the devices employed in black-and-white television and not through any basic discoveries in color television which still uses a mechanical system of many limitations.

"For example, the new RCA

VISITORS TO RCA LABORATORIES EXAMINE DETAILS OF RCA VICTOR TELEVISION RECEIVERS. DIRECT VIEWING AND PROJECTION TYPE MODELS WERE SHOWN.

Image Orthicon tube, or 'eye,' used in the camera, is so accurate that it is unnecessary to introduce special controls to balance the three primary colors for proper blending. Its light sensitivity is such that studio productions can be picked up with much less light than now used in the studio for black-and-white television. When this camera 'eye' is used to pick up color, a disk comprising red, green and blue filters revolves between the camera lens and the face of the tube.

"Receiving equipment consisted of a special 12-inch RCA Kinescope installed within a revolving drum carrying three equally spaced color filters.

"Interesting as these tests have been, we are convinced through our achievements in all-electronic black-and-white television that any mechanical color system is outmoded.

Dr. Jolliffe called attention to the fact that the color demonstration employed a directional beam transmitter and parabolic antenna. The power was 1 20 of a watt, which is infinitesimal compared with the 50,000-watt transmitters used by standard broadcasting stations. A new electron tube developed during the war made this accomplishment possible on a carrier frequency of 10,000 megacycles — a frequency twenty times higher than any used heretofore in television. The wavelength at such a frequency is only three centimeters.

New Transmission Methods

A new method of transmission used in the demonstration permits sound-and-sight signals to be carried on the same wave. The sound is transmitted during the very brief periods when the scanning beam is inactive and insures high fidelity reproduction.

"On the lower frequencies, television black-and-white transmitters now can be built to operate with at least 5 kilowatts up to 300 megacycles. New antennas can be built to make the effective power of 5-kilowatt transmitters the equivalent of 20 to 50-kilowatts output. Thus it is now possible to deliver all the power necessary on all 13 channels assigned by the FCC to commercial television."

Dr. Jolliffe explained that at present there are two possible methods of producing color television—one using mechanical filters and the other all-electronic.

"We look forward to the day," he continued, "when we will have an all-electronic color system. As with black-and-white television, we believe that the electronic system will be far more satisfactory and practical as a service to the home than anything that can be done mechanically.

Rotating Disk Mixes Colors

"In our demonstration today of the mechanical system, we were shown no fundamental advances in color television as such," Dr. Jolliffe pointed out. "Actually the system of color television which has been demonstrated today is based almost entirely on the elements and apparatus of our all-electronic, black-and-white television system. We have merely added motor-driven color filters to the transmitter and receiver which enable us to transmit the red, green and blue components of the televised material in rapid sequence — so fast that the color components appear to be directly overlaid.

"With the development of the Iconoscope, Kinescope, Orthicon and other electron tubes in RCA Laboratories, an excellent black-and-white, all-electronic system of television has been produced," said Dr. Jolliffe. "It has no motors or whirling disks. It is practical and simple to operate in the home.

Great Strides in Tube Design

"The latest cathode-ray tubes used in all the new receivers demonstrated today were far more efficient than any publicly demonstrated previously. They revealed that great strides had been made in the development and use of fluorescent materials in cathode-ray tube manufacture during the war. In the new tubes the fluorescent screen on which the image appears in black-and-white is backed up with a very thin coating of aluminum which permits the use of higher voltages than formerly. The aluminum film acts as a mirror preventing loss of light inside the tube thereby greatly improving picture brilliance and contrast.

Dr. Jolliffe concluded: "There is no technical reason for further delay in giving television to millions of Americans, as a new medium of information, education and entertainment.

"Black-and-white television is ready for service to the public. We have all of the elements necessary for the immediate expansion of a satisfactory television service to the home on a national scale."

SELTZER WATER SQUIRTED AT STEREOSCOPIC TELEVISION CAMERA GIVES VIEWERS A THREE-DIMENSIONAL THRILL.

Radio in 1945-46

Revolutionized by Wartime Research and Development, Radio Moves into a New Era of Peace in which People Everywhere Will See the World by Television.

By Brig. General David Sarnoff

President,
Radio Corporation of America

ELECTRONIC EYES perfected by wartime research have given long-range radio vision to mankind. The electron tube, which extended man's range of hearing around the world, now enables him to see distant events and people far beyond the range of the human eye. Into his view also come infinitesimal organisms, tiny specks and particles heretofore hidden in the air, in drops of water, in darkness and in dust. Whether it be a germ in the bloodstream or a plane in the clouds, the invisible speck is identified by electron beams which bring it into focus and amplify it as a picture.

To meet the demands of war, RCA developed more than 150 new types of electron tubes. Since tubes are the keys to major advances in radio, these new tubes are now opening the future of a new world of radio in which the eye as well as the ear will play an all-important part. Already this electronic magic has given television a new supersensitive eye, one thousand times more sensitive than the pre-war eye.

Similarly, new electron tubes made possible the miracle of radar. So sensitive is the radar eye that geese tracked for an hour and forty minutes by radar, were followed on the scope, or screen, for 57 miles. The speed of the flock was clocked at 35 miles per hour. Yet the radar man never actually saw the geese, any more than gunners saw the enemy ships which they sank in the dark beyond the horizon, when radar aimed the guns.

Out of the same war research have come electron timers and computers—timers that measure time at intervals of 10 one-millionths of a second, while computers count, multiply and divide in fractions, up into the millions, with split second precision and accuracy.

While television sees by the light of a match, and while radar spots a plane 20,000 feet up in the clouds and 20 miles or more away, the electron microscope sees in the opposite direction—into the submicroscopic world—thus enabling man to study bacteria, viruses and infinitesimal particles of matter far beyond the range of the most powerful optical microscope.

Having thus established a distinguished record in the performance of indispensable tasks of war, radio-electronics has returned to peacetime pursuits. Under the cover of wartime secrecy, scientific progress has been rapid and productive.

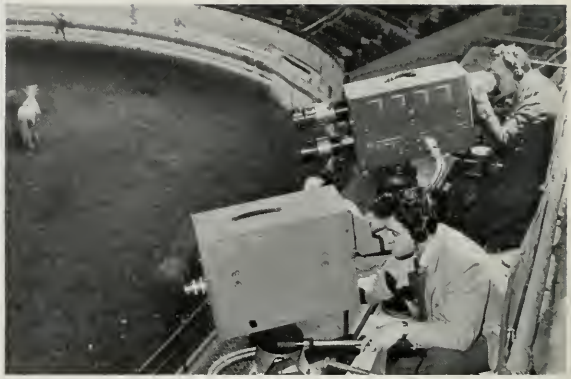
Since 1940, five years of intense research and development have revolutionized every phase of radio. In 1946, that scientific revolution will become continually more apparent to the public, as "secret weapons" are freed for application to everyday use. Instruments and services, which in the normal course of events might not have appeared until 1960, should therefore be in use before 1950.

Conclusion of the war in August made it possible for the broadcasters of the United States to celebrate in a peaceful November of 1945 the completion of their first quarter century of service to the public. Broadcasting climaxed these twenty-five years by performing services far beyond the most sanguine hopes of its founders in 1920. Today there are 940 standard broadcasting stations and 56,000,000 receivers in this country, while hundreds of new FM and television stations are planning to go on the air.

Acme

RADIO CARRIED TO THE WORLD A DESCRIPTION OF THE JAPANESE SURRENDER CEREMONIES ABOARD THE U.S.S. MISSOURI IN TOKYO BAY.

. Navy



ABOVE: SKILLED OPERATORS RECORD RADAR REPORTS IN PLOTTING ROOM AT A NAVAL COMMUNICATIONS HEADQUARTERS. RIGHT: NEW IMAGE ORTHICON CAMERA (FOREGROUND) DEMONSTRATES ITS HIGH SENSITIVITY IN A TELECAST FROM A SPORTS ARENA.

After that day of infamy at Pearl Harbor, radio flashed countless V's into space as the signal of the hope for victory—the symbol of a goal that looked so far away on December 7, 1941, when President Roosevelt, by microphone, summoned his countrymen to partnership "in the most tremendous undertaking in our national history." Through the dark days of war, the civilized world looked forward to the day when an "E" and a "J" would be added to the V to signal victory in Europe and in Japan.

World Hears of Germany's Fall

Finally, after long years of fighting and vigil, the ether on May 7, 1945, pulsed with the news that on the day before Germany had surrendered unconditionally to the Allies, at the headquarters of General Eisenhower in France. The V-E Day broadcasts were heard around the world.

But war in the Pacific was still on. The August air of 1945 became tense as it vibrated with indications that historic news of great import was in the offing. On August 6, a radio news flash from the White House announced the world's first atomic bomb had been dropped on Hiroshima; the next day radio encircled the earth with the news that Russia had declared war on Japan, and on August 14, the message came that the Japanese had surrendered. World War II was over.

Never in history had the population of the earth been kept so well informed and so up-to-the-minute on the progress of a war. Radio spread news and communiques with lightning speed. On September 1, when the documents of surrender were signed by the Japanese on board the U.S.S. Missouri in Tokyo Bay, the microphone was on the deck of that battleship to enable countless people to listen in on one of the greatest events in all recorded history. Electrical transcriptions were rushed by plane to broadcasting stations across the oceans, while films of the surrender were flown to New York, for broadcast by television through the National Broadcasting Company's pioneer station WNBT.

The war indeed had ended, but a gigantic task of reconversion faced the radio industry as it moved to play its part in the restoration and the rehabilitation of the world. Out of the conflict emerged incredible developments in radio science—among them, radar! Peace lifted the curtain of secrecy behind which thousands of men and women in the radio industry and in the armed services had enacted miracles in communication and radio production.

New Words of Achievement

Indicative of their achievements were many new words in the vocabulary of radio—words unknown in 1940. Now they would find their way into dictionaries and encyclopedias—such words as radar, unheard of in the press until 1943; sonar, shoran, loran, teleran, proximity fuses and numerous other terms, each the headline of a new episode of man's ingenuity in radio.

As the year ended, the lifting of wartime secrecy restrictions permitted the new word "shoran" to be printed and spoken. It was one of the best kept secrets of the war and a scientific triumph. Developed in RCA Laboratories, shoran was the most accurate system of bombing developed during the war. Pinpoint accuracy permitted fragmentation bombs to be dropped through heavy overcast from 20,000 feet to fall with demoralizing effect on invisible enemy troops entrenched only 400 yards from American lines. With shoran, a bomb could be aimed at a 30-foot bridge invisible to the bomber because of overcast, and yet hit the bridge with greater precision than by visual bombing.

Another Miracle of War

Another miracle that came out of warfare is the "proximity fuse"—a miniature radio sending and receiving station encased in the nose of projectiles. Radio waves projected from an automatic transmitter in the shell itself were reflected from targets—as in radar—and received by a tiny electron tube which detonated the charge at the moment of its most devastating proximity. RCA assembled more than five million of these fuses.

Through the story of wartime radio runs the theme of accomplishment by operators who participated in pushbutton warfare on an electronic keyboard performing magic undreamed of at the beginning of

the war. Who at that time would have thought that an enemy battleship lurking in the dark, miles away, could be hit by shells and sunk as if it were within clear view, although the gunners could not see it? For the radarmen saw reflections from it on their scopes and told the gunners exactly where to point their guns. Radar and gunnery, radar and aviation, radar and ships, became inseparable. So peace will find them allied in new applications that will enhance safety and aid navigation on the sea and in the air.

The shift from wartime activity to peace, with its promise of new civilian radios, phonographs and television, is a tremendous task. The radio industry, having marshalled more than 550,000 workers in 1,600 factories to produce more than 7½ billion dollars worth of military radio, radar and other communications equipment from 1941 to the end of the war, has had to redesign and retool for the application of wartime developments to peace. Because it represents an abrupt and complete turnabout, months of effort have been required to get back on the track of peacetime production.

