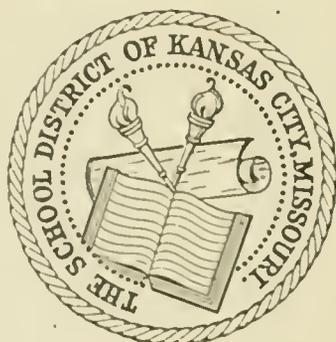




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# RADIO AGE

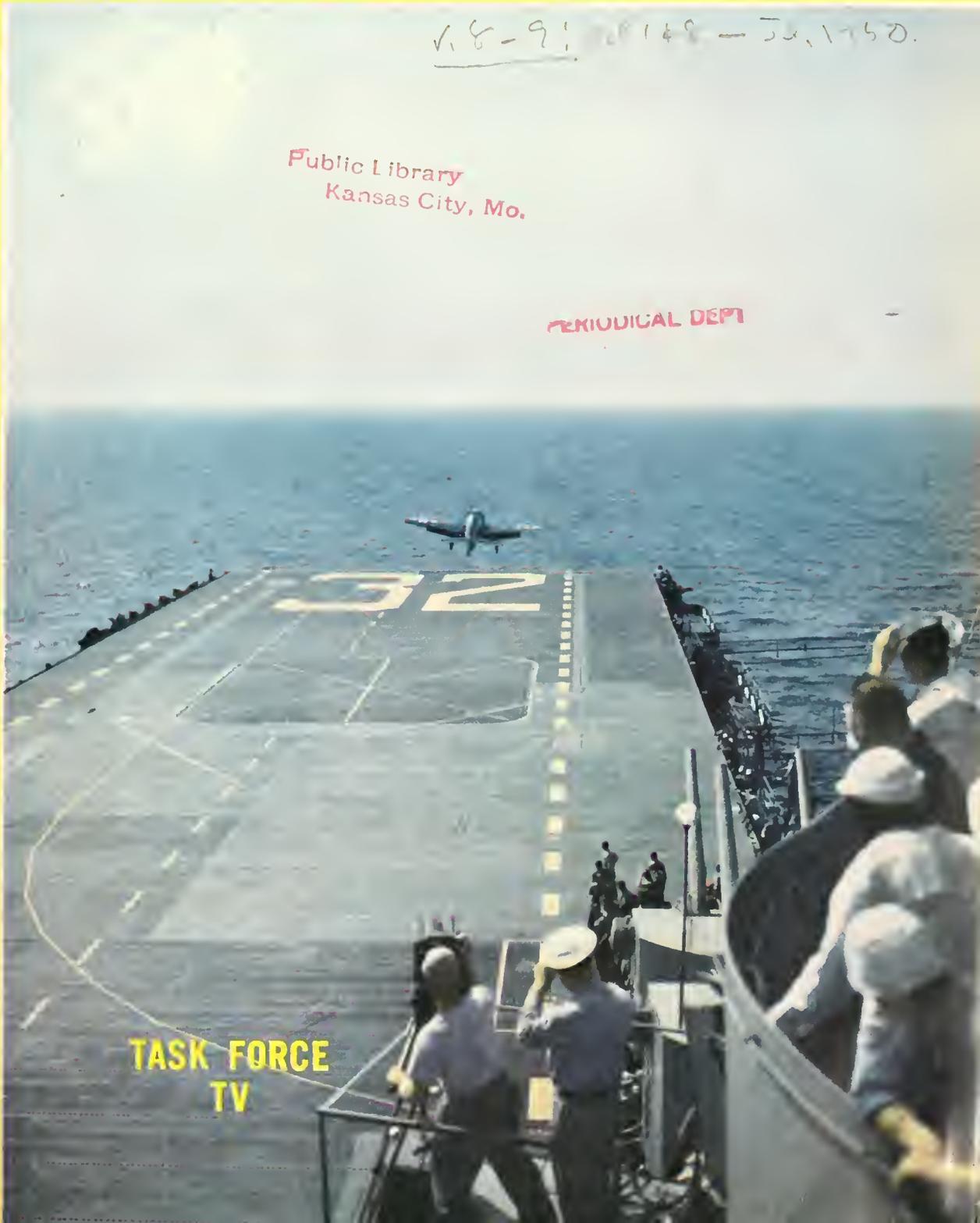
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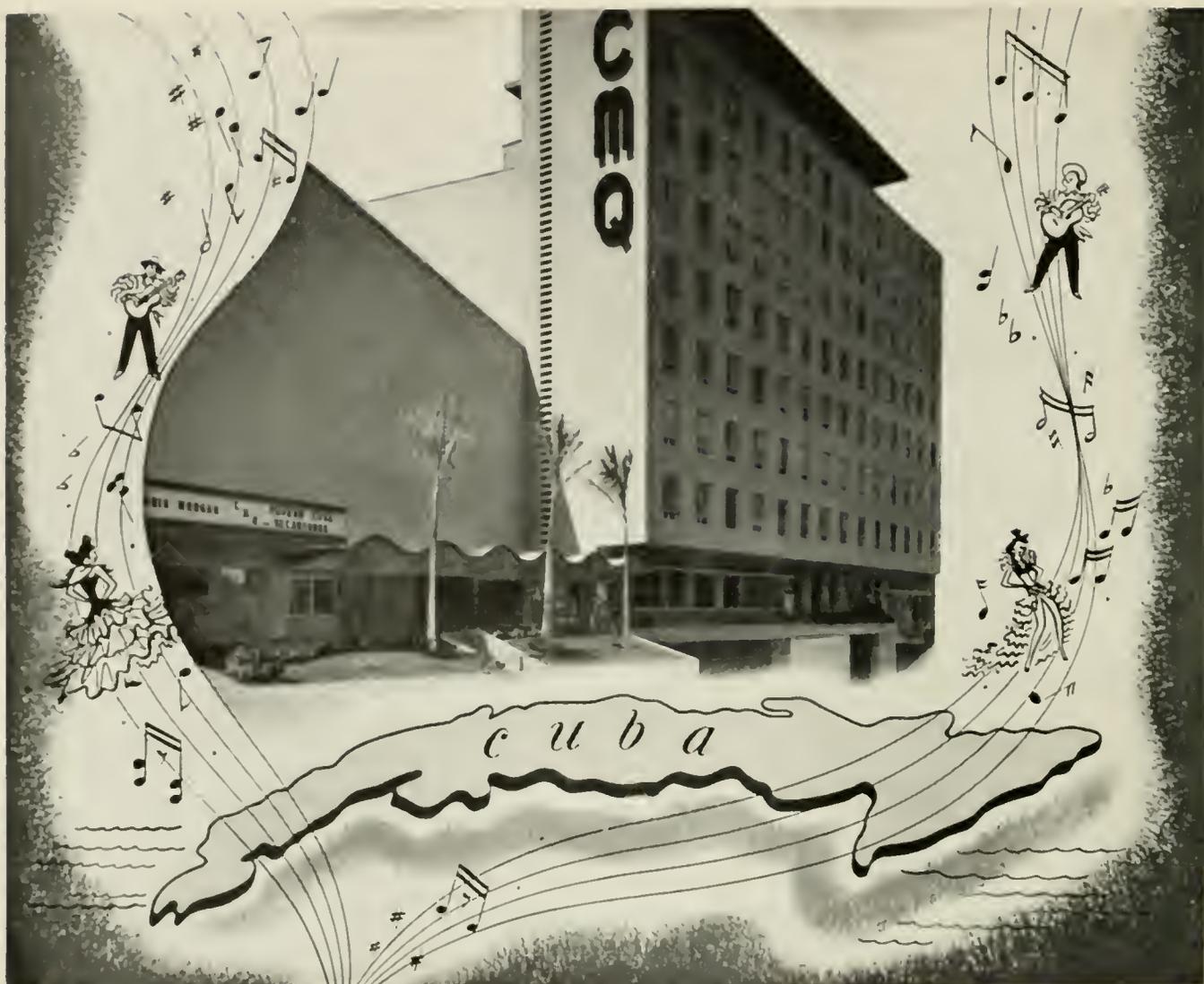
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OCTOBER

1948

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*Modern, efficient, significant is CMQ's Radiocentro, Havana. It includes—at left, above—glamorous new Warner Bros. theatre, also RCA equipped.*

**VIVA!  
RADIOCENTRO!**

## Cuba's new voice among the nations

• Radiocentro, Station CMQ's \$3,000,000 Radio City, is Cuba's new voice among the nations. In it the newest and most efficient broadcasting equipment is beautifully and functionally housed amid fine shops, restaurants, an office building, and the new Warner Bros. theatre, all welded into a great, modern enterprise.

RCA hails the significant trend toward radio centers, such as CMQ, that dramatize the importance of radio to the progress of modern nations

RCA is proud that from microphones to transmission towers, CMQ uses RCA equipment. Around the world the voices of the other great broadcasting stations and networks are RCA equipped, too.

In planning new broadcasting or radio communications facilities, consult your RCA distributor. In radio and electronics, you buy wisely and safely anywhere in the world when the equipment carries the RCA trade mark, symbol of quality and leadership.



RCA INTERNATIONAL DIVISION

**RADIO CORPORATION of AMERICA**

745 FIFTH AVE., NEW YORK, N.Y., U.S.A.

Radio address: RADIOINTER, N. Y.

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# RADIO AGE

RESEARCH • MANUFACTURING • COMMUNICATIONS • BROADCASTING • TELEVISION

PERIODICAL DEPT



COVER

An RCA image orthicon television camera sweeps the flight deck of the U.S.S. Leyte during NBC's thrilling telecast from the carrier while it was operating at sea in mock maneuvers.

VOLUME 8 NUMBER 1

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- RCA Communications, Inc.
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- National Broadcasting Company, Inc.
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- RCA Institutes, Inc.
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- RCA Service Company, Inc.
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- RCA International Division

RADIO CORPORATION OF AMERICA

RCA Building, New York 20, N. Y.

DAVID SARNOFF, *President and Chairman of the Board*

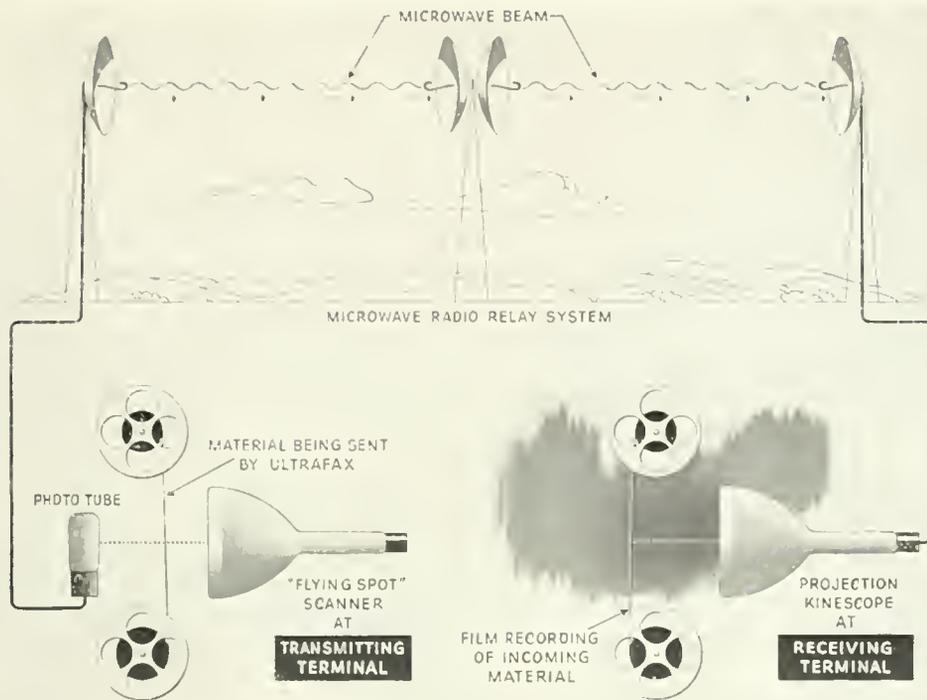
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ARTHUR B. TUTTLE, *Treasurer*

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ONE HUNDRED RCA TELEVISION RECEIVERS INSTALLED ON BOSTON COMMON, MADE IT POSSIBLE FOR TENS OF THOUSANDS OF BASEBALL FANS, UNABLE TO GET INTO BRAVES FIELD, TO WATCH THE THREE WORLD SERIES GAMES PLAYED IN THE MASSACHUSETTS CAPITAL.



PERIODICAL DEPT.

SIMPLIFIED DIAGRAM OF A COMPLETE ULTRAFAX SYSTEM SHOWING THE PRINCIPAL ELEMENTS WHICH MAKE POSSIBLE THE MILLION-WORDS-A-MINUTE TRANSMISSION SPEED OF THE NEWLY DEVELOPED MEDIUM OF COMMUNICATION.

# Ultrafax: Million Words a Minute

*Sarnoff Foresees Ultrafax Opening New Era in National and International Communications—He Urges Study Looking Toward the Establishment of a New National Communications Policy*

ULTRAFAX, a newly developed system of television communications capable of transmitting and receiving written or printed messages and documents at the rate of a million words a minute, was demonstrated publicly for the first time by the Radio Corporation of America at the Library of Congress, Washington, D.C., on October 21.

Brigadier General David Sarnoff, President and Chairman of the Board of RCA, declared that Ultrafax, which splits the seconds and utilizes each fraction for high-speed transmission of intelligence, is as significant a milestone in communications as was the splitting of the atom in the world of energy.

Among the possible developments which General Sarnoff foresaw were:

1. The exchange of international television programs achieved on a transoceanic basis.

2. A service of television and Ultrafax by which the same receiving set would bring various types of publications into the home, or a newspaper for that matter, without interrupting the program being viewed.

3. A system of world-wide military communications for this country, scrambled to the needs of secrecy, which with ten transmitters could carry in sixty seconds the peak load of message traffic cleared from the Pentagon Building in twenty-four hours during the height of World War II.

4. The establishment of great newspapers as national institutions, by instantaneous transmission and

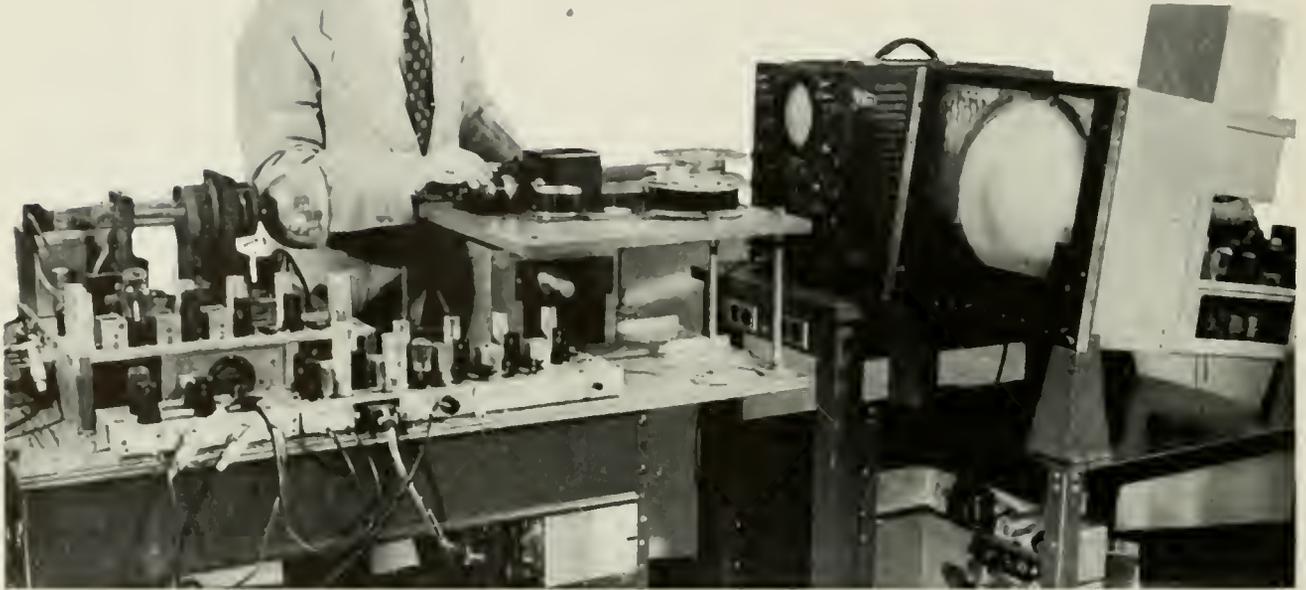
reception of complete editions into every home equipped with a television set.

5. The transmission of a full-length motion picture from a single negative in the production studio simultaneously to the screens of thousands of motion picture theatres throughout the country.

6. The possibility of a new radio-mail system with the vast pickup and delivery services of the Post Office Department.

Representatives of the United States Armed Forces, Government agencies, industry and the press witnessed the introduction of this advanced communications system. RCA presented the demonstration as a "progress report" to show that the system has reached a stage of development where plans can be

PRINCIPAL ELEMENTS OF THE SENDING TERMINAL OF RCA ULTRAFAX. THE CATHODE RAY TUBE (LEFT) GENERATES THE "FLYING SPOT" OF LIGHT FOR SCANNING MESSAGES ON A FILM STRIP AS IT PASSES THROUGH THE UNIT ON THE CENTER TABLE. MONITORING APPARATUS IS AT THE RIGHT.



made for Ultrafax to serve the public.

The demonstration proved the ability of Ultrafax to transmit at the speed of light—186,000 miles a second—a wide variety of graphic material including charts, fingerprints, news and advertising layouts and items ranging from historical documents to complex atomic formulae and battle maps.

A striking feature of the demonstration came when the 1047-page novel "Gone With the Wind" was transmitted word for word in its entirety in about two minutes from the transmitter to the receiver in the Library of Congress.

The Ultrafax system, RCA engineers reported, combines the elements of television with the latest techniques in radio-relaying and high-speed photography. The system is a development of RCA Laboratories, in cooperation with the Eastman Kodak Company and the National Broadcasting Company. Engineers stated that the radio-television-photography combination forms the basis for a system of graphic communication which can be extended from city to city across the nation.

During the demonstration, mes-

sages, technical drawings and other material in foreign languages were among the numerous items transmitted by Ultrafax directly from the tower of the National Broadcasting Company's television station WNBW at the Wardman Park Hotel through the air to a receiving terminal on the stage of the Library of Congress, a distance of three miles. In a regular service the transmissions could be radio-relayed any distance across the country, using the commercial radio-relay system towers which now are being erected to establish national television networks.

Guests at the Coolidge Auditorium were welcomed by the Librarian of Congress, Dr. Luther H. Evans, who said: "I think it eminently fitting that this Library should be the host at a demonstration of this sort. As the principal institution of the nation charged with preserving and making available the printed records of man's communications with his fellows, we are profoundly interested in developments in the art and science of communication."

THIS TINY RCA PHOTOTUBE TRANSFORMS LIGHT VARIATIONS OF ULTRAFAX MESSAGES INTO RADIO SIGNALS.

#### *First Ultrafaxed Messages*

The first message ever publicly transmitted over the Ultrafax system was a handwritten letter by General Sarnoff, congratulating the RCA scientists and engineers who created and developed this new method of radio communications and concluded: "May Ultrafax, as swift as light, open a new and useful service for mankind everywhere."



This message was followed by a transmission of letters from Secretary of Defense James A. Forrestal and Wayne Coy, Chairman of the Federal Communications Commission, addressed to General Sarnoff. Secretary Forrestal stated his interest in the wartime possibilities of Ultrafax, particularly in transmitting combat information to and from commanders in combat areas. Said Secretary Forrestal:

"One of the most important, and not always appreciated, elements of a nation's life is the media of communications. The normal life of an American citizen depends heavily upon these media—in which each segment, such as mail, telephone, telegraph, radio, cables and television—plays an important part.

"In wartime, extra burdens are placed on the existing means of communications, transmitting combat information to and from the commanders in combat areas. Every step which improves the effectiveness of this network enhances the security of the nation.

"The techniques utilized in Ultrafax appear to offer many possibili-

ties in this field, and its perfection will certainly add to the efficiency of the nation's communication system and thus to the national security. My congratulations to the scientists, technicians and members of your organization who have been instrumental in bringing this achievement into being."

Chairman Coy said: "The advance in communications represented by Ultrafax reflects a spirit of research and pioneering of positive benefit to our nation and the world."

Dr. C. E. Kenneth Mees, Vice President and Director of Research of the Eastman Kodak Company, who described the origin of the rapid processing unit used in the demonstration, declared: "We are marking today, with the official unveiling of Ultrafax, the beginning of a new era in communications."

**Future of Ultrafax Discussed**

General Sarnoff described the demonstration as a preview of a new prodigy of television, for Ultrafax is an offspring of that science and art. He said that the number

of uses and the scope of Ultrafax will multiply with time and experience.

"It is now within the compass of one's imagination to foresee the day, when through television and Ultrafax, a radio newspaper may be delivered through the air into every home equipped with a television set," he declared. "It would be possible to have the same transmitter that broadcasts the television program simultaneously broadcast the radio newspaper. In fact, the same home-receiver, with proper attachments, could print the newspaper even without interrupting the program being viewed."

Further, he said, it seems only reasonable to expect, as the present system of Ultrafax progresses, that it may be possible to transmit full-length motion pictures from a single negative in the production studio simultaneously to the screens of thousands of theatres throughout the country. This, he added, would provide a new system of motion picture distribution.

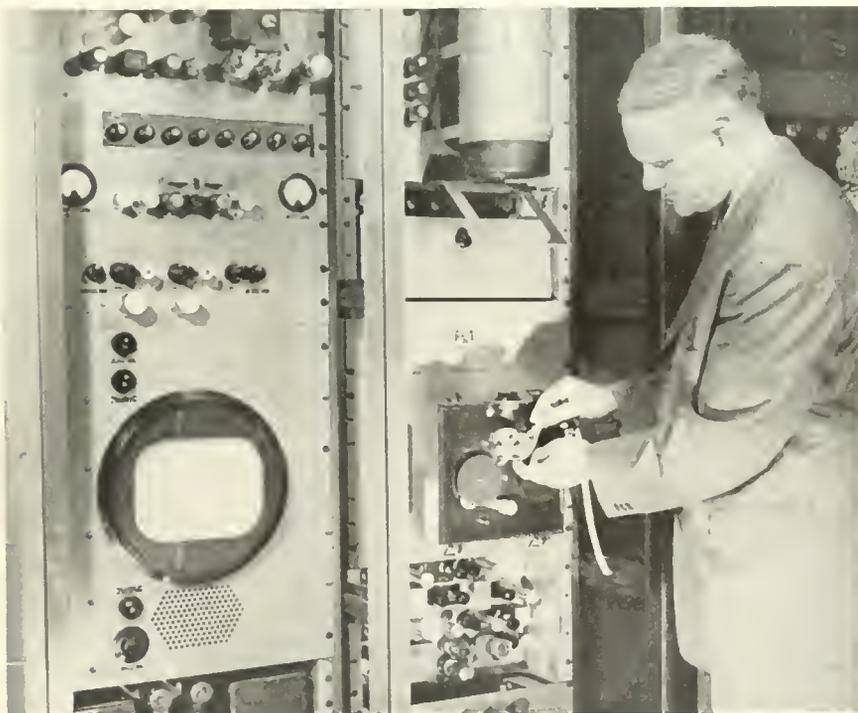
The messages, letters and documents beamed through the air to be received and reproduced as exact duplicates of the originals, General Sarnoff pointed out, revealed that Ultrafax holds promise of a radio mail system.

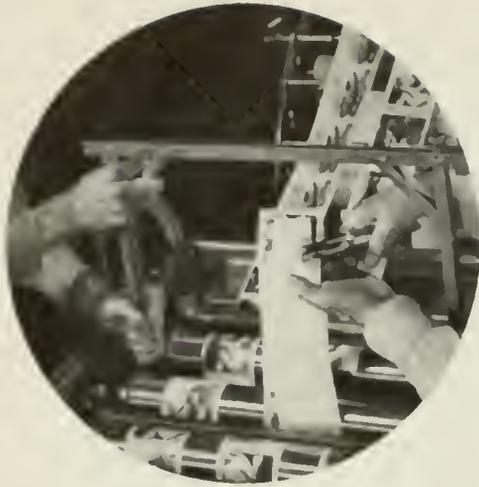
"We would, of course, have to add hands and feet to this winged messenger," he continued, "in order to provide a pickup and delivery service that corresponds to our present mail system. That is where the Post Office with its thousands of letter carriers and mail boxes may find new opportunities for increased service to the public."

As a radio-mail system, it was pointed out, Ultrafax has the potential of delivering the equivalent of forty tons of mail coast-to-coast in a single day at relatively low cost.

General Sarnoff envisaged this new system as a new arm of our national defense. In the busiest days of the war, the Signal Center at the Pentagon Building handled as many as ten million words a day. Ultrafax, he said, could handle this extraordinarily heavy load in ten minutes with one transmitter and in one minute with ten transmitters in operation. Thus, in any future war, should communication centers

RECEIVING TERMINAL OF ULTRAFAX SYSTEM AT WHICH THE INCOMING MESSAGES ARE REPRODUCED AS TELEVISION IMAGES ON A KINESCOPE TUBE IN THE CYLINDER AT UPPER RIGHT, AND THEN COPIED ON FILM BY THE CAMERA DIRECTLY BENEATH THE CYLINDER. HERE C. J. YOUNG OF RCA LABORATORIES IS LOADING THE CAMERA.





CLOSE-UP VIEW OF DRYING UNIT OF THE CONTINUOUS PAPER PROCESSOR. THROUGH THIS EASTMAN DEVELOPMENT, ENLARGED REPRODUCTIONS OF ULTRAFAX MESSAGES CAN BE SPEEDILY HANDLED.

be destroyed by atomic attack, Ultrafax might prove vital in providing facilities to move military intelligence, message traffic, V-mail and other mail across the continent, across the seas, or across the globe with lightning speed and mobility. Such a system, General Sarnoff said, may prove to be "an indispensable element in our national security."

"We can foresee the day," he continued, "when Ultrafax, which includes television and radio relays, can provide us with a new service of international television. But first, an 'airlift' must be provided across the Atlantic. Even now by the use of twelve to fourteen suitably equipped communication planes flying over the ocean and properly spaced, an overseas airborne radio-relay system could be established between the United States and Europe that would provide not only an exchange of television programs, but also handle the equivalent of tons of mail, news and other services which Ultrafax makes possible.

"I cannot conceive any better peacetime use to which some of our military planes on the ground can be put than to provide such a transoceanic radio-relay service. Certainly, the practice and experience, which our Armed Forces would gain in peacetime, would be invaluable in time of crisis.

"How to guide the future of Ultrafax and to translate its poten-

tialities into services," said General Sarnoff, "is the job not only for the scientist and engineer, but also for the industrialist and businessman and for Congress and the Federal Communications Commission. Indeed, so many political and social problems are raised by these and other recent scientific developments that a new national communications policy should be considered and established by Congress. In any consideration of such a comprehensive national policy, the legitimate interests of private industry and of the various Government departments concerned with such activities, as well as the needs of our Armed Forces, must be given the careful study that they deserve."

He said he was merely trying to outline the many possibilities of Ultrafax. "No one," he declared, "knows all the possible answers to the problems which this new art poses. But we must weigh the problems today if we are to find the answers tomorrow."

#### How Ultrafax Operates

Ultrafax's remarkable speed, the engineers explained, is possible be-

cause full pages of information are transmitted as television pictures at the rate of fifteen to thirty a second. The principal steps in transmitting and receiving by Ultrafax are:

1. Preparation of data to be transmitted, to assure a continuous flow at high speed.

2. Scanning of this data by what is known as a flying-spot television scanner, at the sending terminal.

3. Transmission of the television image as ultra-high radio-frequency signals over a microwave relay system.

4. Reception on projection-type television kinescope, or "picture tube", from which incoming messages are recorded on motion picture film, or ultimately directly onto photographic paper.

At the end of a transmission, the exposed film can be transferred quickly to a special processing unit developed by Kodak Research Laboratories. The film is passed through a miniature developing tank, rinsed and fixed in less than 15 seconds and dried in 25 seconds more. This unit, regarded as an

(Continued on page 22)



*My heartiest Congratulations  
to the Scientists and Engineers who have  
created and developed this new System of  
Radio Communications.*

*May Ultrafax, as swift as light,  
open a new and useful service for  
Mankind everywhere.*

*Harry Sarnoff*

FIRST PUBLICLY TRANSMITTED ULTRAFAX MESSAGE—A MESSAGE OF CONGRATULATIONS FROM GENERAL SARNOFF TO THE ENGINEERS WHO HELPED MAKE ULTRAFAX POSSIBLE.



AN NBC TELEVISION CAMERA SCANS THE CROWDED FLIGHT DECK OF THE U.S.S. LEYTE, BEFORE THE SHIP'S FIGHTING PLANES TAKE OFF IN SIMULATED MANEUVERS.



AGAINST A COLORFUL BACKGROUND OF ANTENNAS FOR RADAR AND OTHER SERVICES, A TELEVISION CAMERAMAN TRAINS HIS INSTRUMENT ON ACTIVITIES BELOW.

## Television Presents "Task Force TV"

*In First Telecast of Its Kind, Two Million Video Viewers in Their Homes Watch Thrilling Maneuvers of U.S.S. Leyte as Aircraft Carrier Undergoes Mock Combat Attack at Sea*

**I**N A HIGHLY entertaining and informative 100-minute telecast on August 29, originating aboard the aircraft carrier *U.S.S. Leyte* at sea, the NBC television staff saw the result of five months' preparation reach a successful climax. An estimated 2,000,000 video viewers in the East watched the flat-top, under simulated combat conditions, undergoing a mock attack by its own planes in maneuvers known as "Task Force TV."

Preliminary work on "Task Force TV" began with a visit by NBC's television special events director to the *U.S.S. Kearsage*, an Essex class carrier, to determine the feasibility of such a telecast. Once it was decided that the feat was possible from an engineering standpoint, the Navy cast about for a carrier to be made available to NBC for the long periods needed for tests and for the program itself.



By Doug Rodgers

*Assistant Director, Program Dept.,  
NBC Television*

When the *Leyte* was chosen, a series of visits were made by James Davis, surveying engineer, and myself to complete plans. A tremendous amount of engineering coordination and planning was needed to plot the complicated paths of video and audio signals—video from *Leyte*

to the Empire State Building to Radio City and back to Empire again; audio from *Leyte* to RCA at Riverhead, L. I., to RCA Communications building, New York, to Radio City to Empire. Chance for error naturally increased with each link added and we were fighting shipboard problems all the way.

Circumstances involving the carrier and her orders, together with the mounting cost of producing the show, shortened the scheduled test period from two weeks to four days before the broadcast. Since the transmitter to be used was a new 1300-megacycle unit with a beam antenna designed by NBC's development laboratory specifically for this job, chances for success were even slimmer because of the shorter test period.

On the Thursday before the telecast, two tons of equipment, valued close to \$200,000, and about 8,000

[RADIO AGE 7]

Public Library  
Kansas City, Mo.

FROM HIS LOFTY STATION, AN NBC CAMERAMAN WEARING PROTECTIVE HELMET AND SAFETY BELT SWINGS HIS CAMERA TO PICK UP MANEUVERS OF PLANES "ATTACKING" THE CARRIER.



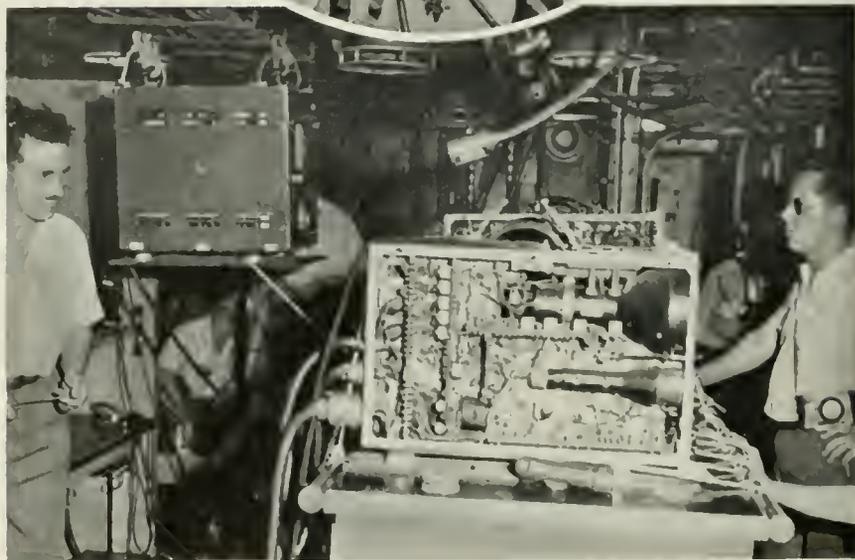
feet of cable were loaded aboard the *Leyte* at Quonset Point, Rhode Island, and the testing began. Meanwhile, details of what was to be televised were decided in conjunction with the Navy. Limiting factors such as the fuel capacity of the aircraft, security regulations, the fact that the *Leyte* could not turn so as to place her mast between her transmitting antenna and Empire State, immovability of cameras, possible weather and wind conditions, etc., were taken into account in planning the show's format.