Pictures of a New Era

Since V-J Day, in August, "reconversion" has been the dominating factor in research as well as in production. Laboratories that devoted every effort to the war now are concentrating on peace, as are broadcasting and communication services. Some indication of the service they are rendering is seen in the fact that Admiral Chester W. Nimitz broadcast a message to service men in hospitals, over television station WNBT, New York, so that he might, at the same time, be seen by them.

President Makes Television Debut

President Truman made his television debut while speaking at the October Navy Day ceremonies in Central Park, New York. Secretary of State Byrnes, Secretary of War Patterson and Secretary of the Navy Forrestal also made their first television appearance over the same station at a Forum in New York. In the realm of sports, the Army was televiewed as it rolled up a score of 48 to 0 against Notre Dame while the players plunged, punted and passed under the telephoto lens of the television camera.

Since the war, the new supersensitive television camera tube called the Image Orthicon, developed in RCA Laboratories, was demonstrated at the NBC studios, in an exhibition that showed how television has acquired an electronic eye so sensitive that it sees in candlelight, moonlight, twilight or even in darkness with the scene "illuminated" by infra-red rays. This achievement solves major problems in television programming and in outdoor pick-ups, making possible 24-hour news coverage. Here was a camera that brought new life and detail into television at the Army-Navy football game, despite the darkening shadows of a December afternoon.

The demands of war led the scientists across new frontiers in the spectrum of space. In applying television techniques to radar and in mastering the radio "echo," as well as in the development of secret systems of communication, new and ever shorter wavelengths have been harnessed to perform new magic. A recent demonstration by the Western Union Telegraph Company of an ultra-short wave radio relay system, developed by RCA was a revolutionary step in electronic communications, destined eventually to replace thousands of telegraph and telephone poles and thousands of miles of wire from coast to coast.

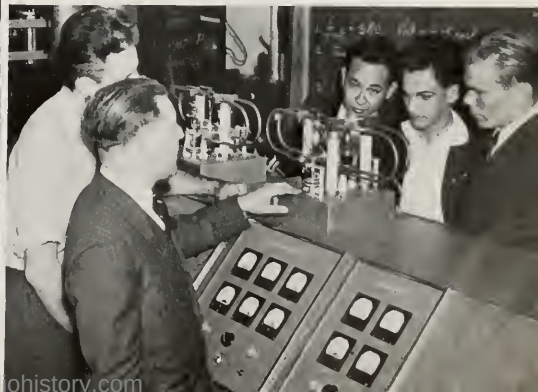
"Citizens Radio" a Prospect

As a result of wartime developments vehicular radio, or "citizens' radio," as it is popularly called, is about to be introduced. From microwave transmitters in automobiles, trucks and buses, travelers on the highways will be able to establish contact by radio with the nearest telephone exchange so that they can talk with any telephone subscriber in the country, just as a passenger on a modern ship can telephone via a radio link to home or office.

During 1945, extensive tests of radio on railroads were inaugurated to increase safety, assist in train dispatching and in communication along the rails as well as intertrain.

Many of these advances have evolved from the war which called for new specifications in the design

LEFT: AUTOMATIC RECORDING MACHINE SPEEDS UP MANUFACTURING PROCESS AT RCA VICTOR. BELOW: STUDENTS RECEIVING INSTRUCTION IN ELECTRONICS AT RCA INSTITUTES.



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 9½ seconds, surpassing the previous record of 3½ 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 nonbreakable 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 coordinating 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.

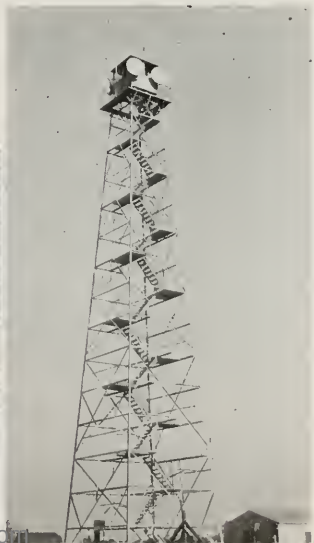
Opportunities for Youth

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.



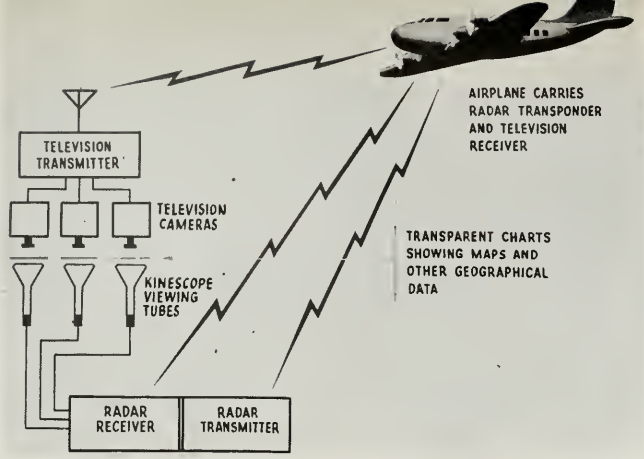


FIGURE 1—SIMPLIFIED DIAGRAM SHOWING HOW TELERAN TRANSMITS MAPS, DETAILS OF LANDING FIELDS AND OTHER VITAL INFORMATION TO PILOT OF PLANE.

THE STORY OF TELERAN

In this New Aid to Air Navigation, RCA Engineers See a Possible Solution to Many Traffic Problems Facing the Aviation Industry

By Loren F. Jones

Engineering Products Department
RCA Victor Division

A NEW system of air navigation known as Teleran (a contraction of TELEvision-Radar Air Navigation) is being developed by RCA engineers and scientists in Camden and Princeton. It is expected that Teleran will constitute a major advance in the field of aviation by meeting a critical need.

The constantly increasing density of air traffic requires development of improved methods for navigating aircraft. Improvements in present methods will suffice for the immediate future, but a more comprehensive solution will be required within the next several years, a situation that is generally recognized.

Various methods have been proposed for controlling traffic, preventing collisions, performing instrument approaches and in other ways navigating aircraft, particularly under conditions of poor visibility. The problem is the all-weather flying of large numbers of aircraft having different speeds, different maneuverabilities, different destinations and different degrees of pilot skill.

In the RCA Teleran method, devised in 1941 but not actively worked on until 1945 because of the war, radar and television technologies are combined along original lines. Teleran collects information by means of radar equipment on the ground, collates it with meteorological, geographical and control data, and transmits a television picture of the assembled information to a television receiver in the aeroplane. On the Kinescope of his television receiver, the pilot sees a picture showing the position of his aeroplane and of all other aircraft at his altitude, superimposed upon a terrain map complete with route markings, weather data and unmistakable visual instructions pertaining to his flight.

Teleran had its origin in a synthesis of the requirements for a technically ideal system of air navigation. An ideal system must present complete information to the pilot in the simplest possible form, must minimize weight and complexity of the airborne equipment, and must be operative under all weather conditions. It must operate in conjunction with other existing navigational aids, must be very flexible so that changes in traffic control methods can be accomplished without obsolescence, and must be able to handle greatly increased traffic densities.

In addition, the ideal system must be able to handle all types of aircraft and must make identification of individual aircraft unnecessary. It should allow pilots freedom of action where necessary, should provide explicit instructions for approach, holding and landing and should provide warnings of impending collisions. It must be able to provide supplementary information such as weather data, and must operate at a cost commensurate with the services rendered. It must not necessitate reference to innumerable meters, scales, charts and radio signals.

Radar Alone Has Limitations

Radar is a valuable new navigation device, but in the use of radar alone, there are limitations. For instance, airborne radar equipment is relatively bulky and requires skill in its operation. It provides no traffic control data for the use of the traffic control personnel on the ground. Also, due to space and weight limitations, there are limits to the attainable accuracy. Ground radar, on the other hand, furnishes adequate and accurate information, but this information is on the ground and is not available to the pilot. The full advantages of radar can be realized only if the information from a large and accurate ground search radar can be transmitted to the pilot. Television is the natural and unique means for accomplishing this. In addition to transmitting precise radar infor-

mation to aircraft, television provides a means for transmitting other data, e.g., weather maps, ceiling, visibility and traffic instructions. In fact, by the combination of radar and television, the requirements for an ideal system can be essentially fulfilled.

Camera Combines Views

For convenience, a simplified Teleran installation is illustrated in Figure 1. This shows a ground search radar whose data are displayed as a "PPI" picture on a cathode ray tube. Placed in front of this tube is a transparent map or chart. Both the map and the face of the tube are photographed by a television camera, and the combined picture is sent aloft.

Since the presentation of all aircraft in the skies would confuse the pilot, any one pilot being interested only in other aircraft flying at approximately his altitude, the system includes a method for separating the signals received from aircraft at various altitudes and for transmitting a separate picture for each level. This is accomplished by using in each aircraft a transponder or beacon whose transmitting signal is coded in relation to altitude. By means of this code, altitude separation can be accomplished automatically by the ground radar. Thus there actually are several "PPI" radar indicators, each showing aircraft in a certain altitude layer, and several television cameras with individual television transmissions. Each pilot tunes in the transmission appropriate for his altitude.

Figure 2 is typical of the kind of picture which will be sent aloft. In this particular view, which is for aircraft flying at 10,000-13,000 feet, it will be noted that the picture indicates the airways, the television channel to be used when entering the next Teleran zone, terrain features of interest, wind velocity and direction, and the presence of other aircraft. The spot representing the plane in which the picture is being received is indicated by a radial line passing through the spot.

Requirements of Basic System

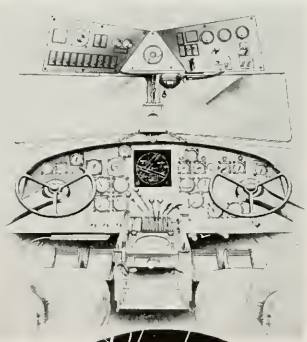
The basic system, therefore, requires a ground search radar, ground selection equipment to separate the signals received from various altitude levels, television cameras, maps and charts, television transmitters for sending the pictures aloft, and a radar transponder and television receiver in each aircraft.

In Figure 6 is depicted a more complete Teleran system in which a shorter range radar is employed for approaching the airport and for controlling traffic. Also, in conjunction with a television link, there is a special radar for bringing the plane down the glide path. This radar permits sending a special picture for instrument approach.

Spot Indicates Each Plane

The picture for instrument approach on the glide path is shown in Figure 3. In this case, each aircraft again appears as an elongated spot, and its distance from the airport and its deviation from the glide path are plainly shown. The horizontal lines indicate whether the aircraft is above or below the exact glide path. These lines appear in the picture automatically, without requiring the attention of the pilot or the ground operators.

Possibly the most important feature of Teleran is its adaptation to traffic control, a subject too lengthy for discussion here. Experienced pilots and airline operators state that the traffic control problem is certain to become critical. Many are outspoken in their belief that Teleran offers the ideal solution.



BELOW, LEFT TO RIGHT: FIGURE 2—TYPICAL PICTURE SENT ALOFT BY TELERAN; FIGURE 3—PICTORIAL INSTRUCTIONS WHICH GUIDE PILOT IN LANDING; FIGURE 4—TELERAN WEATHER MAP AND TERRAIN FEATURES. AT RIGHT: FIGURE 5—SUGGESTED METHOD OF MOUNTING TELERAN KINESCOPE IN COCKPIT OF PLANE.

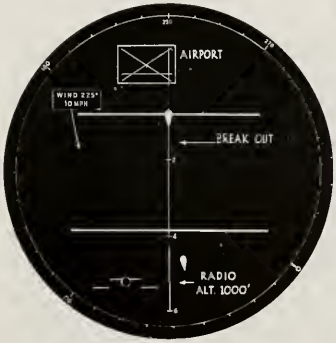


Figure 4 is an example of other information which can be transmitted. The importance of weather data has been emphasized by many pilots. It may be worthwhile to transmit special weather maps periodically over the Teleran system. Then each pilot would receive regularly, without any effort on his part, complete meteorological information in visual form, the information being particularly suited for one flying at his altitude.

Figure 7 shows a network of Teleran stations along trans-continental airways, illustrating how long-range navigation can be accomplished by Teleran, providing sufficient stations are installed.