After the program was planned, the next big problem was to place the cameras where they would catch as much of the action as possible and still provide a means of covering each sector with two cameras in case one failed. These cameras had to be chained because of the pitch and roll of the vessel, and so were immovable during the broadcast. The *Leyte* provided us with excellent platforms for the three above-deck camera positions. One was built in the catwalk opposite the island and next to the deckside plane elevator; one extended from the bridge, and one from the air defense station five levels above the flight deck, and to the rear of the island.

All three of these positions were personally dangerous to cameramen. Bob Long, our elevator side cameraman, wore a life-belt and safety line, and was fenced in by a guard rail. His camera, located at flight deck level, about amidships and with 360 degrees of freedom, was able effectively to see every part of the action as a Navy crewman working there would have seen it. The terrific air blast of the propellers, the danger each crewman faced in the deckload of spinning blades were vividly portrayed on this camera. Effective lens-shots through the barriers to catch the landings, across the deck and upward to the streaming colors at the mast also were available to him.

The second camera, built out

[8 RADIO AGE]



DEEP IN THE SHIP'S INTERIOR, CONTROL ENGINEERS MONITOR THE SCENES RECORDED BY THE SEVERAL CAMERAS AND SELECT THE SEQUENCES TO GO ON THE AIR.

ONE UNIT OF THE TWO TONS OF EQUIPMENT WHICH WAS CARRIED ABOARD THE LEYTE TO MAKE THE UNUSUAL TELEVISION PROGRAM A SUCCESSFUL FEATURE.



from the bridge and in the hands of Bill Waterbury, was able to cover most of the flight deck activity and all action on the bridge of the *Leyte* where Captain Charles Coe, commanding officer, was giving orders. The third camera, under Les Shaw's direction, was in air defense aft and covered all landing operations, supplementing camera 2 on the bridge. A fourth camera in the ready room was used to show pilots being briefed.

Briefing of our own cameramen; Rad Hall, our narrator; and Bob Stanton and Ray Forrest, our announcers—none of whom had ever been aboard a carrier—took several hours. Sequences were set up tentatively and important parts of each operation stressed. This later proved to be time valuably spent, when, as suspected, cameramen found it very difficult to hear my

instructions with approximately 100,000 horse-power loose on the flight deck.

Sunday morning the *Leyte* lay off Ambrose Light, twenty miles from the Empire State Building, while the microwave antenna was being homed and tested. The carrier then proceeded slowly out to 26 miles for further tests of transmission.

#### *A Period of Anxiety*

The transmitter had to be shut down then to prevent overheating and was turned on again at 2:30. From then until 4:00 no acceptable picture was seen at Radio City. Then suddenly word came that we were on the air with the opening spot from top Naval Officials in Washington and New York studios, and that the picture from the carrier was good.

However, our troubles were not over at this point. Two minutes before we were to take the opening shot from the *Leyte* two of our above-deck cameras went out. Thanks to the extremely quick work of Edgar Kahn, our video man, both were back in commission within three minutes. One of these, unfortunately, was practically useless due to interference in the picture. Kahn had an answer for that, too. The ready-room camera was completely dismantled and substituted for the ailing one, a process requiring about half an hour. These were the only difficulties in producing "Task Force TV"!

IN A TELEGRAM TO SECRETARY FORRESTAL, GENERAL SARNOFF CONGRATULATES THE U. S. NAVY FOR ITS COOPERATION IN LEYTE TELECAST AND OFFERS RCA FACILITIES "FOR DEVELOPMENT AND APPLICATION OF SCIENCE TO NATIONAL SECURITY."

## "A Privilege to Participate"

AUGUST 30, 1948

JAMES V FORRESTAL  
SECRETARY OF DEFENSE  
WASHINGTON D.C.

CONGRATULATIONS TO THE U.S. NAVY FOR ITS ENTERPRISE AND SPLENDID SPIRIT OF COOPERATION IN TELECASTING BATTLE MANEUVERS ON THE AIRCRAFT CARRIER U.S.S. LEYTE YESTERDAY OFF LONG ISLAND COAST. FROM TELEVISION VIEWPOINT IT WAS A GREAT SUCCESS. THE STRATEGIC IMPORTANCE OF TELEVISION IN NAVAL, MILITARY AND AIR OPERATIONS IN THIS MODERN AGE WAS DRAMATICALLY REVEALED. IT WAS A PRIVILEGE FOR RADIO CORPORATION OF AMERICA AND NATIONAL BROADCASTING COMPANY TO PARTICIPATE WITH THE NAVY IN THIS HISTORIC DEMONSTRATION. OUR FACILITIES IN RESEARCH, ENGINEERING, COMMUNICATIONS AND ALL PHASES OF RADIO ARE ALWAYS AVAILABLE FOR DEVELOPMENT AND APPLICATION OF SCIENCE TO NATIONAL SECURITY.

DAVID SARNOFF  
PRESIDENT AND  
CHAIRMAN OF THE BOARD  
RADIO CORPORATION OF AMERICA

## Elected Director of RCA

George L. Harrison, Chairman of the Board of the New York Life Insurance Company, has been elected a member of the Board of Directors of Radio Corporation of America, Brig. Gen. David Sarnoff, President and Chairman of the Board, announced following a meeting of the Board on August 6. His election fills the vacancy created in July by the retirement of Bertram Cutler as a director of RCA.

Mr. Harrison also was elected to the Boards of Directors of RCA's wholly-owned subsidiaries, the National Broadcasting Company and RCA Communications, Inc.



GEORGE L. HARRISON



GENERAL DWIGHT D. EISENHOWER, PRESIDENT OF COLUMBIA UNIVERSITY (SECOND FROM LEFT), RECEIVES THE HONORARY DEGREE OF DOCTOR OF HUMANE LETTERS FROM DR. LOUIS FINKELSTEIN, PRESIDENT OF THE JEWISH THEOLOGICAL SEMINARY. BRIG. GENERAL DAVID SARNOFF, NEXT TO GENERAL EISENHOWER, AND FORMER GOVERNOR HERBERT H. LEHMAN PARTICIPATED IN THE CEREMONY.

## Sarnoff Speaks at Eisenhower Ceremony

*RCA President, in Address Honoring New President of Columbia University, Declares World Crisis Calls for Inspired Leadership*

*Address by Brig. General David Sarnoff, President and Chairman of the Board, Radio Corporation of America, at Convocation Ceremony held at Jewish Theological Seminary, welcoming General Dwight D. Eisenhower, new President of Columbia University, to Morningside Heights.*

AS one who has had the honor to serve abroad under the command of Dwight D. Eisenhower, General of the Army, I am grateful for the opportunity to join in this welcome to an eminent American—our neighbor on Morningside Heights.

I see more than a gracious act of neighborliness in this occasion. This is a convocation of the students, faculty, and Board of Directors of the Jewish Theological Seminary, to greet their friend and neighbor, the new President of Columbia University, who has chosen to devote his great gifts of leadership to the task of peacetime education. But this also is a convocation of the spirit which expresses the most exalted Americanism.

Great was General Eisenhower's role as Supreme Commander of the Allied Expeditionary Forces when they broke the terror of the German onslaught. Equally great and urgent is the task that now faces him. Civilization, it has been remarked, has become a race between education and catastrophe. In this conflict the principles of true education are arrayed against the false philosophies which seek to undermine the basic values of our civilization. Today, this conflict is reaching a climax. The crisis calls for inspired leadership.

Every page of the General's career bespeaks statesmanship, tolerance and humaneness. He is a soldier of intellectual integrity, with a love for peace and for his fellow man. That Americans everywhere recognize these outstanding attributes of leadership in General Eisenhower has been attested by the national outpouring of respect and admiration, of loyalty and affection for him.

General Eisenhower has seen how technological power can be harnessed to achieve victory in war.

He knows, too, that Science can be an even greater force in the preservation of peace.

We are only at the beginning of the application of scientific methods to our social and political problems, but too many tired intellectuals are ready to give up the search! They begin and end with the thought that though science may teach us the best means for achieving our ends, it cannot tell us what ends to pursue. They fail to take into account the religious and educational forces that shape our lives, and the extent to which ignorance, prejudice and poverty darken men's understanding.

If the historian, Tacitus, could see our world today, he would repeat with the same irony the observation he made more than eighteen hundred years ago: "They create a waste—and call it peace." Through all the centuries of evolving civilization, the problems of man's relationships with man remain essentially the same. We think today that we have a much greater understanding of these problems. But we have still to win freedom

from hate, freedom from prejudice, freedom from superstition, and freedom from ignorance, before we can boast that we have achieved the ideals of a true civilization. Much still must be done to put aright an ailing world.

If the world is to have peace, if civilization is to survive, the mind and spirit must be united to harness the forces of nature for the welfare of humanity. Man must be master of himself, as well as of science. He must guide and control the modern machine, with a superior and unselfish leadership that seeks to serve the needs of modern society.

When science blasts a hole in the iron curtain that hides nature's secrets, it often leaves the wreckage of belief that causes men to lose their bearings in this complex world. There are always timid intellects who, because they cannot put the pieces of their faith together, find no purpose or meaning in life.

There is no denying the effect upon human imagination when vast forces are released by our new discoveries, to present a physical world in endless motion—going relentlessly somewhere, for no perceptible reason, to no understandable destination; a world seemingly oblivious to man. There is no mistaking the paralysis of will and purpose which has seized so many who have lost their faith in an ordered universe. They see man destined to obliterate himself, with the energy he has liberated by exploding the atom.

#### *Task Far From Hopeless*

It is natural that those who have lost faith in man should lose faith in a purposeful world, in a meaningful life. Yet the task of education is far from hopeless. Look at the record of our youth in the last war, or better still: ask General Eisenhower. He will tell you that their heroic performance offered convincing proof of their innate convictions of truth and faith.

On the other hand, it was to be expected that many should be blinded by the false social and political forces which a long era of violence unloosed upon the world. It is the natural backwash of such

a conflict. Some of the disillusioned have dropped what they termed the Great Illusion about God and Country, only to adopt the minor illusion that they can obtain bread without earning it, have freedom without maintaining it, enjoy a right without defending it, and achieve happiness without deserving it. For these cynical slackers in the battle of life, the career of General Eisenhower provides a convincing answer.

#### *Had World-wide Influence*

Columbia University had a world-wide influence under the presidency of Dr. Nicholas Murray Butler. Now another great figure has taken up the torch. General Eisenhower's great gifts as a man of action as well as a man of thought, will contribute much of practical wisdom to the solution of our pressing educational problems.

No man could have entered the educational world with a greater knowledge of so many minds, so many peoples, so many arts, as has

General Eisenhower. To obtain effective cooperation in the war, among millions of men and women of diverse training and background, was an achievement unparalleled in history. General Eisenhower's deeds emphasize, what this Seminary teaches, the virtues which are common to all good men. Let us, therefore, join with him in unifying these social forces, rather than to dwell upon the minor differences which cause misunderstandings and divide people.

To you, as students in these halls of education and religion, I would add that you will find here opportunities of great promise to spread the gospel of service and fellowship. In your search for knowledge and wisdom in a world of crisis and conflict, may you nourish within you the seeds of an inspired spiritual leadership. May the lessons of your abiding faith help man to master the forces he has unleashed, rather than be mastered by them, and thus keep bright the beacons of freedom.

## Mobile Television Projector Provides Life-Size Pictures

Life-size television pictures are now available for hotels, clubs,



COMPACTNESS AND SIMPLICITY MAKE THE PROJECTOR IDEAL FOR CHURCHES, SCHOOLS AND HOSPITALS.

and amusement places, hospitals, churches, schools, and industry through the use of a new, mobile large-screen television projector recently developed by RCA.

The new unit will project a clear 63-square-foot picture at a distance of 17 feet from the viewing screen, and a correspondingly smaller picture at shorter distances. Accompanying sound is supplied by a large speaker housed in a matched cabinet designed for mounting near the screen. Rear projection on a translucent screen, as well as conventional projection on a reflective-surfaced screen, is feasible with this system.

Extremely simple operation is a feature of the new projector. The controls, operated as easily as those of a home television set, are arranged to permit adjustment without blocking the path of the projected picture. An "all channel" station selector permits instant selection of the station desired.

# More Channels for Television

*Appearing at FCC Hearing, Engstrom of RCA, Outlines Current High-Band Tests in Washington and Reaffirms Company's Cooperation with Government and Industry*

**D**ISCUSSING the challenge of what he described as television's "phenomenal rise", Elmer W. Engstrom, representing the Radio Corporation of America and the National Broadcasting Company, at a hearing on September 21 before the FCC, outlined several considerations in the orderly development and extension of present commercial television service.

Mr. Engstrom, Vice President in Charge of Research of RCA Laboratories, declared that in the three years since the Commission's 1945 Allocations Decision, television had "caught the enthusiasm of the public, the broadcaster, the advertiser and the entertainment world."

He said that the public, as of June 30, had invested \$228,000,000 in television receivers, being produced at that time at the rate of 65,000 a month by more than fifty competing manufacturers. The number of television stations on the air has jumped from six to thirty-one as of the same date, he added, and permission has been granted for construction of seventy-eight additional stations, while 285 applications are pending. Of this total of 394 stations, 5 are owned and operated by the NBC.

## *Factors in Television Progress*

This rapid progress of television resulted from a number of factors, Mr. Engstrom asserted. He listed these as follows: First, the Commission's decisions on standards and allocations which provided a stable basis for planning; second, the manner in which the radio industry expedited conversion to peacetime manufacturing, and took the maximum advantage of wartime developments; third, vision and courage of broadcasters which prompted them to go ahead, in the face of monetary losses, during the pioneering years of operations, and with faith in the future of television as a service to the public.

"Commercial television service

is today a reality, and this reality has been built upon the bedrock of the twelve channels allocated to television by the Commission," affirmed Mr. Engstrom. "In our opinion, the further development and expansion of television must continue to be built upon the basis of these twelve channels.

"RCA-NBC agree with the Commission that more channels are necessary for commercial television. It is our desire that as many people as possible in the United States have an opportunity to receive television service. We are willing and anxious to work with the Commission and the industry to advance this objective as rapidly as possible. In so doing, there are several possible avenues of approach.

## *Higher Power Urged*

"RCA-NBC feel that the Commission should authorize the use of higher power for television stations. We feel that it is only by the use of higher power that improved reception can be provided for the public throughout the service area of a television station. This higher power would make possible the simplification of the receiving antennas and the installation of television receivers. . ."

A second possibility for expansion consists in the assignment of additional channels for television below 300 megacycles. Accordingly, Mr. Engstrom urged the Commission to examine thoroughly the allocations below 300 megacycles to determine whether some additional channels could be made available there for television.

Mr. Engstrom suggested further that the Commission should continue to explore the characteristics of the band 475 to 890 megacycles to determine whether it is feasible also to assign space there for the expansion of television.

In reference to his statement on the RCA-NBC position on the

question of introducing television to the upper frequencies, Mr. Engstrom said:

"We feel that any plans for commercial use of the uhf band should provide for the use of the same standards, insofar as they relate to interchangeability of operations as those in use on the present twelve channels. While, of course, the opening of these higher frequencies to commercial service would not immediately produce an answer to the problems which the industry and the Commission face, it would serve to stimulate the commercial development of equipment and shorten the time until the problems of this region would be solved."

Recalling that for many years RCA has carried on research in the upper reaches of the radio spectrum, Mr. Engstrom declared that allocations by the Commission of frequencies above 475 megacycles for the future use of television and research with respect to color television had stimulated RCA study of this area of the spectrum. He pointed out, for instance, that RCA had begun propagation tests in Washington earlier this month.

## *Tests Being Made in Capital*

"With the announcement of this hearing," he said, "our plans were altered and it was decided to shift some of the propagation tests from New York to Washington. By expediting the work of installation we were able to get on the air with transmissions at a date prior to the beginning of these hearings. The present transmissions will be continued for a suitable period of time in order to permit persons who so desire to make investigations, and in particular, to give the Commission ample opportunity to make such studies as it requires."

In conclusion, Mr. Engstrom declared: "We are here to help the Commission by supplying data in the testimony which follows and to develop any points which the Commission may regard as relevant. Just as crystallization of standards and allocation of channels a few years ago resulted in today's television industry and service, an

*(Continued on page 32)*



SCENE IN STUDIO 8H ON ELECTION NIGHT IN 1944. ACTIVITIES IN THE SAME STUDIO WILL BE INTENSIFIED THIS YEAR BY THE PRESENCE OF SEVERAL TELEVISION CAMERAS.

# TELEVISION JOINS RADIO COVERING ELECTION RETURNS

*For the First Time, Both Network Services, Operating Simultaneously, Are to Carry Results of Presidential Contest*



By William F. Brooks

*Vice President in Charge of News and International Relations National Broadcasting Company*

WHEN millions of Americans go to the polls next month to choose the 33rd president of the United States, it will mark the first time that the National Broadcasting Company has broadcast and telecast simultaneously over networks the up-to-the-minute bulletins of election returns and summations of balloting trends.

An augmented staff of over 300, comprising announcers, commentators, rewrite men, tabulators, editors, engineers, cameramen and technicians will be assembled to handle the heavy volume of election news that will be pouring into the NBC newsroom over a battery of teletypes. These machines will sup-

ply election returns compiled by the Associated Press, United Press, and International News Service.

In addition to the announcement of election returns, both radio and television networks will carry on-the-spot features from major party headquarters in New York and Washington, local color pick-ups at the homes of the presidential and vice presidential candidates, interviews with the national chairmen of the major parties and coverage of other points of interest, including the surging crowds.

To provide the maximum amount of air time for the election coverage, commercial program schedules are being adjusted in cooperation with sponsors who, in events of similar importance, have been eager to assist in this public service. It is expected that the election features will start at 8 p.m. EST., with both networks remaining on the air until the outcome of the election is certain. As a final offering, NBC commentators will pool their observations in a special round-table discussion program after the returns are in and victory has been conceded.

Headquarters for NBC's coverage will center in studio 8H, Radio City, the world's largest broadcasting studio. Following in general,

the layout which proved so successful in 1944, the studio will be transformed into a special news center. At the rear of the stage a huge election chart showing the latest assembled returns will be erected. Directly below the chart, will be a battery of news tickers, a control desk, copy table, tabulators, monitoring tables, and press desks.

On an elevated dais, facing the entire setup, will be the radio commentators' table. H. V. Kaltenborn and Robert Trout will act as chief commentators for the radio operation. The television section, from which cameras will play upon the giant election chart as well as the proceedings on the floor of the studio, will occupy the other side of the huge auditorium. Ben Grauer and John Cameron Swayzee will act as chief commentators for the television network.

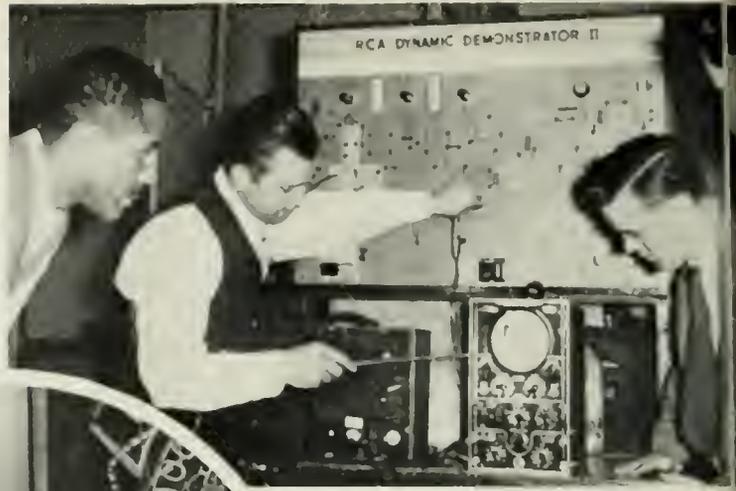
Television stations linked with WNBT, New York, in the NBC network will be, WPTZ, Philadelphia; WTVR, Richmond; WNBW, Washington; WRGB, Schenectady; WBAL, Baltimore; and WBZ, Boston. Midwestern television audiences will witness special election coverage over NBC's newly formed midwestern television network.

LEADING COMMENTATORS AND NEWS-CASTERS WILL BE TELEVISIONED AS THEY ANALYZE THE VOTING TREND ON THE NIGHT OF NOVEMBER 2.



Proficiency in International code is a necessity for students interested in radio communications.

Use of test instruments in servicing electronic equipment is explained with the aid of a demonstration board.

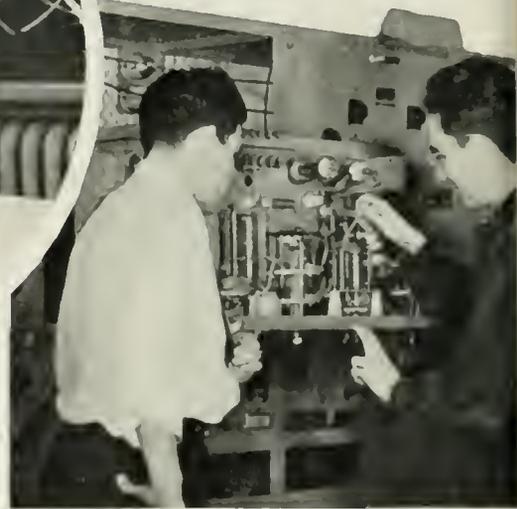


An Institutes group learns modern methods of servicing radio receivers and other electronic apparatus.

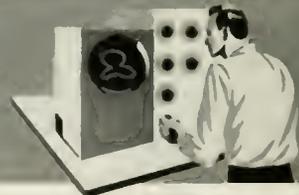
A thorough knowledge of radio transmitters is gained by experiments in the laboratory.



A student studies the design and operation of machines for generating power.

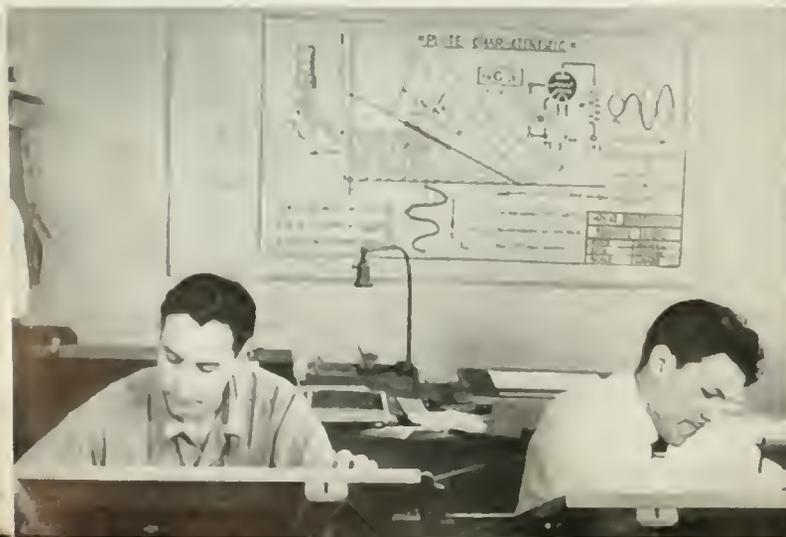


## TRAINING TECHNICIANS AT RCA INSTITUTES



The making and reading of blueprints are essential parts of the instruction in the Advanced Technology Course.

Potential laboratory technicians and radio station engineers attend a lecture on radio circuits.





FRANK M. FOLSOM, EXECUTIVE VICE PRESIDENT IN CHARGE OF THE RCA VICTOR DIVISION (LEFT) AND CHARLES A. DOSTAL, VICE PRESIDENT, WESTINGHOUSE ELECTRIC CORPORATION, AT APPLIANCE TRADE DINNER IN SAN FRANCISCO.

## TELEVISION HEADS WEST

*San Francisco will be Test Point for Video Because of Problems Raised by Mountainous Region, Folsom Tells Trade Association.*

TELEVISION, having proved itself in the East by its wide variety of entertainment and its up-to-the-minute coverage of major sports, political conventions, and news events, now faces toward the West, according to Frank M. Folsom, Executive Vice President in Charge of the RCA Victor Division.

Speaking at the Western Radio and Appliance Trade Dinner in San Francisco, on August 1, Mr. Folsom told retailers and distributors that "the entire nation will be watching the progress of television in San Francisco with close attention." because through experience gained in that city, he said, the industry will learn much about the ability of the service to operate in a mountainous region, and from the tests made there many interesting new developments should result.

In reviewing television prospects in the Golden Gate city, Mr. Folsom said:

"Three stations already have been granted construction permits in San Francisco. One will be owned by the American Broadcasting Company, another by Associ-

ated Broadcasters, Inc., and the third by the San Francisco Chronicle, to be affiliated with NBC."

With only six channels available to the San Francisco-Oakland region, he pointed out, six broadcasters are seeking the remaining three unassigned channels. These are: Twentieth Century-Fox of California, Inc., Paramount Television Productions, Inc., the Columbia Broadcasting System, Don Lee Broadcasting Company, Television California, and station KROW, in Oakland.

Sizeable sums are being invested in television by broadcasters seeking outlets on the West Coast, said Mr. Folsom. Construction figures range as high as \$691,785, with one applicant planning to spend \$921,693 for his first year's operation.

Plans are well along, he said, for linking San Francisco by cable and relays with all major cities to the North, the East and the South. Although coast-to-coast networks are not expected to be in operation until the end of 1952, Folsom said, regional links will supply interconnecting television service for West

Coast municipal neighbors at a much earlier date. Then, with the West and the East linked by networks, national advertisers, no longer restricted to locally originated programs or shows recorded on film, will be able to present television programs using talent that would be far too costly for individual station showings.

In emphasizing the importance of video's future role as an advertising medium, the RCA executive quoted Amos Parrish, noted merchandising consultant:

"Television is the biggest thing since radio. And it will out-sell radio in selling goods many to one, because it appeals to your eyes as well as to your ears. And the eyes are still the windows to your soul — especially your buying soul.

"We don't know and we don't want to know what's in a television set, because we don't understand it. But we do know there is one thing —one of the elements that makes up the future of America—and that means it has no limits. That no-limit element is a combination of excellent reporting, teaching, entertaining, selling. This element says in undebatable terms: 'Stop, Listen and LOOK!' And people will not only 'Stop, Listen, and LOOK!'—but they will also buy."

Television receivers are rolling off production lines in an increasing spiral, Mr. Folsom revealed. Today more than 500,000 are in the public's hands. By the end of the year, he predicted, the industry should have produced in excess of 850,000 television receivers. In 1949, the estimated output should be 1,600,000 receivers, representing a potential retail business of more than \$400,000,000. As its share of this figure, Mr. Folsom said, San Francisco can expect a television receiver business with a retail volume of more than \$10,000,000.

"Proud as we are of the business stature television has attained," he said in conclusion, "we're even prouder of the many excellent ways in which it has served and will continue to serve humanity with major roles envisioned for it in educational, religious, industrial and military fields."



1. An installation crew receives orders from the dispatcher at an RCA Service Company office, the first step in servicing a new television receiver.



4. When the truck arrives at the customer's house, the RCA dipole receiving antenna is assembled on the ground before being erected on the roof.



2. The two-man RCA installation crew checks equipment before leaving the service depot in the completely equipped truck.



5. Using special rigging and supports, the antenna is clamped securely to the most suitable spot on the roof.



3. Credentials of the RCA service crew are presented to the new owner of a television set before starting work on the television installation.



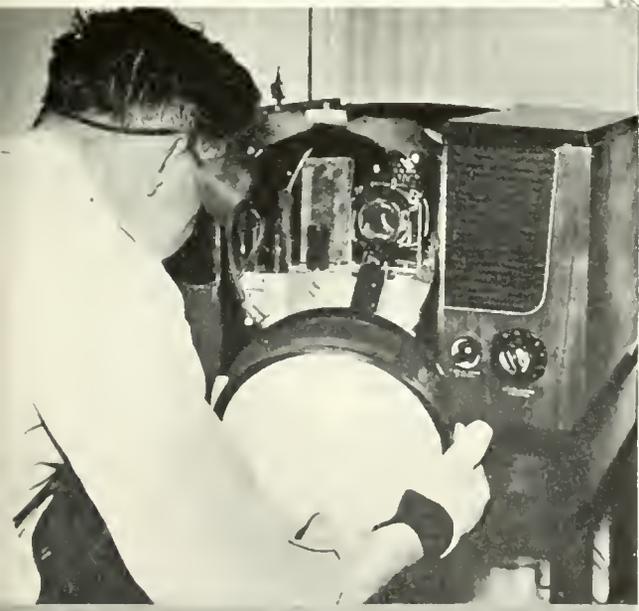
6. Holes are drilled in the side of the house to support hooks for the RCA "Bright-picture" tape which conveys signals to the receiver.

# RCA Television Servicemen at Work

In many cities and towns from coast to coast, RCA Service Company technicians are installing RCA Victor television receivers at a constantly increasing rate. The pictures on this page, taken by Don Reed and Nick Strinkowski of the Bryn Mawr, Pa., service depot, portray some of the important steps in the daily routine of a television service crew.



9. A high frequency antenna is added to the main antenna mast to ensure reception of all stations in localities where some signals are weak.



7. A 10-inch RCA kinescope is inserted into the socket of the television receiver to complete the installation inside the home.



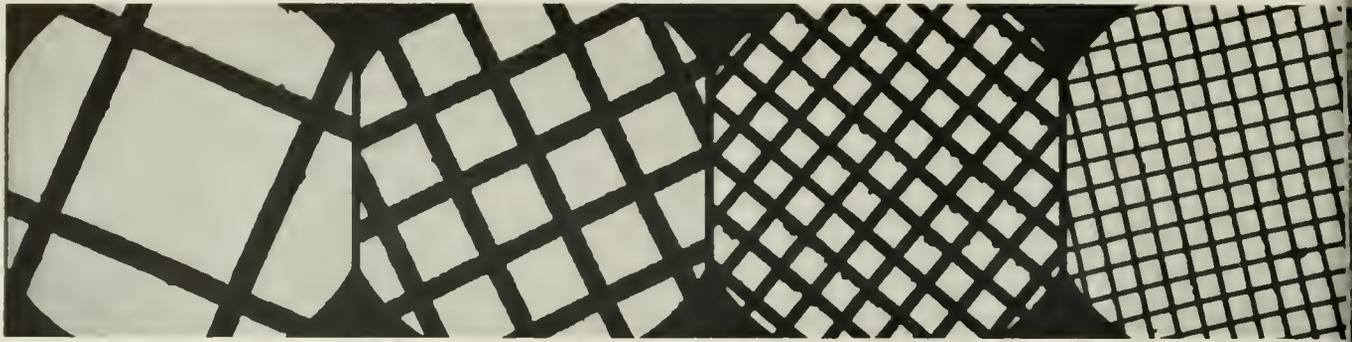
10. Before leaving the installation, an RCA Service Company crewman explains the operation of the receiver to the woman-of-the-house.



8. One RCA technician observes results as the antenna is oriented and gives orders to the other crew member when the best picture is obtained



11. Television receivers requiring complicated repairs or adjustments are brought to the RCA service shop where the most modern equipment is available.



SHADOW PICTURES OF 200, 500, 1000, AND 1500 MESH SCREENS ENLARGED 200 TIMES BY ELECTRON MICROSCOPE.

## MAKING FINE MESH SCREENS

*Metallic Gossamers of Extreme Fineness Are Made for Image Orthicon Tubes by Process Developed at RCA Laboratories*



By Dr. Harold B. Law  
RCA Laboratories Division

PRODUCTION of a copper screen with 250,000 openings to the square inch was one of the problems faced in developing the sensitive image orthicon television camera tube now in common use at most television studios. Because the electron image of the scene to be televised is focused on this screen, the mesh must be extremely fine, otherwise it would be visible in the picture when viewed at the receiver.

Despite formidable difficulties, the problem was not only solved but in the research a method of manufacture was devised by which a screen could be made with the holes constituting more than 50 percent of the screen area.

The finest prewar mesh screens were made of woven wire or formed

by electrolysis. They had about 200 holes per linear inch, or 40,000 openings to the square inch. However, these metallic gossamers passed less than 40 percent of the electron image and, in addition, were non-uniform in the arrangement of openings.

Although these were the screens that had to be used in early models of the image orthicon, it was immediately obvious that they would seriously restrict picture quality.

Because of the possible value of the image orthicon in military applications, a search was started for a method of making a high transmission, uniform screen of 500 mesh or more. Out of this war-intensified activity came a procedure that, on a small scale, delivered very uniform screens up to 1500 mesh, three times the goal.