Figure 5 shows one way that the Teleran Kinescope could be mounted in an aircraft instrument panel.

The further development and demonstration in flight of Teleran will require several years of effort by RCA Victor Division engineers at Camden, with consultation and other assistance from RCA Laboratories engineers at Princeton. The chief engineer in charge of the Teleran project is Dr. Douglas Ewing of the Victor Division. RCA Laboratories personnel who have contributed most are Mr. P. J. Herbst and Drs. V. K. Zworykin and Irving Wolff.

FIGURE 6—DRAWING OF COMPLETE TELERAN AIRPORT INSTALLATION COMBINED WITH SHORT-RANGE RADAR FOR CONTROLLING TRAFFIC. BELOW, FIGURE 7—PROPOSED NETWORK OF TELERAN STATIONS AS IT WOULD BE ARRANGED ALONG TRANSCONTINENTAL AIRWAYS, SHOWING OVERLAPPING RANGE OF EACH STATION.

SIGNAL CORPS USED RCA RELAY SYSTEMS

Two of the radio relay systems demonstrated recently between Catalina Island and San Francisco by the U. S. Army Signal Corps to show wartime developments in military communications which may revolutionize peacetime civilian telephone and teletype operations were developed by the Radio Corporation of America.

These two systems eliminate the necessity of long lines in certain types of long-distance telephone communication, according to Dr. H. H. Beverage, Associate Research Director of RCA Laboratories, which developed the system in collaboration with the Camp Cole Ground Signal Agency.

Operating at radio frequencies well above those used before the war, the systems provide multiple voice channels on a single carrier. One type has a capacity for four voice channels, which may in turn be used to provide four teletype channels. The other provides eight simultaneous voice channels on a single carrier. In each instance, operation requires no wires, since transmission is carried out efficiently by automatic radio relay stations which "bounce" the high frequency waves from one point to another completing the desired circuit.

A unique feature of the four-voice channel set is its flexibility. The carrier frequency is held constant by a device which can be adjusted to any carrier frequency in a 20-megacycle band in a matter of seconds. Transmitter and receiver function without radiation of spurious frequencies or harmonics. This is regarded as a marked improvement in the field where a number of units must be used at a single location.

While the four-channel system operates on FM (frequency modulation), the eight-channel unit operates fundamentally on a system of the time-division multiplex employing very short pulses. The radio frequency energy is radiated in a series of short bursts or pulses, each somewhat less than one-half of a millionth of a second in duration.

MOLECULES OF POLYSTYRENE LATEX MAGNIFIED 180,000 TIMES BY IMPROVED ELECTRON MICROSCOPE.

DEEPER INTO THE UNKNOWN

Improvement in Electron Microscope Permits Magnification of Atomic Structure to More Than 180,000 Times Original

SUCCESS in magnifying an infinitesimal particle of atomic structure to a size more than 180,000 times greater than the original specimen—an achievement opening to scientists and disease fighters heretofore unseen realms for research and exploration — was disclosed by the Radio Corporation of America to members of the Electron Microscope Society of America, meeting at Princeton University on November 30 and December 1.

Dr. James Hillier, one of the electron microscopy pioneers of RCA Laboratories, told of developments which have almost doubled the previous accepted bounds of magnification by electronic means. These include design of an electronic "gun" which increases the intensity of the image twenty-fold and improves illumination to such an extent it is possible to use a new telescopic viewing device. Also revealed was an improved lens designed to increase resolving power. Dr. Hillier described how these modifications not only have enabled an operator to examine the final image visually at unprecedented levels of magnification but have made possible photographic exposures as well.

He pointed out that were the magnification (180,000 times) of the modified RCA electron microscope applied to a man of average size, he would tower 200 miles above the earth; should he lie down, his head would be in Washington and his feet in Philadelphia.

This advance makes visible for the first time submicroscopic objects far smaller than the virus and brings molecules into sight. In fact, bacteria can be magnified to the size of a dachshund and were this atomic laboratory animal to have fleas they, too, would be clearly visible and have the approximate size of molecules.

Dr. Hillier said that in laboratory experiments he and his associates had achieved magnifications in which the final images were examined at as high as 300,000 times original size. He said recent improvements had made it possible consistently to obtain resolutions of the order of 20 angstrom units (one unit representing approximately 1½ atoms). This is considered a major advance in view of the fact that during the previous five years only a few exposures of this resolving power had been obtained from more than 25,000 exposures made during the period.

Electrons "Illuminate" Specimen

The electron microscope—hailed by research experts as the greatest aid to science developed in the 20th Century—differs from the optical microscope chiefly in the fact that the specimen to be examined is "illuminated" by directing a concentrated beam of electrons through it. These electrons, in passing through the specimen, are affected in varying degrees according to the density and composition of various parts of the specimen. When the electron beam emerges from the far side of the specimen it bears the pattern or "image" of the specimen. This image is magnified to satisfactory size by magnetic lenses, which correspond roughly to the optical lenses in a light microscope.

Spanish Lessons on Records

A new Spanish language record set titled "New World Spanish," consisting of two albums of ten 10-inch records, together with a 337-page textbook, was announced in November by RCA Victor. Prepared and arranged by outstanding Spanish language authorities in this country, the set is designed to give a practical and authentic approach to the learning of the language by students in classrooms and individuals in homes or clubs.

RCA-NBC FIRS

1923

Dr. V. K. Zworykin, now Associate Research Director of RCA Laboratories, applied for patent on the Iconoscope, television's electronic "eye." *(December 29.)*

1929

Dr. V. K. Zworykin demonstrated an all-electronic television receiver using the Kinescope, or picture tube, which he developed. *(November 18.)*

1930

Television on 6 x 8-foot screen was shown by RCA at RKO-Proctor's 58th Street Theater, New York. *(January 16.)*

NBC began operating W2XBS, pioneer experimental television station in New York. *(July 30.)*

1931

Empire State Building, world's loftiest skyscraper, was selected as site for RCA-NBC television transmitter.

1932

RCA-initiated field tests with 120-line, all-electronic television. *(May 25.)*

1936

Television outdoor pickups demonstrated by RCA at Camden, N. J., on 6-meter wave across distance of a mile. *(April 24.)*

1937

RCA announced development of electron projection "gun" making possible television pictures on 8 x 10-foot screen. *(May 12.)*

Mobile television vans operated by RCA-NBC appeared on New York Streets for first time. *(December 12.)*

1938

Scenes from Broadway play, "Susan and God," starring Gertrude Lawrence, telecast from NBC studios in Radio City. *(June 7.)*

1939

RCA and NBC introduced television as a service to the public at opening ceremonies of New York World's Fair, featuring President Roosevelt as first Chief Executive to be seen by television. *(April 30.)*

Improved television "eye," the "Orthicon," was introduced by RCA. *(June 7.)*

Major league baseball was telecast for the first time by NBC, covering a game between the Brooklyn Dodgers and Cincinnati Reds at Ebbets Field. *(August 26.)*

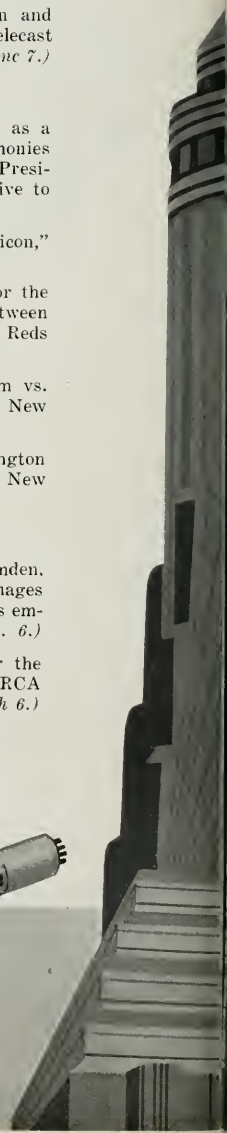
First college football game—Fordham vs. Waynesburg—televised by NBC in New York. *(September 30.)*

RCA receiver in plane over Washington picked up telecast from NBC station in New York, 200 miles away. *(October 17.)*

1940

RCA demonstrated to the FCC, at Camden, N. J., a television receiver producing images in color by electronic and optical means employing no moving mechanism. *(Feb. 6.)*

New York televised from the air for the first time by a plane equipped with RCA portable television transmitter. *(March 6.)*



IN TELEVISION

Television pictures on 4½ x 6-foot screen demonstrated by RCA at annual stockholders meeting in Radio City. *(May 7.)*

Coaxial cable used for first time in television program service by NBC in televising Republican National Convention at Philadelphia and transmitting scenes over New York station. *(June 24.)*

1941

Demonstrating television progress to the FCC, RCA exhibited the projection-type home television receiver featuring a screen 13½ x 18 inches. . . . Television pictures including a prize fight from Madison Square Garden and a baseball game at Ebbets Field, Brooklyn, were projected on a 15 x 20-foot screen in the New Yorker Theatre. . . . Scenes at Camp Upton, Long Island, were automatically relayed by radio to New York establishing a record as the first remote pick-ups handled by radio relay stations. *(January 24.)*

Color television pictures in motion were put on the air by NBC in the first telecast in color by mechanical means from a television studio. *(February 20.)*

RCA-NBC made successful tests with first projection-type color television receiver using mechanical methods. *(May 1.)*

NBC's television station WNBT became the first commercially licensed transmitter to go on the air. *(July 1.)*

1942

First mass education by television was initiated by RCA-NBC in training thousands of air-raid wardens in the New York area. *(January 23.)*

1943

NBC televised major sports and other events at Madison Square Garden for wounded servicemen in television-equipped hospitals in the New York area. *(October 25.)*

1944

NBC announced plans for nation-wide television network to be completed possibly by 1950. *(March 1.)*

1945

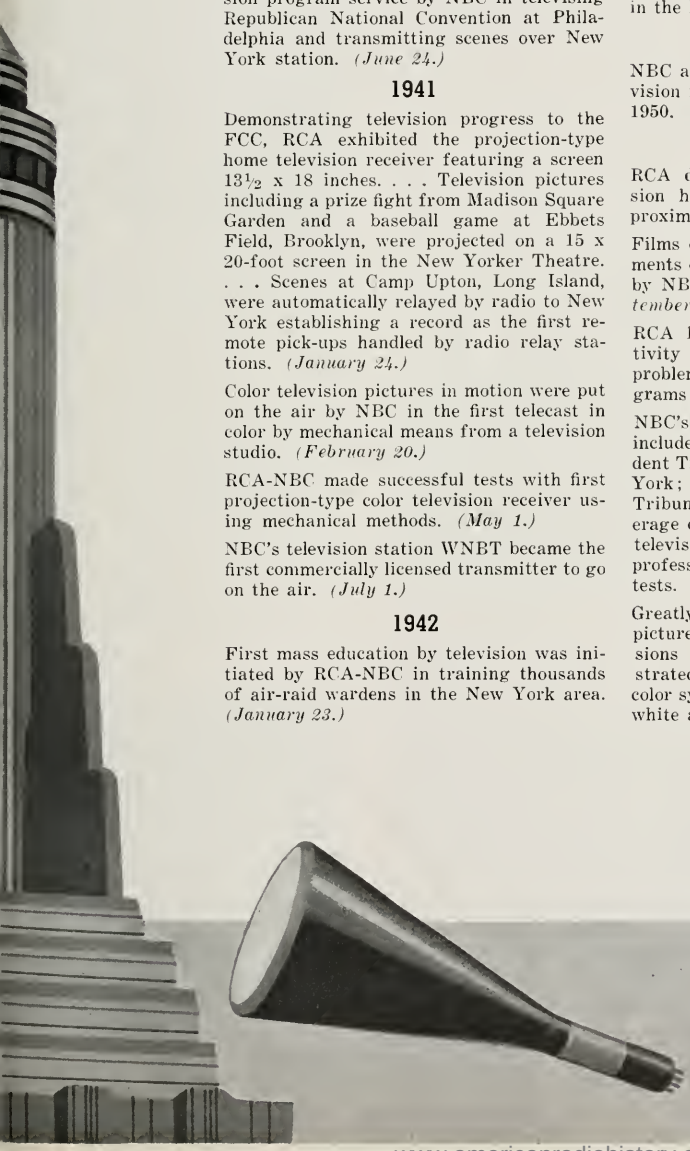
RCA demonstrated projection-type television home receiver featuring screen approximately 18 x 24 inches. *(March 15.)*

Films of Japanese signing surrender documents on board USS Missouri were telecast by NBC station WNBT, New York. *(September 9.)*

RCA Image Orthicon tube of supersensitivity was introduced as solution to major problems in illumination of television programs and outdoor pickups. *(October 25.)*

NBC's expanding television program service included these outstanding events: President Truman at Navy Day exercises in New York; coverage of the New York Herald Tribune Forum, and climaxing record coverage of the year's major sports events by televising the Army-Navy football game, professional football games and college contests.