On the opposite page is an attempt to illustrate the fineness of a 500-mesh screen. A small section of screen was laid over a period of the size which ends this sentence and the combination was enlarged about 70 times. Small as the dot appears to the naked eye, nevertheless, the photomicrograph reveals that 66 perfectly-formed, complete openings of the screen are included within the circumference of the period.

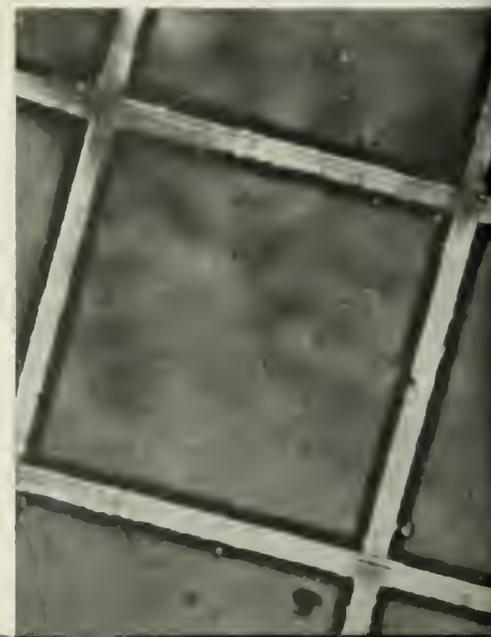
Production of fine mesh screens by the process developed at RCA Laboratories really begins with a sheet of highly polished plate glass

coated with a layer of material resistant to acid. An exceedingly accurate ruling engine, similar to those used in making optical gratings, scores the desired pattern through the resistant layer, and then the lines are etched into the glass by submersing the entire plate in a hydrofluoric acid.

The metal which will form the screen is applied to the master by a process called sputtering. In this, the master is exposed to a fine mist of a special palladium-gold preparation until a thin semi-transparent layer of the metal covers the surface of the glass. The master is then placed in a shallow dish of water while the surface is rubbed with a thin piece of rubber. This removes the thin metal on the surface, without affecting the metal in the grooves. A corner is left unrubbed in order to provide electrical contact for the next step, that of copper-plating the metal in the grooves.

Since the metal in the grooves is

SECTION OF 200-MESH GLASS "MASTER", ENLARGED ABOUT 400 TIMES.



EXCESS METAL IS ERASED FROM THE MASTER (LEFT) AS ANOTHER WORKER EXAMINES A SCREEN FOR FLAWS.



very thin, plating does not take place instantly over the whole surface but proceeds from the plating electrode in an ever-widening area until the whole surface is covered.

After plating, the master with the screen in the grooves is washed and the screen removed. Depending on the master, the screen may "float" off in the wash water or require only gentle pulling to be freed from the grooves. Roughness of the etch producing the grooves

FINENESS OF 500-MESH SCREEN IS ILLUSTRATED BELOW BY LAYING A SECTION OVER A PERIOD AND ENLARGING THE COMBINATION 70 TIMES.



largely determines the degree to which the screen sticks.

High transmission, fine mesh screens are, of necessity, very delicate. To secure a screen mounted tautly on a frame is a difficult task if conventional mounting procedures are used. Fortunately in this instance, nature was caught in one of her rare cooperative moods, for it was soon found possible to mount the screen in a safely loose condition, using ordinary methods. Then, by holding the mounted screen for a few minutes in a vacuum in a temperature of about 900° C., it was found that a contraction takes place that tightens the screen ready for use.

With the start of factory production of the image orthicon the need for relatively large production of fine mesh screen became apparent. Mr. R. S. Moore, RCA Victor Division, Lancaster, Penna., took over the problem and has contributed improvements in the process. These advances result in a longer master life and a continuous high quality output in great numbers of 200 and 500 mesh screens of 75% and 60% transmission respectively, and in lesser quantities of 1000 mesh.

## NBC Television Newsreel Moves to New Quarters

New quarters for the NBC Television Newsreel will be opened early next month in the RKO-Pathé Studios at 106th Street and Fifth Avenue, New York City.

In announcing the opening, Sidney N. Strotz, administrative vice president in charge of NBC Television, said that the entire job of editing, processing and storing the films is to be performed in the new studios. In addition to the space for film work, facilities available in the new studios include three live video studios and an entire floor for office personnel. The main live studio measures 97 by 74 feet.

The move of the newsreel was timed, according to Strotz, to coincide with completion of the reel's reorganization by Jerry Fairbanks Productions.

After "moving day," the newsreel will be integrated within NBC's news operations.

NBC now produces and broadcasts three newsreels weekly in addition to numerous special event and documentary films and a weekly ten-minute review of the news.

## 25-Year Employees Receive Gold Watches

TEN employees of the RCA Executive Offices who have served twenty-five years or more with the Company were awarded gold watches at a luncheon held September 17 in Radio City. Presentations were made by Edward J. Nally, first president of the Radio Corporation of America and at present a member of the RCA Board of Directors. Brigadier General David Sarnoff, President and Chairman of the Board of RCA addressed the group following the presentations.

Those receiving the awards were George S. De Sousa, Vice President; Henry A. Sullivan, Controller; William R. Eberle, Robert C. Hoek, George H. Clark, Mary Millea, Clara A. Schlevogt, Eleanor F. Wetzel, Ella V. Smith and Alice Wishart. Marie A. Ward and Mary E. Casserly were eligible for awards but were unable to attend.



LEFT: RADAR ANTENNA OF THE "MORAN" IS LOCATED AT PEAK OF FOREMAST.

BELOW: CHIEF MATE F. C. SCHWEIGEL OPERATES THE RADIOMARINE RADAR AS FRANK BELFORD, VICE PRESIDENT OF THE MORAN TOWING COMPANY, (CENTER) AND SALES ENGINEER R. E. SCANLAN OF RADIOMARINE WATCH THE PROCEDURE.



## TUGBOAT RADAR

*Radiomarine Unit Aboard the Edmond J. Moran Speeds Passage of Tows Through River and Harbor Channels*

**T**ORTUOUS river channels, numerous bridge abutments, tricky tides and a confusion of harbor shipping, once formidable obstacles faced in fog and darkness by the skipper of the tugboat *Edmond J. Moran* while hauling barge loads of chemical refuse from Sayreville, N. J., to ocean dumping grounds well off the Jersey coast, are scarcely more than normal navigating problems since the installation of Radiomarine radar equipment aboard the *Moran*. With the radar scope revealing the position of every detail of the channels and the landmarks bordering them, the

skipper is able to follow his course in all weather as confidently as though he had daylight as his ally.

The route followed by the *Edmond J. Moran*, a 1900 h.p. diesel-electric tug, leader of Moran's deep-sea fleet, gives the radar unit a constant opportunity to prove its value. Starting at the plant of the National Lead Company on the Raritan River near Sayreville, the tug picks up a 260-foot specially constructed barge loaded with 300 tons of chemical waste. The river channel that must be followed averages only 270 feet in width with clearances between bridge abut-

ments of less than 150 feet, leaving little margin for error. Once beyond the river mouth the tow heads out into Raritan Bay, through Sandy Hook and South Channels to Scotland Lightship, then 13 miles to the designated dumping area.

The total distance of the haul is 33½ miles, most of it through waters that require at all times a constant watch of anchored and moving vessels, buoys, markers and shifting currents. Unaided by radar, the progress of the tow in fog and at night was often slow and precarious, thereby adding to the 13 hours normally required for each round trip.

"The course followed by the *Moran*," said Frank Belford, vice president of the Moran Towing Company, "is a severe test of the value of radar as a navigational aid. The Radiomarine unit is doing

a fine job and is proving its effectiveness."

Commenting on the performance of radar aboard his tug, Chief Mate Fred C. Schweigel said: "Radar is an aid when navigating approaches to the Victory. Addison and Pennsylvania R.R. bridges in the Raritan River through narrow channels. It is also helpful when crossing the European and Southern route steamship lanes and when making the hazardous entrance to the narrow channel at Sandy Hook, beset by terrific sets of tides. Radar helps us watch the buoys and keep in the narrow channel."

For all its proved effectiveness, the 3.2-centimeter Radiomarine radar is neither massive nor difficult to operate. A complete installation consists of only three units, two of which are usually placed in the wheelhouse. The third unit, the griddle-like antenna is mounted atop one of the ship's masts.

The indicating unit contains the 12-inch radar scope and is located alongside the wheel where it can be easily viewed. As navigating conditions change, the details made available on the scope may be changed to conform. By the simple twist of a knob, the scope picture may be altered instantly to cover a range of 1½, 5, 15 or 50 miles. Objects as close as 80 yards are discernible on the 1½ mile range.

A complete picture of the range under view is obtained by the revolving radar antenna. By means of an electronic switching system, this antenna sends out a brief radio pulse of extremely short duration and an instant later acts as a receiving antenna to pick up the returning "echo" of that pulse. These pulses, returning many thousands of times a second from any and all obstacles encountered, are coordinated on the scope and re-create the radar view of the area.

where, from 1930 to 1942, many of the components of the present television system were developed under his direction. These included the first high-power, high-frequency television transmitter, the first iconoscope camera, the first remote pick-up and radio relay.

Since 1942 he has been directing television research at the RCA Laboratories, Princeton, N. J. The all-electronic simultaneous color television system is one of the latest results of this work. In 1940 he received a Modern Pioneer Award from the National Association of Manufacturers, and in 1947 a Fellowship Award in the Institute of Radio Engineers. Both awards were for his contributions to television.

The Institute's 1948 Levy Medal was awarded to Dr. Rajehman and Cherry, research physicists at the Laboratories, in recognition of their paper "The Electron Mechanics of Induction Acceleration," which appeared in the April and May, 1947, issues of the Journal of The Franklin Institute.

Dr. Rajehman was born in London, England, in 1911. He received his diploma in Electrical Engineering in 1934 and the degree of Doctor of Technical Sciences in 1938 from the Swiss Federal Institute of Technology. In 1936 he joined the staff of the RCA Manufacturing Company as a research engineer and in 1942 was transferred to the RCA Laboratories in Princeton as a research physicist. He has been chiefly responsible for the development of the electron multiplier. He is a member of Sigma Xi, American Physical Society, and Institute of Radio Engineers.

Cherry is a graduate of the Massachusetts Institute of Technology, where he received his degree of Bachelor of Science in physics in 1941. In August of the same year he joined the RCA Manufacturing Company in Harrison, New Jersey, and in 1942 he was transferred as a research physicist to the RCA Laboratories at Princeton. At present, Cherry is working in the RCA television group and carrying on graduate studies in physics at Princeton University. He is a member of Sigma Xi.



RAY D. KELL

WILLIAM H. CHERRY

DR. JAN A. RAJCHMAN

## THREE SCIENTISTS HONORED

*RCA Laboratories Staff Members Receive Awards from The Franklin Institute*

**M**EDALS for their contributions to the field of electronics were awarded Ray D. Kell, Dr. Jan A. Rajchman, and William H. Cherry of RCA Laboratories, Princeton, N. J., by The Franklin Institute, at Medal Day ceremonies in Philadelphia, on October 20.

Kell, director of television research, received the Stuart Ballantine Medal for "his outstanding pioneer work in television, the adap-

tation of this means of communication to military needs, and for his inventive contributions and leadership in the development of color television."

Kell was graduated from the University of Illinois in 1926, with a B.S. degree. Following three years of association with the General Electric Company at Schenectady, N. Y., he joined the RCA Victor Division of RCA at Camden, N. J.,

# Ultrafax Demonstrated

(Continued from page 6)

important advance in photographic art, resulted from advance equipment built for the armed services during the war.

The Ultrafax film may be enlarged to full-sized copy by means of a high-speed continuous processing machine. The equipment is similar to that used during the war for V-Mail enlarging. There is no limit to the number of Ultrafax messages which may be printed from a single film.

Elmer W. Engstrom, Vice President in charge of research at RCA Laboratories, pointed out the significance of the Ultrafax demonstration with respect to the construction at this time of nation-wide radio-relay networks which are capable of transmitting interchangeably both television and Ultrafax signals. Mr. Engstrom stated: "We have succeeded in obtaining results which show that Ultrafax can now promise practical commercial use, and at a time when demands are greater than ever for speed, speed and more speed in communications."

The advanced engineering and development work is under the direction of Donald S. Bond of the RCA Laboratories staff, who participated in the demonstration. Mr. Bond has spearheaded the task of putting together the known tools as developed for television, radio relays and facsimile, all of which have been combined as a system to create Ultrafax. With associates in RCA Laboratories and NBC, Mr. Bond devised the electronic equipment, and in cooperation with engineers of Eastman Kodak Company, added high-speed film processing apparatus. Credit for contributing early suggestions as to how Ultrafax could employ radio-relay and television techniques is given to C. W. Hansell of RCA Laboratories, pioneer in developing radio-relaying systems.

## Historic Documents Transmitted

The Library of Congress and other government agencies provided material transmitted during the proceedings, which lasted more than an hour. Among the documents sent and received by Ultrafax to demonstrate its versatility were:

A battle map, contour map, and four pages of Naval specifications—as examples of national security and military uses.

A transportation schedule, bank draft, financial report, technical drawing, money order—as examples of usefulness to business and industry.

Personal letter with diagrammed drawing, birth announcement—in the new father's excited handwriting.

FBI description of a public enemy-at-large, along with fingerprints; weather map; Civil Service job application; consumer price index chart—illustrating Ultrafax's public service potential.

Newspaper mastheads, cartoons, advertising layout and an index of magazine contents—pointing up numerous possibilities for the publishing field, where speed and distribution are prime factors.

Writings in Latin, Hebrew, Russian, and Japanese—the original Japanese surrender document, in the latter case—showed Ultrafax's indiscriminate handling of all languages.

Borrowing from the treasures of the Library of Congress, Ultrafax brought to the audience these documents of our American heritage: The Declaration of Independence, in the handwriting of Thomas Jefferson; the battle map of the Battle of Bunker Hill; the first official government map of Washington, D. C.; the first printed copy of the National Anthem; the Gettysburg Address, in Abraham Lincoln's handwriting—the very copy he used for his delivery.

And finally, marking two of the most significant affirmations of man's progress, there was transmitted a page of the Gutenberg Bible—the first printed word—and the preamble to the Charter of the United Nations.

The unveiling of Ultrafax, which was televised from Washington to viewers on the NBC East Coast network, took place near the site of Professor Samuel F. B. Morse's historic demonstration of the telegraph 104 years ago.



ULTRAFAX CAN TRANSMIT ENTIRE BOOKS, EVEN AS LONG AS "GONE WITH THE WIND", IN A FEW SECONDS.



AMPLE AISLES, ADEQUATE LIGHTING AND FLOORS KEPT SPOTLESS BY SANDING MACHINES ARE TYPICAL FEATURES OF THE "HOUSEKEEPING" PROGRAM FOLLOWED AT RCA'S BLOOMINGTON, INDIANA, PLANT.

## Safety and Health

*Success in Eliminating Occupational Hazards in Factories and in the Field Has Won Wide Recognition for the RCA Victor Division*



By E. M. Tuft

*Director of Personnel  
RCA Victor Division*

EVERYBODY loses from industrial accidents—men and management alike—the community, too. To prevent these losses the RCA Victor Division, from its very inception, has had in operation a Safety and Health Program which is constantly being improved to meet new conditions. It is looked upon as a model for the radio and phonograph industry.

Employing over 25,000 people in ten plants and in the field, RCA Victor, in its efforts to maintain the

safety and health of its employees, is confronted with a wide range of problems inherent to the extensive scope of its manufacturing activities.

Its cabinet plants in Pulaski, Virginia, and Monticello, Indiana, present the hazards of the wood-working industry, which by their nature are much greater than those encountered in radio manufacturing. The Camden, New Jersey, plant advances special problems involving the manufacture of bulky products, ranging from television and radio broadcast equipment to television receivers. The Bloomington, Indiana, plant by contrast emphasizes the good housekeeping needed for efficient mass production of small radios.

Entirely different types of problems are encountered in tube manufacture at Harrison, New Jersey; Lancaster, Pennsylvania; and Indianapolis, Indiana. The last named shares with Camden and the Canonsburg, Pennsylvania, plant special safety problems arising from record manufacturing activities, and together with the Camden plant, those

arising from production of relatively large units as typified by radio and television console receivers.

Field people, such as employees of RCA Service Company, who install and service many types of equipment, present still another series of problems.

Despite the wide range of conditions to be met, the RCA Victor Division long has enjoyed a better-than-average safety record, as compared with other firms engaged solely in radio manufacturing. Behind this accomplishment is the Safety and Health Program which has won wide recognition for the company as a leader in safety activities, and many awards to individual plants for their outstanding safety records.