Greatly improved black-and-white television pictures and color television in three dimensions featuring live talent were demonstrated by RCA at Princeton, N. J. The color system was mechanical; the black-and-white all-electronic. *(December 13.)*



Radar in Aviation

AIR TRAVEL FOR COMMERCIAL AND PRIVATE PILOTS WILL BE SAFER THROUGH USE OF ALTIMETERS AND LORAN EQUIPMENTS.

By H. M. Hucke

Manager, Aviation Radio Sales
RCA Victor Division

ON AUGUST 14, 1945, the Office of War Information issued a 20,000 word release on the subject of Radar. This statement was devoted almost exclusively to the military aspects of the subject and, as a result, the general public was left without an answer to the question, "What will Radar do for us in post-war years?"

Since the term "Radar" covers a wholly new family of radio devices and principles, it is not possible to produce a simple answer to the public's question. For example: Radar principles have been applied to gun directing, aircraft altimeters, precision bombing, precision navigation of both aircraft and marine vessels, warning against enemy bombing attacks, searching for submarines and at least a dozen other special purposes. In order to select those applications which will be useful to the public, it immediately becomes necessary to decide on one field of activity and cover that as a specialized subject.

For this reason, we will choose the field of private and commercial air navigation and limit our discussion to those Radar applications which will have useful application within the next two to five years. These are: Altimeters, Loran and the pictorial type of Radar as applied to collision prevention.

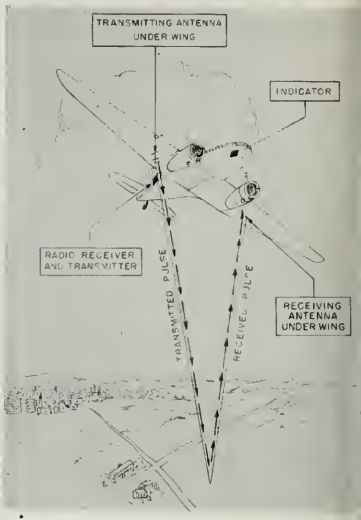
Army and Navy radar altimeters undoubtedly will be used in their present form by many commercial airlines. In the more distant future, radar altimeters may become standard equipment, even in the larger private planes. These altimeters show the actual height above ground or water, rather than the height above sea level or some other predetermined level as do conventional barometric altimeters. In addition, when flying at high altitudes the pilot or navigator need not make air temperature or barometric corrections of the radio altimeter readings. A radio altimeter and barometric altimeter may be used together to obtain corrected barometric readings for weather purposes over long ocean routes.

There are two types of radio altimeters now in general use. One of these altimeters is known as the RCA type AVQ-9. It weighs approximately 34 pounds installed. One of the units contains a small radar transmitter, a receiver, and the necessary power supply equipment. The second unit is a cathode-ray tube indicator and control unit. This indicator can be designed to cover any altitudes normally reached by airplanes.

Two Antennas Required

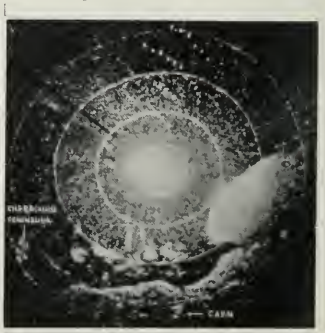
The transmitter - receiver unit may be installed in a remote position, with the indicator located near the pilot or navigator. The required two small antennas are installed on the underside of the wings or fuselage.

The fundamental operating procedure is well known. Radio pulses from the transmitting antenna travel to the ground and are then reflected back to the receiving antenna. The time of travel is measured and converted to distance by the indicator.



RADIO ALTIMETER GIVES EXACT HEIGHT OF PLANE BY MEASURING ELAPSED TRAVEL TIME OF MICROWAVE PULSE TO GROUND OR WATER AND RETURN.

The second type of radar altimeter is the RCA AVQ-6. This equipment weighs approximately 35 pounds installed. One large unit contains the transmitter, receiver, power supply and measuring circuits; one of the small units includes indicating meter and control switches. Two other small units are an altitude selector switch and indicator light unit. The large unit is located at a remote point, and the remaining units are mounted on the



ACTUAL SCOPE IMAGE OF FRENCH COAST AS RECORDED ON RADAR SCREEN IN PLANE. THIS PICTURE WAS TAKEN ON D-DAY.

instrument panel. Two small antennas are required and are mounted on the underside of the plane. This altimeter is available in single and double-range models, with altitude ranges of 0-400 and 0-4,000 feet. An additional feature of this model is an altitude limit switch which, when set to a desired altitude, allows automatic altitude control of a plane. The three indicator lights (red, amber and green) are included to inform a pilot of his altitude with respect to the desired altitude.

Operates on Different Principle

The AVQ-6 altimeter operates on a slightly different principle from the first radar altimeter described. The transmitter sends out a continuous radio-frequency signal whose frequency is continuously shifted up and down over a narrow frequency band at a low audio frequency rate (frequency modulated). Some of the radio energy travels directly to the receiving antenna and some of it travels to the ground whence it is reflected back to the receiving antenna. The energy that travels to the ground and back is delayed in time with respect to the energy going directly to the receiving antenna. Since the frequency of the transmitted signal is continually changing with time, there will be a frequency difference between the reflected and directly received signals. This difference is proportional to the altitude. Frequency-meter type circuits measure this frequency difference and cause the meter to indicate the plane's altitude above ground.

Both the pulse and the frequency modulation types of altimeters are used by the Army and Navy, and both will be used by civilian aviation. Designed by RCA, each has certain features that make it most suitable for certain applications. The FM altimeter in its present form is particularly useful at altitudes below a few hundred feet. This is the condition encountered in instrument landing.

The Loran navigation system is the outgrowth of a British system which was designed to guide bombers in their air-raids over Germany. The British principles were further developed by the Radiation Laboratory for the Army and Navy in this country. A series of ground stations has been installed on an almost world-wide basis in the past two years. Most of the work on the airborne receivers necessary to operate with the ground stations was done by the RCA Industrial Service Laboratory in New York and the latest design was manufactured at the RCA plant in Camden.

The Loran aircraft receiver is essentially a navigator's equipment rather than a pilot's, since it is used to obtain fixes on long over-ocean flights when celestial navigation is impossible because sun and stars are obscured by clouds. The time required to take and compute the fixes with the Loran is much shorter than celestial observation and the accuracy of the Radar system is as good as or better than that of the astronomical system. Fixes can be taken at distances of several hundred miles and sometimes at ranges of more than 1,000 miles from the ground stations.

Radar As Anti-Collision Device

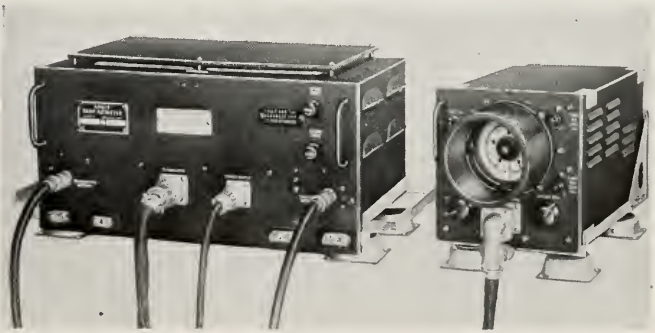
Collision prevention is one of the civilian applications of Radar most often mentioned. A good collision prevention device would be a valuable instrument, especially to a pilot "stacked up" in a solid overcast over a busy metropolitan airport. To be useful as a collision prevention device, a Radar system must not only detect the presence of an airplane and determine its distance, but it must also determine the altitude of the detected airplane with respect to the airplane carrying the detector, and the direction in which the detected airplane is traveling. Furthermore, the equipment should warn the pilot automatically of impending danger. It should not require the continuous attention of an operator in the airplane.

Radar Meets Requirements

Some of these requirements can be met by airborne equipment providing a Radar "picture." This "picture" will show the distance and direction of other airplanes but not their altitudes. A small auxiliary radio transmitter connected to an altitude measuring instrument installed in all airplanes could furnish the altitude information. (Such a device for automatically broadcasting altitude readings was considered by the Civilian Aeronautics Authority several years ago.) The combination of the two devices could furnish all information needed, but the full attention of an operator in the airplane would be required.

From the foregoing analysis, it is apparent that the commercial airlines will benefit immediately from the use of Radar altimeters and the Loran, while only the larger types of private planes will be able to carry these devices. Both private and commercial planes will benefit from the installation of Radar collision and traffic control devices on the ground, but several years of experimental work will be required before such systems will become generally available.

COMPLETE ALTIMETER INSTALLATION DESIGNED BY RCA TO COVER ANY ALTITUDE NORMALLY REACHED BY AIRPLANES.



HIGH ON THE STADIUM ROOF, AN NBC TELEVISION CAMERA CATCHES THE FORMATION OF WEST POINT CADETS PRIOR TO THE ARMY-NAVY FOOTBALL GAME AT PHILADELPHIA. PICTURES WERE TRANSMITTED TO WNBT, NEW YORK, OVER AN 80-MILE COAXIAL CABLE.

TELEVISION IS READY TO GO!

In Address to Radio Executives Club, Dr. Jolliffe Declared that All Elements of a Sight-and-Sound System Now are Ready for Public

GREATLY improved by wartime developments, television is ready to go, Dr. C. B. Jolliffe, Executive Vice President in Charge of RCA Laboratories, told the Radio Executives Club of New York, at the Hotel Roosevelt on November 15. All the elements necessary to the immediate expansion of an eminently satisfactory television service to the public have been developed, he said, and there is no technical reason for further delay in welding them into a system that "will give the American public a wonderful new service for which it has been waiting a long, long time."

Taking up in turn the camera, transmitter, network facilities and receiver, he highlighted the respective advances that have been made since 1940 and described their collective effect in producing high quality pictures for the home.

"Before the war," he said, "we used the Iconoscope—the "eye" of the television camera—to televise drama, sports events, films and other program material. The quality was good and the picture was reliable but we needed an excessive amount of light in the studio and fair weather out-of-doors.

"We also had the Orthicon, a pick-up tube approximately ten times as sensitive as the Iconoscope. It was particularly useful for outdoor events, such as football and baseball, but because it did not provide quite as much picture detail as the Iconoscope, the Orthicon did not solve the studio problem."

The next step, Dr. Jolliffe said, was the Image Orthicon, a development only recently demonstrated, which provides a camera tube 100 times more sensitive than the Orthicon.

"Although it is still in the development stage, the Image Orthicon is so good that we have every reason to believe that it can be used equally well in or out of the studio. Moreover, we can use it in other places where it was previously impossible to pick up a television picture at all.

"Using no more lights than are normally available in the ballroom of the Waldorf-Astoria Hotel, the National Broadcasting Company televised the recent Navy Day Dinner with the Image Orthicon. From this, it is apparent that we can take the television audience to the circus and the rodeo, to political conventions and to the halls of Congress."

Portability of equipment, another important factor in versatile pro-

gramming, he said, has been helped greatly by the development of a complete set of cameras and associated units that can be placed in a station wagon and carried quickly to any desired point.