Maintenance of employee safety and health is a major personnel policy of the RCA Victor Division. The program is a "down-to-earth" one, stressed as an operational function of each plant. In the company's larger plants, the program is coordinated by safety supervisors; in the others, by personnel managers. But, fundamentally, safety becomes the responsibility of each supervisor and group leader. These are the people who are "on the front line". It is their job to expose hazards and prevent accidents.

Rank and file participation in the

[RADIO AGE 23]

Safety and Health Program is also encouraged. This begins with the training given to each new employee, or to an old one shifted to a new operation or machine. It carries over to the plant-wide safety committees, and sub-groups covering specific activities.

A primary consideration of the RCA Victor Division is the welfare of its employees. It is concerned with the prevention of the pain, the discomfort, and the resulting financial setbacks which victims of accident and illness may suffer.

#### *Program Helps Consumer*

There is a by-product for the consumer, too, in the Safety Program. The careful workmanship which avoids accidents assures the consumer of the dependability and high quality of the merchandise bearing the company's label.

How "safety thinking" pervades all activities of the company is illustrated by the extensive safety organization in a typical RCA plant.

At the head of this activity in each plant is the safety supervisor or chairman of the safety committee. The latter is composed of supervisory and engineering personnel. Under the direction of the safety supervisor is a dispensary, staffed with nurses and doctors; an emergency first aid crew; the general fire and safety committee; safety committees for special hazards such as X-ray and high voltage; and the staff of the safety section.

The safety supervisor works in close cooperation with the plant fire marshal; plant engineering, chemical engineering, and standardizing groups, within the company; and outside agencies such as the State

Department of Labor, the State Department of Health, Red Cross, local industrial safety council, and the National Safety Council.

At the periphery of the safety wheel, whose rim is comprised of the company's employees, are safety co-ordinators—one for each activity, including engineering, manufacturing, material control, central planning, plant engineering, power, building service, maintenance and construction, warehousing, quality, and purchasing. Many of these activities have safety sub-committees to act on their own problems. It is on this level that most of the educational and preventive safety work is done. If the sub-committee is stumped by a problem it has a two-way channel of communication to the plant's general safety and fire committee and the safety supervisor.

#### *Model of Effectiveness*

Despite its apparent complexity, this safety organization is a model of integration and effectiveness in operation. Frequent training sessions for supervisors, safety procedure indoctrination for all groups of trainee engineers, generous use of dramatic safety posters such as those put out by the National Safety Council, and day-in, day-out activities of the Safety Section hammer away at education and prevention.

One of the fundamentals of RCA Victor policy is compliance with all state and local laws and codes relating to safety and health measures. In practice, local compliance frequently exceeds statutory requirements.

At Camden, for example, it was necessary to store 50 pounds of

smokeless powder for use in an important test procedure of certain equipment. To store this amount of the explosive, New Jersey requires a "Class B Magazine" license. A "Class B Magazine" is a steel box, conspicuously lettered with the word "Explosives", mounted on wheels with a handle attached, so that in the event of fire the magazine may be pushed to safety.

RCA Victor, however, wouldn't take the chance of having to have the explosive pushed out of the building in the event of a fire. It built a "Class A Magazine", a brick building out in the yard remote from plant buildings. *In this structure, the "Class B Magazine" was stored.*

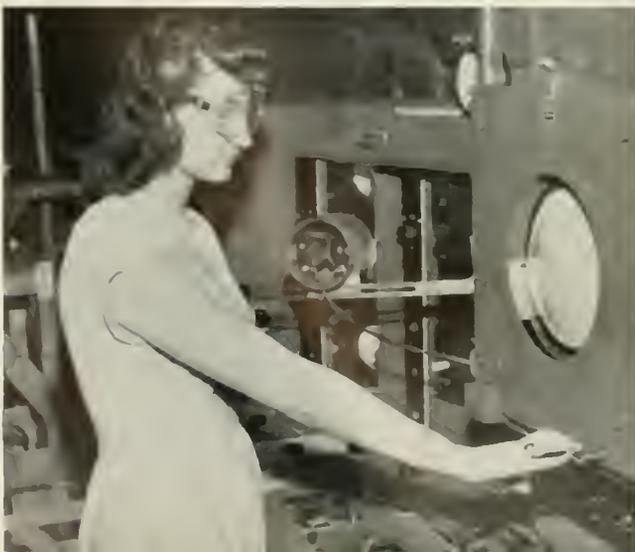
Preventive actions such as this are an everyday occurrence at all RCA Victor plants. In this Company, safety literally starts on the drawing board. Working closely with engineering, the safety staff is consulted on any new products, processes or procedures.

#### *New Machines Studied*

Safety precautions begin with the study of the materials specified for toxicity or other hazards. Then, the production procedure is analyzed and specifications set down for safe operations. If there are any new machines to be used, their plans are also carefully examined together with their lay-out, to make certain that no new hazards will be introduced. If a hazard is discovered in connection with a machine or piece of equipment, the mechanism is "tagged" with a bright yellow card, which means that it must

*(Continued on page 30)*

SAFETY GOGGLES FOR WORKERS AND PROTECTIVE CABINETS FOR KINESCOPE TUBES HAVE REDUCED THE POSSIBILITY OF EYE-ACCIDENTS.



O. C. BOILEAU (RIGHT) SAFETY SUPERVISOR AT CAMDEN, WATCHES A SUBSTANCE BEING TESTED FOR FLAMMABILITY IN THE CHEMICAL-PHYSICAL LABORATORY.





OLD AND NEW MEET IN A MADRID PLAZA WHERE A MONUMENT TO FERDINAND VII IS USED AS BACKGROUND IN TELEVISIONING A STREET SCENE.

## TELEVISION IN SPAIN

*Madrid Audiences Watch Telecasts of Dances, Street Scenes and Bullfights in Demonstration of American Video Equipment*

A high degree of success has been attained by the Radio Corporation of America in acquainting the Spanish people with the progress of American television. In a series of demonstrations conducted in Madrid by representatives of the RCA International Division, the latest types of RCA television receivers, cameras and relay equipment went into action at the Government Palace and in the ancient streets and plazas of the capital. Highlighting the performance were direct pick-ups from one of Spain's most famous bullfighting arenas.

Beginning in July with private showings for Spanish officials at the Palace, the demonstrations were continued until the latter part of August, with the cooperation of Rey Soria & Company, RCA distributors in Spain. The pick-ups featured typical dances of

Sevilla and Aragon, reviews of the Moorish Guards, presentation of American motion pictures and the traditional drama of "blood and sand." Sixteen of the newest models of RCA Victor television receivers reproduced the scenes transmitted by two mobile television units.

Despite early technical difficulties, the first television pick-ups of bullfights in Spain received enthusiastic response from the press and the hundreds of spectators who packed an amusement center, six miles from the celebrated Vista Alegre Arena, where the noted matador, Domingo Dominguin, staged the spectacle.

More than two hours before the television show got under way the theatre in downtown Madrid was crammed to capacity with some 2,000 bullfight fans, eagerly awaiting one of the early exhibitions.

In all, three Sunday bullfighting

"corridas" were covered by RCA television, and the famed impresario, Dominguin, had this to say about the introduction of the new television art into the ancient pastime of Spain: "I am extremely pleased that the Spanish people have had the opportunity of seeing television and of witnessing the televising of bullfights. It is a wonderful combination of the old and the new—of spectacular entertainment and science."

Several members of the RCA television crew were veterans of televising bullfights in Mexico last year. They were assisted by Spanish technicians who became quickly skilled in handling the video gear. After official and public demonstrations they participated in the send-off for the introduction of television in Spain.

The Madrid press received the bullfight coverage with enthusiasm, offering the consensus that in many instances the televised pictures of the events were brighter than the actual scenes in the arena.

The Madrid daily, *Hoja del Lunes*, declared editorially: "Perfect quality of pictures and sound was demonstrated by RCA television in covering the bullfights."

Another newspaper, *Diario Alca-*

USING A TELEPHOTO LENS, A TELEVISION CAMERAMAN FOCUSES ON ACTION IN A FAR CORNER OF A SPORTS ARENA.



[RADIO AGE 25]

zar, said: "Spectators at the arena crowded around the television monitoring equipment near the end of last night's performance when heavy clouds caused poor visibility in the arena. The television viewers saw pictures that were much brighter than the actual scene in the arena."

The *Diario de Madrid* added: "RCA deserves warm praise for its television coverage of a Spanish bullfighting spectacle. Television enabled viewers many kilometers from the arena to see the events with excellent fidelity."

During the television demonstrations in Madrid the city displayed colorful posters advertising what it termed a "television corrida" and gave wide acclaim to RCA representatives and the distributing organization. At intervals, the noted Dominguin stood behind the RCA producer Ed Price, and advised him on camera shots. Dominguin, himself a sports impresario, announced that he hoped to employ television in coverage not only of bullfighting, but in other events such as boxing and wrestling, when television makes its permanent entrance into Spain.

In October, 1946, a television

crew of the RCA International Division journeyed to Mexico and demonstrated the RCA system with a series of pick-ups in the capital. There, success was achieved for the first time in the pick-up and transmission of bullfight scenes.

Later, in June, 1947, the first demonstration of the American television system on the continent of Europe was conducted by RCA at the Milan International Fair and at various other Italian sites, including Vatican City, where Pope Pius XIII was televised for the first time. These demonstrations were held in conjunction with the celebration in Italy of the 50th anniversary of the invention of radio.

Members of the RCA International Division's television crew who introduced the video art to Spain were William J. Reilly, C. E. Davis, T. J. Shipferling, F. W. Millsbaugh and Ed Price. On hand for the initial exhibition were Vice-Admiral William A. Glassford, European Manager of RCA; John F. Royal, Vice President and Assistant to the President, National Broadcasting Company; and Carlos Villalvazo, European Field Representative of the RCA International Division.

## 300 Engineers Complete Television Courses

More than 300 broadcast engineers from leading radio networks and independent stations in the United States, Australia, Canada, and Mexico, have completed the television technical training courses being conducted by the Engineering Products Department of the RCA Victor Division in Camden, N. J.

Conducted by "popular request" in Camden and also on the West Coast the week-long clinics acquaint broadcast technicians with the theory, design, operation, and maintenance of the latest television equipment. A combination of technical sessions and practical demonstrations familiarizes the engineers with problems concerning the installation and operation of television systems. Each course, staffed by the same RCA television engineers who designed the equipment and are familiar with every phase of its operation, is delivered at an engineering level.

Technical sessions include discussions of all aspects of television technical operation, ranging from fundamental theory to layout of television studios, kinescope photography, and the use of mobile television microwave equipment in the coverage of remote broadcasts.

Practical demonstrations for those attending the fifth clinic in the Camden series, were held in a newly constructed television studio where the visiting engineers witnessed a live video program from the control position. They also were given an opportunity to operate the cameras, control equipment, and the 16mm and 35mm projectors used in televising motion picture film. In adjoining laboratories, they viewed demonstrations of RCA's 7000-megaeye relay equipment used for relaying television programs between remote pickup locations and the studio.

Included in the training programs were a tour of the transmitter production plant and inspection trips to RCA's experimental television station W3XEP and RCA Laboratories in Princeton, N. J.

SCENES SUCH AS THIS, PICKED UP BY AN IMAGE ORTHICON CAMERA FROM A LOCAL BULLFIGHTING ARENA WERE SHOWN IN A CROWD-PACKED MADRID THEATRE.



# Pack Transmitters Grow Smaller

*Latest Model Weighs Only 24 Pounds, Complete with Batteries, and Has a Range Up to 20 Miles*

The first known successful broadcast using a pack transmitter was made in 1929 by a parachute jumper who described the sensations of his descent to earth as an NBC feature. The pack transmitter used by that hardy and unknown soul was quite heavy, had only fair tonal quality, was somewhat unstable in the frequency of its signals and could be operated only for short periods due to limited battery life. However, the broadcast was successful and created widespread interest.

Since that time, the pack transmitter has become an essential tool of the broadcaster. Portable, low-powered, high-frequency self-contained stations of this general type are now used extensively for the relaying of sound broadcasts during golf matches, parades, street interviews and at large assemblages, such as political conventions.

But the size as well as the capabilities of the instrument have undergone noteworthy evolution. These improvements are typified in the latest model developed within the past year by NBC engineering talent.

In the Spring of 1947, George McElrath, NBC engineer executive, called in Jarrett L. Hathaway, NBC's assistant manager of engineering development—then a staff engineer—and told him the network needed seven new pack transmitters for its owned and operated stations and for Western Division headquarters at Hollywood. Hathaway investigated the possibility of getting seven pack transmitters of existing types in a hurry. But a thorough study of the situation convinced him that such a project would be excessively expensive. In addition, the current models were ten years old with tubes and circuit already obsolete, moreover, the method of controlling the frequency was not sufficiently accurate to meet the Federal Communications Commission's new standards. Hathaway knew, too, as did the other engineers—and especially the field

men—that the units then in use were too big, too heavy and too cumbersome.

This whole situation represented a challenge to any engineer charged with the procurement of new electronic equipment, so Hathaway determined to design a new pack transmitter that would be lighter, smaller and more efficient.

Forthwith he set to work on the basic circuit and after a short time, when he was satisfied with the foundation, he called in William Hotine, NBC development engineer, who added the mechanical details and refined the electrical circuits. Time devoted to the project from the start through the stage of manufacture was over a year, and in May, 1948, the pack transmitter was approved by Hathaway from an engineering standpoint.

The following month, it was used on the air for the first time during



J. L. HATHAWAY HOLDS THE LATEST STREAMLINED MODEL OF THE PACK TRANSMITTER. BATTERIES TO OPERATE THE UNIT FOR 6 HOURS ARE INSIDE THE CABINET.



THIS EARLY VERSION OF THE PORTABLE TRANSMITTER WAS LARGE AND CUMBERSOME AND REQUIRED A LENGTH OF WIRE FOR ITS ANTENNA.

the broadcast of a golf match in Hollywood. That particular pack transmitter had been brought to Hollywood for the National Association of Broadcasters convention in May, and was left there with NBC Western Division engineers. This was the pack transmitter that was used fairly extensively at the recent major political conventions in Philadelphia for remote pickups and for cue-channel transmission. The latter provides off-the-air cues and conversations between remote points and control booths.

The new pack transmitter is high quality, low powered and high frequency, designed for remote pickup of sound broadcast programs when extreme mobility and freedom of action are required. It is about one-third smaller in size and weight than previous models, yet is capable of improved performance. The saving in space and weight was made possible by the type of construction employed, together with the use of miniature components, including tubes. Other features are simplified tuning controls, high level modulation, automatic audio gain control,

high frequency pre-emphasis and high quality monitoring.

The newest pack transmitter has been designed for use within the 25 to 32 megacycle frequency band. The external housing dimensions are only  $9\frac{3}{4}$  inches wide by  $12\frac{1}{4}$  inches high by  $5\frac{3}{8}$  inches in depth. This size permits easy carrying, since the unit does not protrude too far from the back, and the height is small enough to avoid the annoying bumping of the lower edge against the hip of the operator—a common curse of the older transmitters. The overall weight, including batteries and protective cover, is only 24 pounds. Batteries provide about six hours of continuous operation, which corresponds to about fifteen hours of operation at a rate of one hour a day. Range is



WITH PACK TRANSMITTER AND BATTERIES STRAPPED TO HIS BACK AN EXERCISE BOY GIVES A RUNNING ACCOUNT OF HIS JAUNT AS A BROADCAST FEATURE FIFTEEN YEARS AGO.

one to twenty miles, depending on extraneous noise at the receiving location and also on the nature of the terrain over which the signals must travel.

Diligent research through the

intervening years has made possible the several successively smaller and more efficient pack transmitters. No one will venture a prediction as to the limit of improvement which one day may be reached.

## RICHMOND, VA., INSTALLS 2-WAY RADIO FOR POLICE

*More Than a Hundred Mobile Units Provide Protection to City*

ONE of the nation's largest high-frequency two-way police communications systems was recently installed and put in operation by the City of Richmond, Virginia, using equipment supplied by the RCA Engineering Products Department. The system, broadcasting over Station WPHF, operates at 155.01 megacycles for the station transmitter and mobile receivers, and at 156.09 megacycles for the mobile transmitters.

Richmond's original police communications system, which went into service in 1932 with one 400-watt station transmitter and 24 mobile

receivers, operating in the 2450 kc low-frequency band, today boasts a 250-watt high-frequency transmitter, two auxiliary 45-watt transmitters, and more than a hundred two-way mobile units. These units mounted in police cars, fire-fighting equipment, city ambulances, and other city-owned vehicles, give complete protection to Richmond, its harbor, and residents of adjoining Henrico County.