By utilizing experience and knowledge gained through their work on radar, Dr. Jolliffe said, engineers now are able to build transmitters that will produce all necessary power to give adequate service on any frequency within the present wave band.

"Before Pearl Harbor, we had available transmitters capable of operating at 5 kilowatts of power on frequencies between 40 and 108 megacycles. Now we can build them to operate at 50 kilowatts up to 108 megacycles and at 5 kilowatts all the way up to 300 megacycles. Furthermore, for the 5-kilowatt transmitters, we can design new antennas with sufficient gain to make the power equivalent to from 20 to 50 kilowatts."

Improvements in home receivers, he pointed out, are comparable to those made in cameras and transmitters. Previous objections to the small size of the reproduced image, he said, have been overcome by a new type of projection tube which provides a picture size of approximately 18 by 24 inches. In addition, he said, projection receivers have been improved to the point where the reserve of screen brightness permits showing of pictures in daylight.

Equals Best Home Movies

"The picture detail and contrast are good," he declared. "The result is comparable to the best 16 mm. motion picture."

Knowledge gained during the war, Dr. Jolliffe stated, will contribute not only to an improved quality in television pictures but also to lowering the cost of television receivers.

"We feel confident that we can manufacture direct-viewing and projection-type receivers at prices within the reach of the public in various income groups. The range probably will be from $150 to $200 for excellent direct-view table models, to $500 for the large projection console type."

The design of television antennas for private dwellings and small apartment houses, Dr. Jolliffe said, presents no problem.

"But for large apartment buildings," he added, "there is still work to be done in developing a satisfactory distribution system. This difficulty can be overcome in a short time. We have the necessary engineering knowledge, and the only question is one of design."

Network facilities, he said, are available in two forms, radio relays and coaxial cables, both of which are ready for immediate practical, commercial use. An automatic unattended radio relay system developed by RCA engineers and used as the basis of the multi-channel telegraph demonstration by Western Union a month ago can be utilized for the distribution of television for long distances across country.

Relay Tests to Continue

"We are not alone in this field," he continued. "The American Telephone and Telegraph Company recently revealed its radio relay developments, and has announced its intention of carrying on experiments in television relaying between New York and Boston."

A comparable station interconnecting system, he said, using coaxial cables installed by the Bell System, is spreading out across the nation and will span 1,500 miles by the end of this year.

In reviewing the coming demand for technical and servicing personnel in the television field, Dr. Jolliffe declared that the chief element of such a corps—trained manpower—is at hand. During the war, he reminded Club members, the armed forces trained thousands and thousands of men to maintain and operate complicated radio-electronic communications, navigation and radar equipment. This equipment incorporates most of the elements of television, ultra-high frequencies, cathode-ray tubes, wide band amplification, timing (synchronization circuits), etc. With some additional knowledge, the men trained in communications and radar will be ready for work as studio and transmitter technicians and as service men for home television sets.

Discussing permanency of present standards, Dr. Jolliffe stated that "the bugaboo of quick obsolescence in television has been overemphasized."

"Of course, there will be obsolescence; that is the only way the industry can grow. As long as research and development men work in the field there will be new things. If we wait for the perfect system, it will always be 'around the corner,' for men will think and will make new discoveries.

"The time is here when management must take television out of the engineering laboratory and give it a chance to grow up. We have coddled it as a baby for too long. It is bigger and stronger than we have thought. Its first strides will be bigger than a giant's, for it is equipped with Seven League Boots.

"By this I don't mean to say that television has reached the top of its technical development. We shall certainly see many more advances this year, next year and in the years to come.

"Ultimately, of course, we may expect such advances in all-electronic television as pictures in three dimensions and in color. We will have program transmission over world-wide networks, too. But these developments are still in the laboratory stage, and it will be a few years at least before they are ready for use.

"Meanwhile, we have the 'makings' of an industry that in all likelihood can eventually produce an annual income of between one and five billion dollars. Why wait?

Dividend Declared by RCA

At the Board of Directors meeting of the Radio Corporation of America held in New York on December 7, Brig. General David Sarnoff, President of RCA, declared the following dividends:

On the outstanding shares of First Preferred stock, 87½ cents per share, for the period from October 1, 1945, to December 31, 1945, payable in cash on January 2, 1946, to holders of record of such stock at the close of business December 17, 1945.

On the outstanding shares of Common Stock, 20 cents per share, payable in cash on January 29, 1946, to holders of record of such stock at the close of business December 21, 1945.

DR. C. B. JOLLIFFE
EXEC. VICE PRESIDENT
IN CHARGE OF
RCA LABORATORIES
DIVISION

E. W. ENGSTROM
VICE PRESIDENT IN
CHARGE OF RESEARCH,
RCA LABORATORIES
DIVISION

E. C. ANDERSON
VICE PRESIDENT IN
CHARGE OF COMMER-
CIAL DEPARTMENT,
RCA LABORATORIES
DIVISION

T. H. MITCHELL
EXEC. VICE PRESIDENT
RCA COMMUNICA-
TIONS, INC.

L. W. TEEGARDEN
VICE PRESIDENT
IN CHARGE OF THE
RCA TUBES

J. W. MURRAY
VICE PRESIDENT
IN CHARGE OF THE
RCA VICTOR RECORDS

J. H. MC CONNELL
VICE PRESIDENT AND
GENERAL ATTORNEY,
RCA VICTOR

MEADE BRUNET
VICE PRESIDENT IN
CHARGE OF THE EN-
GINEERING PRODUCTS
DEPARTMENT,
RCA VICTOR

J. B. ELLIOTT
VICE PRESIDENT
IN CHARGE OF
HOME INSTRUMENTS,
RCA VICTOR

RCA EXECUTIVES PROMOTED

General Sarnoff Makes Announcement, Affecting Officials in New York, Camden and Princeton, Following Board Meeting on December 7.

ELECTION of E. W. Engstrom as Vice President in Charge of Research of RCA Laboratories Division and E. C. Anderson as Vice President in Charge of the Commercial Department of RCA Laboratories Division was announced December 7 by Brig. General David Sarnoff, President of the Radio Corporation of America, following a meeting of the Board of Directors. Dr. C. B. Jolliffe, Vice President in Charge of RCA Laboratories, was elevated to Executive Vice President in Charge of RCA Laboratories Division.

At the same time, five officials of the RCA Victor Division were elected Vice Presidents in charge of their respective Departments of RCA Victor. They are Joseph B. Elliott, Vice President in Charge of the RCA Victor Home Instruments; Meade Brunet, Vice President in Charge of the RCA Victor Engineering Products; L. W. Teegarden, Vice President in Charge of the RCA Tubes; J. W. Murray, Vice President in Charge of the RCA Victor Records, and J. H. McConnell, Vice President and General Attorney of RCA Victor.

Thompson H. Mitchell, at present Vice President and General Manager of RCA Communications, Inc., was elected Executive Vice President of RCA Communications.

Mr. Engstrom, as Director of Research of RCA Laboratories, supervised research and engineering which resulted in wartime advances in radar, television, radio and other electronic developments. Prior to his appointment to that post in 1943, he had served for thirteen years in RCA research positions. He is a graduate of the University of Minnesota and a Fellow of the Institute of Radio Engineers.

Mr. Anderson has been Commercial Manager of RCA Laboratories for the past five years. He joined the Company in 1922 as a sales representative in the New York area, and subsequently served as Assistant Manager of the RCA Tube Department and RCA License Administrator. He is a graduate of Columbia University, Columbia Business School and Harvard Graduate School of Business and Administration.

Mr. Elliott, who has been active

in the radio-phonograph sales field for 17 years, was appointed General Manager of the RCA Victor Home Instruments last July, returning to the RCA organization after serving for a time as a sales and advertising executive with another company. During the war, he was on special assignment as manager of RCA's field procurement operations and helped to organize the Company's huge wartime procurement program. He is a graduate of Georgia School of Technology and Columbia University.

Mr. Brunet became associated with RCA in 1921. He was in charge of production and distribution of RCA Radiotrons and Radiolas for five years and was appointed manager of the Radiola Division. In 1930, he advanced to Sales Manager, and later was promoted to various executive positions, including that of General Manager of the Engineering Products. He is a graduate of Union College.

Mr. Teegarden came to RCA in 1930. Three years later, he was elevated from East Central District Manager for radio tubes to tube sales head in the New York area, and in 1936 became New York District Sales Manager for all RCA products. He took charge of tube renewal sales in Camden in 1938, and soon after was appointed Manager of RCA's Tube and Equipment Department. Earlier this year he was named General Manager of the RCA Tubes.

Active in the record business since 1928, Mr. Murray joined RCA Victor three years ago as General Manager of the Phonograph Record Commercial Division, and was promoted to General Manager of the RCA Victor Records. From 1932 until 1939, he was engaged in the sales and manufacture of phonograph records in the Far East. Upon his return to this country, he continued these activities in the recording field. He is a graduate of Columbia University.

Mr. McConnell joined the Company in 1941 as a member of the Legal Department in Camden, and the following year he was appointed General Counsel of RCA Victor. He became General Attorney of the Division this year. A graduate of Davidson College, Davidson, S. C., Mr. McConnell received his Doctor of Laws degree at the University of Virginia.

IMPROVED ACOUSTICS IN NEW NBC STUDIO

A new studio embodying many distinctive features designed to improve its acoustics while presenting a pleasing atmosphere for audiences was unveiled recently by the National Broadcasting Company in Radio City.

Located on the sixth floor of the RCA Building and designated 6D, the new studio is equipped with 227 removable seats. The room is 30 feet wide and 67 feet long, with a stage 34 feet deep.

The ceiling of the new studio is sawtooth in shape. This irregularity reflects sound in a diffused pattern and at the same time gives proper reflection of the fluorescent lighting. To prevent stray humming noise, originating in the lighting units, from reaching microphones, control apparatus for the fluorescent lamps is installed outside the studio.

The rear wall of the stage is wholly reflective. Applied on it at random are thin global sections or "diffusispheres," as they have been termed. These rounded surfaces disperse sound waves, thereby eliminating the possibility of disturbing echoes. Draperies hung on the rear wall of the stage control acoustical conditions for proper microphone balance.

The side wall, into which the control room and clients' booth are inset, is composed of a series of non-parallel surfaces which prevent sound waves from being constantly reflected back and forth between opposite sides of the studio. Side-by-side placement of the two booths is unusual in studio design. This arrangement permits occupants of the clients' booth to observe technical operations through the plate-glass partition between the two rooms.

A different acoustical treatment is applied to the opposite side wall. Irregularly-shaped areas, like huge patches, extend outward a short distance from the wall, and the intervening area is covered with random-spaced "diffusispheres."

The rear wall of the studio is flat, treated over the major portion with a rock wool blanket under a perforated asbestos board to improve acoustical characteristics.

Construction of 6D was carried out under the supervision of O. B. Hanson, NBC Vice President and Chief Engineer. George M. Nixon handled the acoustical design. Architectural supervision was by W. A. Clarke and C. A. Rackey directed installation of equipment.

VIEWS OF NEW NBC STUDIO IN RADIO CITY SHOWING UNUSUAL FORMS OF WALL AND CEILING TREATMENT TO DIFFUSE SOUNDS AND PREVENT TONE-DESTROYING ECHOES. THE PATTERN OF ROUNDED SURFACES AND EMBOSSED PATCHES IS DIFFERENT FOR EACH WALL.

NBC SETS UP PLANNING GROUP

NETWORK ESTABLISHES NEW DEPARTMENT TO INITIATE DEVELOPMENTS IN POLICIES, OPERATIONS AND STATION RELATIONS

By William S. Hedges
Vice President in Charge of Planning and Development, National Broadcasting Company

RECENTLY the National Broadcasting Company established a Planning and Development Department. This does not mean that heretofore there had been no planning in NBC. The conspicuous progress of NBC since its formation in 1926, had been accomplished by ideas and planning emanating from practically every department of the company. The development of a nation-wide network was based upon the principle of a geographic distribution of clear channel, regional, and local stations so located as to avoid undue encroachment of any one station upon the normal service area of another, with the ultimate objective of securing maximum coverage possible of the radio homes in the United States. Despite the limitations of unscientific (from a radio standpoint) distribution of populations and lack of availability of stations of the right type in every desired city, the National Broadcasting Company network today closely approaches the objectives set down by the Station Relations Department eight years ago. This is an example of planning and implementing a plan by persistent effort throughout the years.