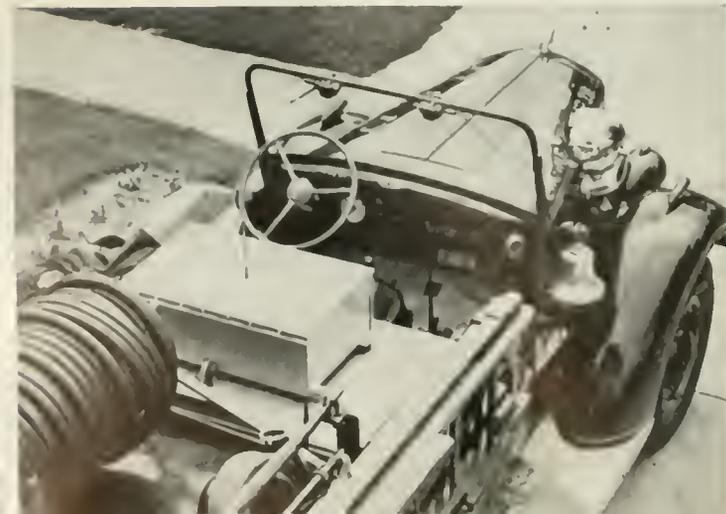
The main transmitter has been installed atop the Carillon, a World War I memorial, with auxiliary units housed in the Second Precinct Police Station and aboard a tug in the harbor. An antenna, mounted approximately 275 feet above ground, serves the main station. Continuous two-way communication with this unit has been successful over a distance of approximately 70 miles. A new radio room, remodeled

with such modern features as air conditioning, acoustic tiling, modern lighting, and fireproof furnishings, is operated twenty-four hours daily, and averages some 600 calls and about 1800 transmissions per day.

The RCA main station and two RCA auxiliary stations are all remotely controlled from two RCA remote control amplifiers located at Police Headquarters, approximately three miles from the transmitters. A system of duplex control makes it possible for either of two dispatchers to select and control the main transmitter or the auxiliary transmitters. The remote control equipment is also used to supply both out-going and in-coming calls to the three precinct stations, Police-Fire alarm office, Henrico County Police Headquarters, and six other offices via telephone lines.

TWO-WAY RADIO UNIT ON ONE OF RICHMOND'S FIRE TRUCKS IS LOCATED DIRECTLY BEHIND THE DRIVER'S SEAT.

THROUGH THIS CENTRAL RADIO CONTROL BOARD, RICHMOND OPERATORS HANDLE AN AVERAGE OF 1800 TRANSMISSIONS A DAY.





SCENE IN THE HOLLYWOOD STUDIO DURING THE FILMING OF "THE PUBLIC PROSECUTOR", FIRST MYSTERY SERIAL PRODUCED FOR TELEVISION.

## FILM DRAMAS FOR TELEVISION

*First Serial Produced Exclusively for Video Stations to be Released Soon in 26 Installments*

THE first dramatic serial feature to be filmed especially for television will shortly be shown to NBC video audiences throughout the country. The series, entitled "Public Prosecutor", consists of twenty-six stories each seventeen and a half minutes in length with an additional two minutes of running time for commercial messages, and thirty seconds to advertise the next installment.

As a television attraction, these "whodunit" programs will augment the kinescope recordings, also produced by NBC, which have been used by NBC affiliates located in

cities not yet supplied with coaxial cable or radio relay service.

A radical departure from current video programming, the films for television feature a new technique. Every foot has been shot solely with the television audience in mind with special attention given to close-ups rather than long shots. This intimate approach brings viewers into the story until they feel that they are actually aiding the Public Prosecutor in tracking down the criminals.

Produced in Hollywood by Jerry Fairbanks, the series stars John Howard and features a cast of well-

known players. Critics who have seen previews have been enthusiastic in their reports. *Newsweek* called the series the best news the home televiewer has had "since the World Series".

Through the NBC Television Recording System—a system of taking motion picture film off the face of a kinescope—the televiewer receives picture quality equal to the best sixteen millimeter home motion pictures.

### *Developed Over Ten-Year Period*

Television recording was developed over a period of ten years by NBC engineers working under the supervision of O. B. Hanson, vice president and chief engineer. Difficult technical problems, once thought insoluble, were overcome and the system is now a working reality.

The system received its baptism of fire with the two national political conventions. While the conclaves were under way, engineers in New York stood by with the recording cameras to put on film all the highlights in Philadelphia.

The NBC Television Recording System provides the method of syndication for the network to bridge the gap until interconnecting facilities are available. Although the

"HOWDY DOODY", POPULAR JUVENILE PROGRAM, IS BEING DISTRIBUTED TO AFFILIATED TELEVISION OUTLETS BY MEANS OF KINESCOPE RECORDINGS.



[RADIO AGE 29]

midwest television chain centering around Chicago will be connected with the East Coast by Jan. 1, 1949, there will be many NBC Television stations which will not be on the network for some time. Thus, the recording system will provide an effective interim networking arrangement.

At the beginning of September, six major NBC Television Feature Service program series were offered to non-interconnected video outlets of the network. This marked the first regular use of the system. The series were: "Musical Miniatures," televised three times weekly, on the east coast network and featuring well-known pianists and singers; Richard Harkness' "Story of the Week," a fifteen-minute interview program with leading personalities in the news; "Stop Me If You've Heard This One," starring Morey Amsterdam, Cal Tinney and Lew Lehr, a half hour comedy program; "America Song," a quarter hour of song and dance; "Howdy Doody", the ever-popular children's program starring Bob Smith; and "Television Screen Magazine" featuring Bob Stanton and interviews. As time goes on, it is expected that all NBC Television programs—both commercial and Feature Service—will be made available to network video stations wherever they may be located.



TELEVISION STATIONS BEYOND THE REACH OF COAXIAL CABLES AND RADIO RELAYS, TRANSMIT THE SONG AND DANCE PROGRAM "AMERICA SONG" FROM KINESCOPE RECORDINGS MADE IN NEW YORK.

## Safety and Health

*(Continued from page 24)*

be shut down until the hazard is eliminated.

It is the seemingly little things that make for good safety—such as having walkways free from hazards in a plant like Indianapolis, where large consoles are moved on conveyors; or, like the marking of certain areas in the Lancaster tube plant, where no one, — and this means no one without exception — is permitted to enter without special types of goggles. It means, also, having the kind of housekeeping in the Bloomington small radio plant that has led to repeated remarks by a factory inspector of the Indiana Department of Labor that this was

"the cleanest, best-kept plant of all those in my jurisdiction."

Pre-occupation with detail doesn't mean that the Safety organization overlooks the big things. When the Camden plant was converted from war to peacetime production, every design for machine lay-out, every new machine, every new process was carefully studied from drawing board to actual operation for elimination of hazards. RCA went even further. It obtained approval from the New Jersey Department of Labor for all of these installations, frequently exceeding State standards.

The end-product of these activities and the thorough-going safety

organization is the knowledge that employment at RCA Victor is safer than the average in the radio and phonograph industries.

At the Camden plant, largest of the ten comprising the RCA Victor group, there has not been a punch press accident in almost two years. On all other power machines, manned with an average of about 13,000 workmen, there have been only 11 accidents in the past year. This splendid record shows up in the accident frequency rate in 1947 of only 4.8 per million man-hours worked, as compared with the industry average of 6.2.

Other RCA plants, too, compare favorably with the industry average. All of them are constantly striving to find better and safer ways of doing things.



**RED SEAL**



**Cunningham**

**RADIOMARINE**

**RCA VICTOR**

**VICTROLA**

**RADIOTRON**



*Via RCA*



the ancient Babylonian and Egyptian brickmakers applied unique identification marks to their bricks. Roman craftsmen often applied their names to their products. In Germany, Venice and England, back in the 14th, 15th and 16th centuries, members of different guilds were placing their guild and personal marks on their respective goods. The bakers, printers, cutlers, cloth-makers and leatherworkers of those times were controlled by extremely rigid guild rules. To fix responsibility for poor workmanship and to identify the particular craftsman's work, it became the custom to apply an identification device or symbol to a product. From these crude beginnings, where the mark was actually a symbol of liability, there evolved the asset trade-mark of the 19th and 20th centuries.

In our modern free and democratic society there is a vast importance in trade-marks. They are socially significant. Americans are trade-mark conscious people. Whether you are a factory worker, an office worker, middle class or wealthy, you shop and buy according to established brands. It makes little difference if you are highly educated or illiterate; your brand or trade-mark consciousness is of intense interest to small business and big business.

The average purchaser likes the freedom to choose among well-known brands. A consumer survey showed that 85 per cent of all people readily recognized that the letters "GE" mean General Electric. The public readily recognizes and relies on our "RCA" trade-mark, and when broadcast listeners hear the familiar chimes on the radio they know at once that they are listening to their favorite "NBC" network.

Taking a closer look at the modern trade-mark, it quickly becomes evident that something new was added to the old guild system mark. Besides identifying the product, its origin, and guaranteeing a stable quality, the modern trade-mark advertises the product. Justice Felix

## The Meaning of Trade-Marks

*These Familiar Symbols Are Essential Tools of Industry which Create and Maintain Good-Will Toward Company and Product*



By Abraham S. Greenberg

*Trade-Mark Attorney,  
Radio Corporation of America*

keep its trademarks in prominence are legion. Newspaper and magazine advertisements; the lure of prize contests; radio network programs with their highly paid stars and well-known orchestras; car cards in trains and buses—these are only a few of the methods that are proving effective in perpetuating and strengthening trade-marks.

Trade-marks by themselves do not sell goods, but properly exploited they create that highly valued business asset called good-will. Like a powerful magnet, good-will attracts the shopper and buyer to a specific product. Customers are already half-sold if they have acquired confidence in the integrity of the maker of a line of goods. Good-will engenders a sense of reliability.

Trade-marks have a pedigree; they go far back to the days of the guild system. Evidence shows that

**T**RADE-MARKS, and the Good-will they create are essential tools of industry, yet few laymen realize to what extent they are vital to the successful conduct of business enterprise. Rarely does the man-in-the-street appreciate their effect on the safety, health and buying confidence of the public.

The devices used by business to

Frankfurter put it very nicely in these words:

"The protection of trade-marks is the law's recognition of the psychological function of symbols. If it is true that we live by symbols, it is no less true that we purchase goods by them. A trade-mark is a merchandising short-cut which induces a purchaser to select what he wants, or what he has been led to believe he wants. The owner of a mark exploits this human propensity by making every effort to impregnate the atmosphere of the market with the drawing power of a congenial symbol. Whatever the means employed, the aim is the same—to convey through the mark, in the minds of potential customers, the desirability of the commodity upon which it appears. Once this is attained, the trade-mark owner has something of value."

#### *Trade-Mark Is a Property Right*

It is interesting to compare a trade-mark with such business values as patents, copyrights, trade secrets, "know-how", the skill, experience and reputation of personnel. Patents and copyrights are property rights which arise out of a grant by the Government. Most of the assets of a business enterprise have a vitality and power of their own which permit them to function independent of the business. A trade-mark, however, is a property right which comes into existence only through use by its owner as a distinctive mark in connection with a given product. Once separated from the article or business to which it refers, the trade-mark becomes meaningless and will perish as a trade designation.

A trade-mark may be said to be a distinctive word, emblem, symbol or device used to identify the maker or distributor of a given product. While trade-marks are protected by the courts, whether registered or not, State and Federal trade-mark registration give substantial benefits to trade-mark owners.

One of the highlights of this new Federal Trade-Mark law is the formal recognition and registration

of a service mark. These are marks used by laundries, cleaners, banks, insurance companies, radio broadcasters and others whose services are rendered interstate. A service mark means a mark used in the sale or advertising of services to identify the services of one person and to distinguish them from the services of others. They include without limitation the marks, names, symbols, titles, designations, slogans, character names, and distinctive features of radio or other advertising used in commerce. For example, the letters "NBC" and the chimes used in the broadcast service of National Broadcasting Company, the RCA monogram as used in the radio communication services of RCA Communications, Inc., the word "Radiomarine" used to indicate the services rendered by Radiomarine Corporation of America—all of these are service marks.

The selection of a suitable trade-mark is not an easy task. It should not be a descriptive word, a geographical name, or in general any symbol or device which others may employ with equal truth and have an equal right to use for the same purpose. The mark should be searched in the U. S. Patent Office or other suitable search source to make sure that the desired mark is not similar to a prior mark. In brief, a good trade-mark or service mark is distinctive, has a psychological appeal, is suitable for the product or service, is euphonious and is easy to remember.

From its formation in 1919, RCA has considered trade-marks one of its foundation stones. In this respect, General Sarnoff, only a short time ago, said:

"RCA's trade-marks are among its most valuable assets. They are a symbol of the intangible value of the 'good-will' between RCA and the public which we have painstakingly and at great cost built up over the years. No improper use of trade-marks should be permitted to impair that investment in effort and expense."

How well the Radio Corporation of America, its divisions and subdivisions have promoted their trade-marks is evidenced by recalling some of their symbols which through ceaseless reiteration have become household words both at home and abroad. "RCA", "RCA Victor", the familiar dog and phonograph "His Master's Voice", "Victrola", "Radiotron", "Red Seal", "Via RCA" and "NBC". Behind these widely advertised trade-marks and service marks stand the integrity and reliability of the manufacturer, the distributor and the dealer.

However, there is more to a trade-mark than merely coining it and promoting it. If it is to remain an asset, it must be zealously watched and protected. As it becomes more valuable, it becomes more vulnerable. Many are the devices resorted to by an unscrupulous competitor in his attempts to promote his own wares by preying on the glowing good-will of another. Courts have ruled repeatedly that the proprietor of good-will is entitled to "protection against one who attempts to deprive him of the benefits resulting from the same, by using his labels and trade-marks without his consent and authority."

While it is true that RCA from time to time has enriched the stockpile of everyday language with coined words such as iconoscope, kinescope, orthicon, loran, shoran, teleran, the Corporation's basic marks are guarded with all the force that can be assembled. For these are the tireless salesmen of RCA.

## States Position on UHF

*(Continued from page 12)*

orderly progression leading toward assignment of additional channels will permit the radio industry and the broadcasters to make concrete plans for expansion of television service to the American people and to do this without disturbance and with full realization of the best public interest."

# RADIO AGE

RESEARCH • MANUFACTURING • COMMUNICATIONS • BROADCASTING • TELEVISION



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Kansas City, Mo.



JANUARY

1949

DR. VLADIMIR K. ZWORYKIN



*"We're terribly worried about him. Television seems to be warping his outlook."*

IN THE PAST CENTURY, it was Tom Sawyer who captured America's juvenile readers. Then, a generation ago, Mickey Mouse began charming the half-price movie-ticket trade. Today, a televised marionette takes complete charge of the young.

It happens weekdays at 5.30, as an estimated 81,000 sets light up for the appearance of Howdy Doody. Such is the impact of his guileless antics on the lives of small viewers that all matters of food, work, play, temper or sleep must await the conclusion of each afternoon's session.

So, if parents are forced to know each machination of Mr. X . . . to be thoroughly acquainted with Clarabelle the Silent Clown . . . to see again carefully edited movie comedies, they are aware of how much good fun can be packed into television viewing.

And when the moppets have been shoofed off to bed, adults will find their own pleasure in the dramas and sports, the variety shows and news, the concerts and comedy that mark the range of balanced entertainment on America's No. 1 Television.

WNBT CHANNEL 4 NEW YORK  
THE NATIONAL BROADCASTING COMPANY



A General Electric Company

# RADIO AGE

RESEARCH • MANUFACTURING • COMMUNICATIONS • BROADCASTING • TELEVISION



VOLUME 8 NUMBER 2

JANUARY 1949

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Dr. V. K. Zworykin, vice president and technical consultant of RCA Laboratories, who, on January 17, will receive the 1948 Poor Richard Club Award for achievement, an honor given annually "to the most deserving of contemporary American citizens."

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Services of RCA are:

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

RADIO CORPORATION OF AMERICA  
RCA Building, New York 20, N. Y.

DAVID SARNOFF, *Chairman of the Board*  
LEWIS MACCONNACH, *Secretary*

FRANK M. FOLSOM, *President*  
ARTHUR B. TUTTLE, *Treasurer*

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AERIAL VIEW OF RCA LABORATORIES, PRINCETON, N. J., SHOWING NEW WING AT EXTREME RIGHT WHICH PROVIDES ADDITIONAL SPACE FOR THE PATENT DEPARTMENT AND LIBRARY.