Planning is as natural an instinct for mankind as the instinct of survival—indeed it plays a very large part in that basic instinct, for survival against the competition of other creatures endowed with intelligence can be accomplished only through planning. The old caveman's first plans were concerned with providing food and shelter for his family and protection against wild animals and marauding fellow humans. Fundamentally, mankind has not changed. To survive in business it is necessary to plan—to devise methods of improving the service now being rendered and to lay plans for utilizing new ideas, new technical devices and new procedures so that, as a minimum goal, competition will always be met if not surpassed.

During 1945, broadcasting celebrated its twenty-fifth anniversary. They have been fruitful years, in which a great industry has been developed, a great industry which has founded its success upon service to the American public. There have been many advancements in the art and science of broadcasting but the evolutions of the past twenty-five years have not wrought technical changes as sweeping as those that now confront us.

Changes Foreseen Before War

We could see those changes coming even before the war. FM had been introduced; television was a reality, and doubtless both would have been offered to the public on a large scale had it not been for the intervention of war. Neither government nor industry could devote much attention to FM or television while the war was on, but within little more than three months after V-J Day new allocations have been issued by the Federal Communications Commission for both FM and television. In fact the allocations were announced during the same month in which the broadcasting industry was celebrating Radio Week.

Thus twenty-five broadcasting years mark the end of an era and the beginning of a new one during which we can anticipate more revolutionary changes in the broadcasting system than have occurred during the first twenty-five years of broadcasting. It is not inconceivable that FM will supplant most local and many regional stations; nor is it impossible to visualize a complete integration of television with the sound broadcasting system. Such possibilities demonstrate the necessity for planning,—planning ways and means of providing the best service to the American public, utilizing the new systems of which we now have knowledge and the still newer developments which are beyond the horizon and hence presently unknown to us, and planning to maintain a position within the industry whereby the rewards will be commensurate with the service rendered.

Full Network Plan Succeeds

When it became apparent that a more widespread distribution of network programs of the more popular type was necessary in order for broadcasting to render a maximum service to American listeners, wherever located, a plan had to be devised. It was the full-network discount plan, which served as such a fine inducement that most of the programs on NBC now exceed the minimum requirements of the plan.

The National Broadcasting Company was less than ten years old, when it moved to Radio City, with the finest studios ever seen in broadcasting. It had, by that time, already acquired a fine plant in Chicago, with a studio and office setup which was far more complete in every detail than NBC's original home at 711 Fifth Avenue, New York City. But in spite of its elaborate facilities in New York and Chicago, NBC recognized the fact that Hollywood was destined to become a program originating point of tremendous importance. To meet this situation a new studio and office building was planned and constructed, and Hollywood today enjoys top rank as a program origination point.

One of the most far-seeing planners in the entire company has been the Engineering Department. It was necessary for the engineers to conceive of broadcasting on a much vaster scale than has ever

been dreamed of before, when they made their plans for the installations at Radio City and thoughtfully provided for expansion even beyond what might have been regarded back in 1931 as the ultimate in planning. The Engineering Department must now concern itself with plans for FM and Television. They must be alert to every technical change; they must, as they have in the past, devise practical application of dreams and inventions of laboratory workers.

With all of these examples—and there are many more—of successful planning for NBC, why have a Planning and Development Department?

It all goes back to a fundamental concept which Niles Trammell, president, and Frank E. Mullen, vice-president and general manager, have of company management. They believe in the teamwork principle, which they have carried out by the establishment of NBC's Management Committee, which is comprised of the officers and department heads and with the creation of the Staff Operating Committee, made up of key men and women from each department.

Company Will Be Stronger

Through coordination of thinking, planning and acting the company will be stronger and more efficient in its operations and in meeting the problems of the future. Every department will be encouraged to continue its own planning, but the plans of each department will clear through the Planning and Development Department in order that any plan affecting other departments may be coordinated with the needs and desires of all departments concerned.

The Manager of the Planning and Development Department is James M. Gaines who brings into the department eight years of diversified broadcasting experience gained in publicity, advertising and promotion, research, station relations and programming. Direction of all engineering and facilities problems comes under the supervision of Philip I. Merryman who for many years has served as Director of Facilities Development and Research and in the Station Relations Department. The financial advisor to the Department is Harry F. McKeon, Controller of the National Broadcasting Company.

An objective view of NBC's new Planning and Development Department was contained in a recent issue of the business letter entitled "Planning for Business".

Under the heading "BUSINESS PLAN OF THE WEEK" the article said in part:

> "Recently (the National Broadcasting Company) decided to establish a planning and development department. A vice president was put in charge to be assisted by four executives . . . these are an advertising and promotion man, a facilities-development executive, an engineer, and a controller.
>
> "The separate departments at NBC still do planning, but keep the new department acquainted with their activities. Thus one department's planning that may have a bearing on some other plans can be coordinated with those. At the same time, possible conflicts and duplications in connection with the work of the new department are prevented through frequent exchanges of information.
>
> "The planning department . . . also . . . initiates plans that are sometimes worked out by other departments. Knowing that departments can get so close to their jobs that they fail to see opportunities to do new and better things, the . . . (Planning) department is constantly on the alert to uncover opportunities for improvements.
>
> "The new department isn't cumbersome. It operates elastically, because rapid adjustability is especially required in the fast-moving broadcasting business.
>
> "Today at NBC the planners take up a finished plan with the president and the general manager, who can usually make prompt decisions on the broad principles presented with the plan. Thus they avoid the burden of the planning details that formerly hampered them in setting policy and in administration."

NBC STARS AND SHOWS SWEEP POLL OF EDITORS

Network Wins 15 Out of 25 First Places in Annual "Fame" Contest

NBC programs and personalities scored 15 out of 25 first awards—more than all other networks combined — in Motion Picture Daily's 10th Annual "Fame" poll of radio editors, columnists and critics in the United States and Canada, announced on December 12.

Bob Hope won three top honors in the poll. In addition to capturing the "Champion of Champions" designation, which is the highest program classification, for the fifth consecutive year, the NBC comedian was voted radio's "best comedian" and his program was voted the "best comedy show."

The remaining awards in the "best comedian" classification went to Fred Allen, who placed second; Ed Gardner and Edgar Bergen, tied for third, and Jack Benny, fourth—effecting a clean sweep for NBC in this division. NBC also took every honor in the "comedy show" classification, with the Bob Hope program first, Fibber McGee and Molly second, and Fred Allen's show third.

Wins Award for Sixth Time

Another perennial NBC winner was Bill Stern. His selection as the best sportscaster of 1945 marked the sixth time he has won this award.

Additional highlights of the poll were the selections of H. V. Kaltenborn as the best news commentator, Fred Waring's musical show, as the best daytime program, and Bing Crosby's designation as radio's best master of ceremonies and most popular male vocalist.

Other NBC winners were Fibber McGee and Molly, best comedy team; John Charles Thomas, best male classical vocalist; Gladys Swarthout, best female classical vocalist; Dinah Shore, best female vocalist in the popular music class; Harry von Zell, best studio announcer; Arturo Toscanini, best symphonic conductor, and "Information Please," best quiz show.

ENGINEERS VISIT RUSSIA

RCA Group Inspects Radio and Electronic Factories in USSR and is Impressed by Soviet Interest in American Developments.

ON May 10, 1945, four RCA men climbed aboard a big transport plane at La Guardia Field, New York. Three months later the group, consisting of Karl Dryer, E. A. Laport, B. F. Moore, Jr., and Dr. B. E. Shackelford, returned to the same take-off spot on a larger Army transport plane. In the meantime, they had crossed the Atlantic by ship from Mobile, Alabama, travelled down the Mediterranean to Istanbul, Turkey, across the Black Sea to Odessa, U.S.S.R., and thence by train to Moscow, their main objective. During their stay in Moscow, they astonished even American consular and Embassy officials with their ability to work rapidly and in close harmony with Soviet commissariats and high engineering officials of the U.S.S.R. Finally, after completing their mission in the Russian capital the quartet started homeward on August 1 by way of Leningrad, Helsinki and Stockholm where a west-bound transport plane picked them up for a fast hop to New York.

The trip was made with a two-fold purpose, viz., to study technological conditions in the U.S.S.R. and to renew valuable commercial friendships made with Russian scientists who have visited Camden, Harrison and Princeton during and before the war years.

Representatives of Intourist, the Soviet organization which assists foreigners in their travels and hotel arrangements in that country, met the RCA delegation at Odessa and were at the service of the group throughout its stay in Russia. Not only did Intourist smooth out many of the problems that a visitor encounters in the Soviet Union but it arranged for registration with the militia, obtained theater tickets and assisted in arranging a banquet which the RCA visitors later gave for its hosts.

Travelers Get Cordial Welcome

The four men found a welcome and cordiality wherever they went. Two of the technical organizations which direct Soviet manufacturing and operating activities in radio and allied fields joined in giving the travelers three of the fabulous banquets for which the Russians are famous. Each dinner lasted for four or five hours.

During their entire stay in the U.S.S.R., the Americans were free to circulate in the community as they pleased, without special permission or passes. This freedom gave them an excellent chance to study the people and their customs. They made the most of the opportunity. This was a study well repaid, for the Russians were found to be very pleasant associates. On the trains and in other places where contacts were made, the individual citizen was friendly and cordial and often went out of his way to give information or be helpful. It also was found that Russians and Americans are in many ways alike and have many similar fundamental points of view. Consequently, they did not always feel in a foreign land, but sometimes very close to home.

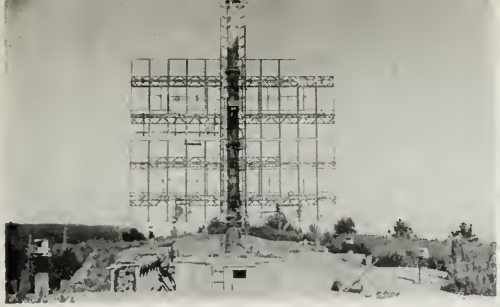
The group inspected factories manufacturing radio tubes and other items, and discussed with Soviet engineers current trends in radio development and equipment. Soviet engineers were keenly interested in developments in the United States during the war years when they had necessarily been engaged in the primary business of defending their own cities and homes. The devastation resulting from the fighting was only too evident in the factories as well as in the countryside.

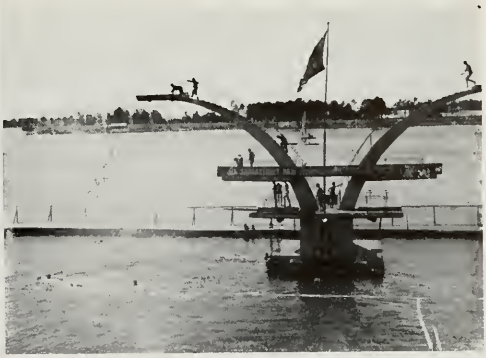
Talks with the various commissariats early revealed the deep interest of the Russians in late American equipment. They discussed the status of AM and FM receivers and transmitters and asked for details on the progress of television and facsimile in the United States.

Fear of Delays Unfounded

When the group arrived in Moscow, consular officials warned them that the Russians were likely to be delayed in starting the many joint meetings which had been scheduled. Hearing this, the visitors studied the calendar and wondered how long they would be delayed beyond their intended return date. Almost immediately they discovered that their fears were completely unfounded. By the time the Americans had ex-

LEFT: RIVER BOATS AT THEIR DOCK ALONG THE STOCKHOLM WATERFRONT. BELOW: A VIEW OF ONE SECTION OF GORKI STREET IN MOSCOW, ONE OF THE PRINCIPAL THOROUGHFARES OF THE RUSSIAN CAPITAL.





THE HUGE GRID OF AN EARLY GERMAN RADAR INSTALLATION DOMINATES THE COASTLINE ON A FINNISH SHORE. RIGHT: FLARING HORNS AND CROSSWAYS PROVIDE PLATFORMS FOR ACQUATIC SPORTS AT A MOSCOW VACATION SPOT.

pressed their final thanks and their genial hosts had replied with a sincere "Do Sveedanye!", the two groups had held 25 meetings and had visited many important spots. Frankly amazed, a representative of the U. S. Embassy could only ascribe this unusual accomplishment to the ability of the RCA delegation to work in full harmony with the Russians.

General living conditions in U.S.S.R., the visitors soon discovered, vary with the city and the extent of the war damage. At Odessa, headquarters were at the Hotel London, one of the first buildings in that Black Sea city to be rehabilitated. This probably was because the hotel was only slightly damaged and could be restored to use as soon as the necessary electrical and water supplies had been made available. Furnishings and accommodations showed the effect of the war years. There was evidence that many of the people had had insufficient food, although their appearance indicated that conditions were better. Although the party felt the extreme scarcity of luxury items, it was everywhere given the best available.

Moscow Conditions Are Better

Conditions were much better at the Intourist Hotel National in Moscow. Moscow had escaped for the most part the usual bombardment and bombing, and the hotels had been kept in condition in order that the necessary visitors to Moscow might receive the best possible hospitality. Each room assigned to the Americans was equipped with hot and cold water, and one room had private bath. The furnishings were not new but much superior to those found in many hotel rooms in our own country. Housekeeping and cleaning activities were so continuous that sometimes it would have been preferable to have the premises remain slightly dirty.

Menus Are Standardized

Regular hotel fare in Moscow was rather on the dull and uninteresting side, relieved occasionally by the inspiration of some dish which seemed to bring a breath of home. Within the limits of the ration tickets and powers of persuasion over the dining room staff, a particular dish was often made a repeat item. It was very pleasing, therefore, when the RCA foursome were invited to the American Embassy for luncheon or dinner. At intervals, it was desirable to patronize the government-operated commercial restaurants where ration cards were not necessary but where a good meal was costly. For instance, a typical menu included meat, 55 rubles; salad, 35 rubles; coffee, 10 rubles, and a plate of ice cream, 40 rubles. Since a ruble is equivalent to about 20 cents a complete dinner meant an outlay of nearly $40 a person.

The returned engineers will not soon forget their train passage through the Ukraine from Odessa to Moscow. Intourist secured for them a compartment with four berths in the only soft class car on the entire train but it was not an easy trip. The better rolling stock had been destroyed by the Germans and that which remained was not in good condition. There was no restaurant car and the food offered for sale at way-stations, while intriguing in appearance, was not recommended for recently arrived foreigners. The U. S. Army Mission in Odessa had supplied a huge sack of Army rations and utensils, and this largess, supplemented by hard-boiled eggs and black bread bought along the way, made mealtime worthwhile and interesting.

The railroad between Odessa and Moscow suffered heavily from the war. Every bridge, trestle and culvert had been destroyed and rebuilt with wood. A large proportion of the trackage had been pieced out with short sections of scrap rail, some of the replacements not over 5 feet long. As a consequence, train speed was limited and the 1,200 kilometer trip consumed 60 hours.

Subway Well Run

The subway, it soon was discovered, affords the best transportation in Moscow. The trains are clean and bright and are run on schedule. The fare is 40 kopecks or about 7½ cents.

Much of the success of the visit of the RCA group, from the personal standpoint as well as from that of business, was due to the most effective and cordial assistance of the staffs of the American Embassy and American Military Mission in Moscow. No problem was too complicated or too simple for them to be of real help, always given graciously.

FRANK M. FOLSOM, EXECUTIVE VICE PRESIDENT IN CHARGE OF RCA VICTOR (CENTER), DISCUSSES THE RCA-GIMBELS TELEVISION MERCHANDISING TEST WITH BERNARD GIMBEL (LEFT), PRESIDENT OF GIMBELS, INC., AND ARTHUR C. HOFFMAN, EXECUTIVE HEAD OF GIMBELS-PHILADELPHIA.

250,000 SEE STORE VIDEO

Television Proves Its Effectiveness as Merchandising Medium in First Department Store Experiment Conducted at Gimbels in Philadelphia

THE first extensive test of television's role as an advertising and merchandising medium for department stores was successfully carried out in October and November at the Gimbels-Philadelphia store in cooperation with the RCA Victor Division. In a run of three weeks, the intra-store displays were witnessed by 250,000 people.

Supervised by RCA Victor engineers, a complete studio and control facilities were set up in the store auditorium with accommodations for an audience of 500 at each program. RCA Victor television receivers were installed at 20 viewing centers or "telesites" throughout the store's seven floors, each room seating an average of 15 people. More than two miles of coaxial and audio cable were needed to connect the studio with the "telesites."

At the beginning of the project, specially written shows consisting of demonstrations of goods and services interspersed with entertainment were staged every half hour with each show limited to ten minutes. Audience reaction was carefully checked and from the information thus obtained, the studio productions were altered to derive the most favorable consumer effect. It was soon determined that shoppers preferred to watch actual demonstrations with little or no accompanying entertainment and the staging format was changed accordingly.

In conjunction with the regular shows, RCA Victor prepared a colorful exhibit of the company's television equipment and allied electronic and communications products in the foyer, adjacent to the auditorium. Among the products shown were the electron microscope, advance models of broadcast receivers and a display of tubes ranging from the miniatures used by the Army and Navy to the huge power tubes that transmit broadcasting and television programs.

Window Exhibits a Feature

One of the high-lights of the intra-store demonstration was the display of a series of five attractive television window exhibits. These displays were designed for RCA Victor by W. L. Stensgaard and Associates, noted industrial designers. The windows provided a graphic story of the evolution of television and the important part RCA has played in making possible this modern type of entertainment and merchandising. Their position in the street-level windows on the side of the store facing Market Street, one of Philadelphia's busiest thoroughfares, drew many passersby into the store to watch the actual programs.

In its final report on the "Shop-By-Television" experiment, Gimbels-Philadelphia officials said that the "store's sales for the period showed a considerable improvement" over Federal Reserve averages for the district.

The "Shop-By-Television" demonstration opened at the Gimbels-Philadelphia store on October 23 and extended through November 14. According to the store's report, 124,987 persons were checked into the auditorium studio to witness the actual telecasting program and another 100,000 made up the estimated attendance at the 20 telesites.

Visitors Give Impressions

In an attempt to evaluate the customers' reaction to television, RCA Victor's Market Research Department conducted a poll by questionnaire cards distributed to viewers at the telesites. Analysis and tabulation of the 2,373 returns showed that:

(a) More than 88% believed intra-store television would become a big aid to the store shopper.

(b) More than 62% indicated the "Shop-By-Television" feature had attracted them to the store.

(c) A greater percentage indicated "Yes" when asked if they intended to visit the departments selling the merchandise displayed during the shows.

(d) About 70% said this was the first time they had seen any type of television.

Because of the interest in intra-store television shown by department store executives throughout the country, RCA Victor has prepared an illustrated brochure titled "RCA Victor Television—Opening a New Merchandising Era for Department Stores," which has been

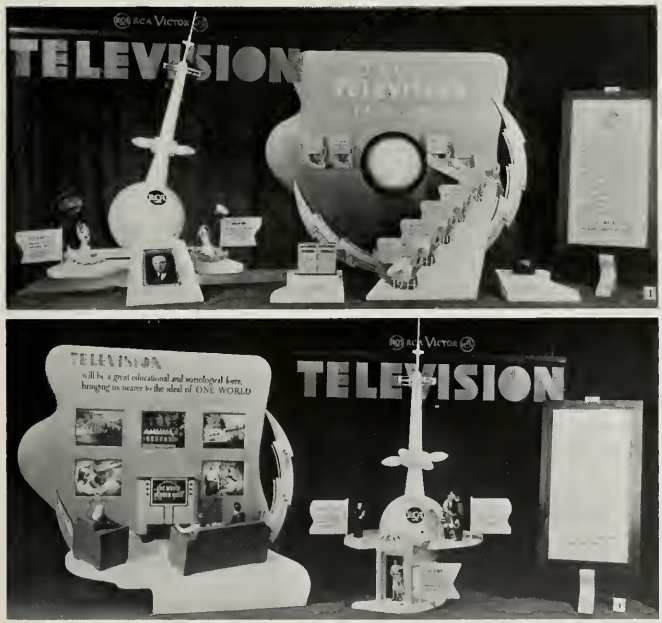
widely distributed to leaders in the fields of advertising, selling and marketing.

According to the booklet, progressive management can profit in four ways from the use of video. The store may operate a complete television station, broadcasting entertainment and educational programs, to extend the firm's prestige and add to the force of its advertising. The second way is to operate a fully equipped studio within the store itself, televising fashion shows, product displays and demonstrations, which could be delivered by a wire link to a local sight-and-sound transmitter and televised from there as regular commercial programs.

The third use of television, suggested by the booklet, would be in the form demonstrated at Gimbels where the television system is limited to the store itself for the purpose of making additional sales to shoppers already there. And finally, the brochure points out, the exhibition of television in action would create a market for home television sets which the store could supply in the same way that it merchandises radio receivers and household appliances.

Gimbels - Philadelphia speculated on the possibility of national advertisers sharing some portion of the cost in intra-store television. Stating that there are enough national advertisers to "provide either scripts or films to be used in video productions to reduce cost of production," the report said these advertisers could pay for time on the television system as they now pay for space in newspaper advertisements appearing under the store's name. "This," the store said, "would make it possible for the expense of a television system to be self-liquidating."

TWO OF THE FIVE EYE-CATCHING WINDOW DISPLAYS WHICH ATTRACTED THOUSANDS TO THE DEMONSTRATIONS OF MERCHANDISE AT THE TWENTY "TELESITES" WITHIN THE GIMBELS STORE.



"RCA REVIEW" RESUMES

Publication of "The RCA Review" will be resumed in March, according to Dr. C. B. Jolliffe, Executive Vice President in Charge of RCA Laboratories. The Review has been suspended since April 1942 because of the ban placed at that time on the distribution of technical information related to war production. George M. K. Baker, staff assistant to Dr. Jolliffe, will be manager of the quarterly publication. Editorial and business offices will be at RCA Laboratories, Princeton, N. J.

First published in July, 1936, for the purpose of presenting research and development activities and accomplishments of RCA engineers, the Review became widely recognized in radio and electronic fields.

Purposes of the new "RCA Review" will be, for the most part, according to Dr. Jolliffe, similar to those of the earlier editions: To present for all scientists and engineers interested in electronics and related fields the latest information available from RCA activities as they affect the advance of electronics as a science, an industry and a service; to maintain a continuous permanent record of important RCA research and engineering advances in electronics and related fields; to provide RCA authors with a readily accessible journal of high prestige through which they may present research and engineering treatises, significant executive and management papers, with the assurance that such papers will receive the attention of outstanding scientists and engineers as well as others interested in the fields to which they pertain, and to maintain the prestige of the Radio Corporation of America, its companies and divisions in research and engineering by presenting written evidence of RCA achievements.

Mr. Baker was graduated from Annapolis in 1939. During his active service with the Navy he prepared manuals on various phases of electronics and most recently was attached to the staff of Admiral Nimitz as the Pacific Fleet Radar Countermeasures Officer, with the rank of Lieutenant Commander.

RCA Extends Communications

Fifty-Seven Countries Now Served by Direct Radiotelegraph Circuits from the United States; Fifteen Services Were Inaugurated During the War

WHEN German forces in 1940 swept into Czechoslovakia, first of the little nations to be invaded, the radiotelegraph link maintained by RCA Communications, Inc., between the United States and Czechoslovakia was broken. Other interruptions of direct service followed as the enemies, first in Europe and later in the Pacific extended their control. But the possibility of such catastrophies had been foreseen at RCA. Where the loss of one terminal serving as a relay point, affected others, arrangements were made either to detour messages around enemy-held territories or to establish new services. As the war turned in favor of the United Nations, RCA was prepared with new equipment and operating crews to move into reconquered capitals and reestablish regular radiotelegraph, radiotelephone and radiophoto services.

The story of the total destruction of RCA facilities at Manila on December 31, 1941, has been frequently told. Although this demolition, which was carried out under orders of the U. S. Signal Corps to prevent high-powered stations in the Philippines capital from falling intact into enemy hands, stopped all service to and from the Islands, the original interruption lasted for only nine days. On January 9, 1942, RCA Communications reopened its offices at Cebu on the island of the same name, and communications were reestablished immediately. However, after a few weeks Cebu was occupied by the Japanese and service to the Philippines ceased for the time being.

A month later, on February 10, a new direct radiotelegraph circuit between New York and Teheran, Iran, was opened by RCA. Previously, all radiotelegraphic traffic from the United States to Teheran had been routed by way of London. The new circuit of 6,000 miles provided faster service at a critical time.

The next expansion in 1942 took place on February 21 when RCA further strengthened the radio lifeline of communication between the U. S. and Australia with a new direct radiotelegraph circuit linking San Francisco and Wellington, New Zealand. Here again the new circuit eliminated a relay point at Australia with a consequent saving in message-delivery time. This accomplishment by RCA Communications was signalized by an exchange of congratulatory messages between President Roosevelt and Prime Minister Fraser.

New Circuit Outwits Enemy

Working in collaboration with the Dutch Government, RCA succeeded on March 11 in transmitting the first messages to the East Indies through Sumatra thereby circumventing the enemy which four days earlier had occupied Batavia, a former point of relay to the East Indies. An interesting sidelight in connection with the reopening of these facilities was the long course taken by one of the first messages. This dispatch was filed by a bank in Madras, India, for its branch in Medan, only 700 miles away across the Bay of Bengal. To reach its destination, the message went to Bombay by wire, then by radio to London where RCA picked it up and transmitted it to Medan via New York and San Francisco. Over 27,000 miles of the globe's surface was traversed by the message in order to span a distance of 700 miles.

March, 1942, continued to be an active period for the restoration of old services and the creation of new ones. On the 13th, a station on the vital island of Noumea, New Caledonia, handled its first traffic direct with San Francisco. On the 17th, RCA put into operation its new error-proof radiotelegraph printer on the New York-Buenos Aires circuit, and on the 21st, pictures flashed through the air 7,420 miles between Melbourne, Australia and San Francisco over the first direct radiophoto circuit ever operated between the two continents. Before the month ended, RCA Communications was able to announce a new radiotelegraph circuit connecting San Francisco direct with Kunming on the Burma Road in China.

Facilities Increase Rapidly

Through the remaining months of the year, RCA continued to make new facilities available to the rapidly increasing United Nations military forces. New York and Cairo were linked on June 23 by a two-way radiophoto circuit, the first such service between the two points. Bermuda commenced to benefit from direct radiotelegraph service with New York on August 10th, and on November 16th, the New York office of RCA Communications received by radiophoto from Sweden a picture of King Gustaf and guests to inaugurate a new service between the two countries.

The year 1943 saw the establishment of three new and important circuits. The west African port of Dakar was linked with New York on March 9; the first direct radiotelegraph service between Ecuador and New York went into regular operation on May 1, and a new radiophoto service to Berne, Switzerland was announced on September 21.

Following closely on the heels of the Allied occupation forces in Italy, RCA engineers opened a direct link between Naples and New York on February 1, 1944 and duplicated the feat on June 13 at Rome, using replacement equipment which was shipped from the United States in anticipation of the liberation of the Italian capital. With the Indian Radio and Cable Company as operators of the Bombay terminus, RCA inaugurated direct service to India on August 15.

Continuing the energetic follow-up of the victorious armies of the United Nations during the final days of the war, RCA facilities were established in Germany and Austria on August 3, 1945; with Tokyo on August 30 and with Shanghai on October 22.

The Vienna station was a mobile RCA unit, formerly located in Northern Italy and then flown, at the request of the U. S. Army, sev-

eral hundred miles across the Mediterranean by a fleet of fourteen C-47 transport planes.

The Berlin station was shipped to Europe from this country and stored in Paris until arrangements could be made for its permanent installation in the German capital.

Prior to September 1939, at the beginning of World War II, RCA Communications, Inc., had direct radiotelegraph circuits to 42 countries. In mid-December of 1945, RCA had extended its coverage with 15 additional circuits. When service to Poland is resumed, RCA Communications will be operating 58 radiotelegraph circuits to practically every important country in the world.

H. G. BAKER PROMOTED

Appointed General Sales Manager of Home Instruments Division.

Henry G. Baker, formerly general purchasing director for RCA Victor has been appointed general sales manager of the Home Instrument Division.

Mr. Baker will have complete charge of sales, advertising and promotional activities for the Home Instrument Division which handles the manufacture and sale of radio receivers, television receivers and Victrola phonographs. In addition, he will continue to assist the newly appointed general purchasing agent in the organization and operation of the general purchasing department.

The new appointee entered the radio industry more than 25 years ago when, as senior partner in the firm of Baker Brothers, he pioneered in radio retail sales and merchandising in Newark, New Jersey. After serving as regional manager for the RCA Special Region of Army-Navy Electronics Production Agency, handling the expediting materials on all RCA contracts with the Army and Navy, he joined RCA Victor in 1943 as purchasing agent for the company's Indianapolis plant. In 1944, he was transferred to Camden as general purchasing agent for standard components and in April, 1945, he was made general purchasing director.

NBC TELEVISION MOVES TO NEW QUARTERS

Space Will Provide Rooms For Offices and Rehearsals.

OCCUPANCY of the newly-acquired space for NBC Television in the South Studio section of the sixth floor of the RCA Building in Radio City is expected early in the new year.

According to plans, the area will be occupied by personnel of the program, production facilities and administrative staffs of the NBC Television Department. The space, which measures approximately 10,000 square feet, provides for two large storage rooms, a conference room, two rehearsal rooms, twelve offices and a large reception foyer.

The first and largest of the storage rooms, which fronts on the corridor in the south studio section, measures 1,550 square feet and will extend upward through the seventh floor. This double floor space, which has the same dimensions as television studio 3-H, will be utilized for the pre-construction of all sets prior to the time the play is in the rehearsal stage. Since the studio and this storage room are the same size, it will be possible to erect the sets in exactly the same relationship and proportions as they will be installed later for the performance. In this space, the sets will be painted, decorated and furnished. Just before camera rehearsals begin, the old sets will be struck and the new ones taken downstairs for the next program.

The central floor space in this storage room will be utilized for machine tools, such as band saws, lathes and the like. Along one side, a movable paint-frame of about 30 to 35 feet will be installed. A platform will enable painters to stand in front of the set being painted and the walls will be shifted vertically to permit the painters to remain in the same position as they work.

Directly to the east of this storage room is a smaller, single-floor storage space measuring 527 square feet. Half of this room will be used for a paint stock- and paint-mix room; also it will have lockers and showers installed for workers. The other half of this smaller room will be used for raw material storage.

Down the corridor to the south is the second large-sized storage room of about 650 square feet which will be utilized for the storing of all scenic construction units. Two offices have been provided for the staff of the production facilities group next to this storage room.

The rehearsal rooms, which will be utilized by the producers for off-camera rehearsals, are located off the large double-floor storage room. One is 26 feet square; the other is 26 by 33 feet.

Ten offices for administrative and program personnel who are moving into the new space, line the east-west corridor and two larger offices are provided at the easternmost end of this corridor.

TRADE GETS FIRST RCA RADIOS BY AIR EXPRESS

RCA Victor's first postwar table model automatic radio-phonograph combinations left the company's Bloomington, Indiana, plant during the early part of November, carried by American Airline freight and air express to distributors throughout the country. This modern mode of shipment gave distributors the earliest possible opportunity to display the model and accept orders on those to follow. At the same time, it was announced that the initial sets would continue to be shipped to each region as anticipated increasing availability of parts permits factory production.

In some cases, distributors used the new sets as Victory Loan prizes to stimulate the community sale of bonds.

THE WINNER...RCA VICTOR!

RADIO'S MIGHTY MATCH OF MUSICAL WITS

... with Deems Taylor, Kenny Delmar, Raymond Paige's Orchestra ...
the laugh-loaded new RCA Victor show!

Tune in the fight *this* Sunday! Cheer on your favorite in RCA Victor's new radio show! Hear Deems Taylor, famed composer, critic and raconteur, defend classical music. Hear Kenny Delmar, nationally known radio personality, uphold popular music. Raymond Paige illustrates the arguments with his symphony orchestra and his hot jazz combination.

The winner every time is ... RCA Victor. For the audience of millions also hears the latest news of RCA Victor Records (with the best of *both* kinds of music) ... Victrola* radio phonographs ... RCA Victor radios and television sets ... and the other members of the great RCA family.

Tune in the new RCA Victor Show this Sunday and every Sunday. You'll enjoy it.

EVERY SUNDAY AT 4:30 P. M.
EASTERN TIME, OVER NBC

RCA VICTOR

RADIO CORPORATION OF AMERICA

*"Victrola" T. M. Reg. U. S. Pat. Off.

The Story of Music

THE NBC UNIVERSITY OF THE AIR PRESENTS:

THE STORY OF MUSIC—a course of 36 programs heard on Thursdays at 11:30 P.M. (EST) . . . brought to you by the National Broadcasting Company and the independent stations associated with the NBC Network . . . offers a delightful experience for all listeners who appreciate good music.

The purpose of this series is to unfold the history of music *through the performance of music.* Thus THE STORY OF MUSIC is presented in its own language . . . each program containing examples taken from the many different periods.

As is customary with NBC University of the Air courses, a supplementary handbook containing general background for the entire series of 36 programs is available at 25¢ per copy. Write to NBC, 30 Rockefeller Plaza, New York 20, N. Y.

• • •

NBC, as a service to its listeners, offers this and many more outstanding educational and cultural programs . . . programs which help to make *NBC "The Network Most People Listen to Most."*

NBC University of the Air also offers these three other important courses

THE WORLD'S GREAT NOVELS
Fridays, 11:30-12:00 P.M. (EST)

HOME IS WHAT YOU MAKE IT
Saturdays, 9:00-9:30 A.M. (EST)

OUR FOREIGN POLICY
Saturdays, 7:00-7:30 P.M. (EST)

National Broadcasting Company

America's No. 1 Network

A Service of Radio Corporation of America

RCA's new television camera has a super-sensitive "eye" that sees even in the dimmest light—indoors or outdoors.

A television camera "with the eyes of a cat"

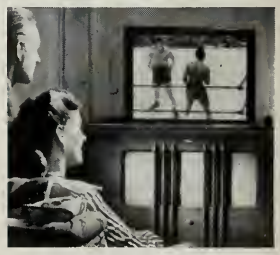
As a result of RCA research, television broadcasts will no longer be confined to brilliantly illuminated special studios—nor will outdoor events fade as the afternoon sun goes down.

For RCA Laboratories has perfected a new television camera tube, known as Image Orthicon. This tube, a hundred times more sensitive than other electronic "eyes," can pick up scenes lit by candlelight, or by the light of a single match!

This super-sensitive camera opens new fields for television. Operas, plays, ballets will be televised from their original performances in the darkened theater. Outdoor events will remain sharp and clear on your television set—until the very end! Television now can go places it could never go before.

From such research come the latest advances in radio, television, recording—all branches of electronics. RCA Laboratories is your assurance that when you buy any RCA product you become the owner of one of the finest instruments of its kind that science has achieved.

Radio Corporation of America, RCA Building, Radio City, New York 20. *Listen to The RCA Show, Sundays, 4:30 P. M., Eastern Time, over NBC.*



RCA Victor television receivers with clear, bright screens will reproduce every detail picked up by the RCA super-sensitive television camera. Lots of treats are in store for you. Even today, hundreds of people around New York enjoy regular weekly boxing bouts and other events over NBC's television station WNBT.

RCA **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 triumph 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 regimentation. 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