TELEVISION BRINGS NEW FORMS OF ENTERTAINMENT AS WELL AS NEWS INTO THE HOME. SHOWN ABOVE IS THE RCA VICTOR TABLE MODEL, CALLED THE "BYSTANDER".

## Radio In 1948 - 1949

*Wide Public Acceptance of Television Speeds All Phases of The New Industry, Says Head of RCA in Year-End Statement — More People Will Eye-Witness Truman Inauguration Than All Who Saw Thirty-One Presidents from Washington to Roosevelt Take The Oath of Office*

By Brig. General David Sarnoff  
*Chairman of the Board,  
 Radio Corporation of America*

THE year 1948 was the most successful in the history of the Radio Corporation of America. The rapid expansion of television as a service to the public was a major factor in this record result.

Because of its continued progress in all phases of radio and television, RCA is today the *World Leader in Radio—First in Television.*

RCA operations in television—research, engineering, manufacturing and broadcasting—have, in great measure, enabled the United States to maintain preeminence in television. As a result, this new science is fitted into the country's program of national security, offering eyes to the fleet, to the air force, and the army.

The past year has provided practical experience—additional engineering "know-how"—to confirm the validity of our vision, optimism and plans. The present and future of television are charted by actual service, not by hopeful promises. Definite accomplishments, coupled with inborn faith in science and public enthusiasm for this new art, have justified our years of pioneering to bring television into the service of the American people.

In 1948, television achieved such high popularity with the public that it became physically impossible to meet the demands for receiving sets and television tubes. This was true chiefly because it was not possible for the industry to obtain manufacturing machinery as rapidly as needed. This condition will continue at least through 1949.

Television set production, for the

industry as a whole, in 1949, will total approximately 2,000,000 receivers. This, according to the best available studies, will be stepped up in succeeding years, and by 1953, the industry's annual television set production is expected to reach close to 5,000,000. By the end of that year the total number of sets in operation would be about 18,000,000. Also, by 1953, it is believed that a coast-to-coast television network service will have been made possible by radio relays and coaxial cables.

So appealing is television to the American public, in all walks of life and at all ages, that the industry at the opening of 1949 will be two years ahead of the dates set by the most optimistic forecasts made at the end of the war.

This accelerated progress has lifted radio and television, in com-

mination as an industry, to a two and a half billion dollar a year enterprise. If the rate of growth continues as the market indices and public acceptance indicate it will, radio-television should rank as one of the ten foremost industries in the United States by 1953.

Radio and television now give employment to hundreds of thousands of people and bring new forms of entertainment as well as news into millions of homes. The American dependence on radio entertainment, acquired over the past 28 years, is being more deeply ingrained by television, which enables people in ever-increasing number to eye-witness events as they happen.

Many millions of Americans, in homes and schools from Boston to Richmond, along the Great Lakes and as far west as St. Louis, will see the inauguration of President Truman on January 20. This telecast will mark an historic milestone in civics as well as in broadcasting, for it is the first event of its kind to be televised. It is estimated that at least 10 million people will eye-witness the Truman inauguration—more than all who saw the thirty-one presidents from Washington to Roosevelt take the oath of office. Forty stations are expected to be in the television hook-up, in contrast to the 21-station radio broadcast of the Coolidge inauguration in 1925—which was the first presidential inaugural broadcast.

Today, 122 television stations have been authorized by the Federal Communications Commission. Forty-nine are on the air. Seventy-five other applicants have permits to construct stations, and 312 additional applications are pending. Television networks are expanding across the nation—opening new markets for receiving sets and constantly increasing television's "circulation" as an advertising medium of powerful sales appeal.

The National Broadcasting Company owns five television stations,

four of which—in New York, Washington, Cleveland and Chicago—are on the air. The fifth, in Hollywood, will begin regular service immediately after the first of the year. Eighteen additional television stations have affiliation arrangements with NBC.

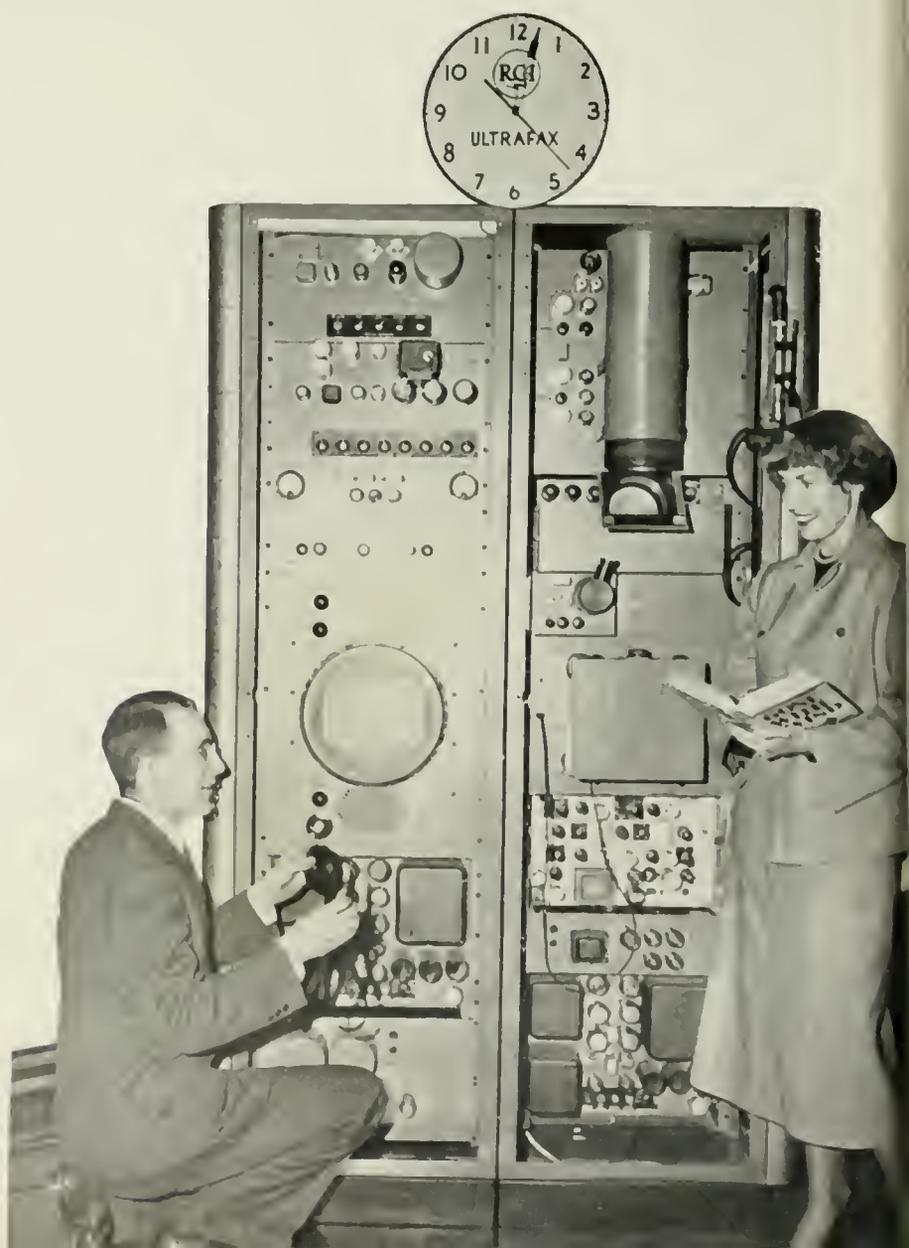
On January 12, 1949, NBC's East Coast and Midwest television networks will be joined by coaxial cable and radio relay into a single network. Comprising initially 15 stations, other affiliates will be added to the NBC-TV network as rapidly as inter-connecting facilities become available. As the networks expand, each new city adds to the available sources of future television programs.

At the opening of 1949, NBC is broadcasting an average of 32 hours of television programs a week. Of this total, 39 per cent is made up of

sustaining programs and 61 per cent is commercially sponsored.

Recently, Chairman Wayne Coy of the FCC estimated that in another two years there will be 400 television stations on the air, and 1,000 stations in seven or eight years from now. He also pointed out that nine-tenths of everything we learn comes through our eyes, and added: "Television enables us to reach the mind via electronics at the speed of light. It is costly to build and to operate a television station. But the advertisers will find it the most powerful, most effective and most profitable medium for mass merchandising yet devised."

So swift has been the scientific and engineering development of television transmitters and receivers that those responsible for the artistry and showmanship of television have found it a real challenge



ULTRAFAX RECEIVING TERMINAL SHOWING THE CLOCK WHICH TIMED THE HISTORIC TRANSMISSION AT THE LIBRARY OF CONGRESS IN WASHINGTON, D. C., ON OCTOBER 21, 1948.



NEW TABLE MODEL TELEVISION RECEIVERS MOVE IN INCREASING NUMBERS DOWN PRODUCTION LINES AT THE RCA VICTOR PLANT, CAMDEN, N. J.

to keep the pace. Nevertheless, the great improvement in programs at this year-end reveals such progress that it guarantees continued advances in the development of this new art.

#### *Ultrafax Demonstrated*

Combining the great advances made by television with sensational achievements in radio relays and photography, the Radio Corporation of America in 1948 introduced Ultrafax, a new system of high-speed television communication, capable of transmitting and receiving handwritten or printed messages and documents, and even complete books, magazines and newspapers, at the rate of a million words a minute. It was demonstrated publicly for the first time by RCA on October 21, 1948, in the Library of Congress, Washington, D. C. This development which splits the second and utilizes each fraction for high-speed transmission of intelligence, promises to be as significant a milestone in communications as was the splitting of

the atom in the world of energy.

While many uses for Ultrafax are foreseen, its scope will multiply with time and experience. We foresee the day when through television and Ultrafax, a radio newspaper may be delivered through the air into every home equipped with a television set. It will be possible to have the same transmitter that broadcasts a television program broadcast the radio newspaper simultaneously. In fact, the same home-receiver, with proper attachments, could print the newspaper without interrupting the television program.

As a radio-mail system, Ultrafax could deliver the equivalent of forty tons of mail coast-to-coast in a single day.

We can also envisage the day when Ultrafax will provide us with a new service of international television. First, however, a radio "air-lift" must be provided across the Atlantic. With twelve to fourteen suitably equipped communication planes flying over the ocean and properly spaced, an overseas air-

borne radio relay system could be established between the U. S. and Europe to provide not only an exchange of television programs, but also to handle the equivalent of tons of mail, news and other services. Ultrafax would make all this possible with lightning speed and mobility.

It is for these reasons that Ultrafax should prove one of the most significant technological advances in the history of communications.

#### *Radio Broadcasting*

While television and Ultrafax dramatically held the spotlight in the advance of radio in 1948, sound broadcasting continued to move forward in its 28th year of service to the American public. The National Broadcasting Company—a service of RCA—completed in 1948 its 22nd year of operation. NBC, with its nation-wide network of 170 broadcasting stations, had the largest volume of business of any year since its formation in 1926.

Radio broadcasting provided the firm foundation of experience and

public service upon which television is being built. Sound and sight combined are weaving a pattern that is more appealing to the mind than sound alone, so a gradual fusion of these two great services is to be expected. More than 1,700 standard broadcasting stations are operating in the United States and construction permits for approximately 300 more have been granted. There are 39,000,000 homes equipped with radio receivers in this country, which means that more than 90 per cent of American families have radio sets.

FM (frequency modulation) broadcasting continues to advance as indicated by the fact that the number of FM stations on the air increased from 300 at the beginning of 1948 to nearly 700 at the close. More than 300 construction permits for additional FM stations have been issued. The number of radio sets equipped for FM reception increased to more than 3,000,000 in 1948.

As a pioneer in standard broadcasting as well as FM, RCA has built and installed approximately one-third of both types of transmitters now on the air. During 1948, RCA supplied the first two 50,000-watt FM transmitters in the United States, one at Milwaukee, Wis., and the other at Birmingham, Ala.

#### *Radar Continues Advance*

Radar has continued to advance, and its application to peacetime uses is being extended as a navigational aid in the marine field as well as in aviation. During the past year Radiomarine Corporation of America—a wholly owned subsidiary of RCA—made several hundred radar installations on board ships, including 20 units for the U. S. Coast Guard and 217 for transports of the U. S. Army Signal Corps.

Scientists and research men at RCA Laboratories made outstanding progress during 1948 in the development of many new devices and in the fundamental explorations of radio and electronics. A new study of radio frequencies above 500 megacycles, as a medium for the expansion of television broadcasting, was made by RCA engineers in Washington, D. C., during

the latter part of 1948. The results were made available to the industry and to the FCC, and are expected to be of invaluable assistance in helping to chart the future area of television's growth.

#### *Progress in Nuclear Physics*

Further progress is being made by RCA Laboratories in developing a research program of nuclear physics, especially in relation to all fields of radio and electronics. The technique of radio-active tracers is being applied in research work on electron tubes, and the Laboratories has made substantial advances in the development of radiation detecting devices for the protection of persons who work with radio-active materials.

In medicine, science and industry, the electron microscope continues to play an increasingly important role. Today, nearly 300 RCA electron microscopes are in use throughout the world. To enhance the usefulness of the microscope in biological and medical problems, RCA Laboratories has concentrated on the development of techniques that enable the study of virtually untouched specimens. This is accomplished by growing bacteria directly on the membrane that supports specimens in the microscope.

By this method, it is possible to follow the growth of several organisms including, in particular, those of tuberculosis, and the action of several bacterial viruses. When this technique is combined with the use of a specially designed lens, some of the structural changes can be observed as they occur in growing bacteria.

Industrial electronics, with its widespread possibilities for useful application, continues to challenge our scientists and engineers. For instance, in 1948, RCA introduced a new electron tube, which acts as a "transducer," converting mechanical vibrations into electrical pulses that can be studied as audible or visual signals. The tube is smaller in diameter than a cigarette and only half as long. It weighs 1/16th of an ounce. It is so sensitive that it can measure the vibrations made by a fly walking on a steel beam. Therefore, it is easy to see what great possibilities it has for use in

such diverse fields as the detection of defects in airplane construction, the causes of dynamic unbalance in rotating machinery, the measurement of the effects of oil well blasts, recording blood pressure, studying under-water sound and numerous other applications.

We can look forward with assurance to many new developments in the field of radio, television and electronics in 1949—the fourth year of intensive study and peacetime application of the scientific discoveries and inventions in this field which contributed so much to hasten victory in World War II. Some of these advances are already in the public service. Others will go to work in the coming years.

But so wide is the scope of radio science today, and so great its possibilities for the future, that it is beyond human power to foresee all the new advances that will appear. It is safe to prophesy that some developments will overshadow in significance many of the achievements of the past. This much is certain—our scientists and engineers will continue to devote their energies and skills toward extending the usefulness of the electronic and communication arts, so that Radio Corporation of America will remain *World Leader in Radio—First in Television!*

## Two Television Images Shown on One Screen

The first split-screen television image in which two pictures from different origination points appeared side-by-side on the same kinescope picture tube was displayed by NBC on December 8 during the Television Broadcasters Association Clinic at the Waldorf-Astoria Hotel in New York. Television set owners who were tuned to WNBT, New York, and WNBW, Washington, D. C., witnessed the unusual program.

This split screen picture was transmitted through a new piece of equipment, the "Image Splitter," developed by the National Broadcasting Company Engineering Department, under the supervision of O. B. Hanson, NBC vice president and chief engineer.



BRIGADIER GENERAL DAVID SARNOFF



FRANK M. FOLSOM

# Changes in RCA Management

*Frank M. Folsom Advanced to Post of President of Radio Corporation of America; David Sarnoff Continues as Chief Executive of the Company and Chairman of the Board of RCA.*

**T**HE Board of Directors of the Radio Corporation of America at its regular meeting held on December 3, upon the recommendation of Brigadier General David Sarnoff, Chairman of the Board, elected Frank M. Folsom as President of the Radio Corporation of America, effective as of January 1, 1949.

Mr. Folsom, Executive Vice President in Charge of RCA Victor Division, has administered the far-flung production and merchandising activities of RCA for the past five years.

At the same meeting, John G. Wilson, Vice President and General Manager in Camden, was elected Executive Vice President in Charge of the RCA Victor Division, succeeding to the post filled by Mr. Folsom.

General Sarnoff, who has occupied both the offices of President and Chairman of the Board of the Radio Corporation of America since the retirement in 1947 of the

late General James G. Harbord, continues as Chairman of the Board and will remain Chief Executive Officer of the RCA, as well as Chairman of the Board of the National Broadcasting Company and RCA Communications, Inc., both wholly owned subsidiaries of RCA.

In announcing the changes, General Sarnoff declared: "The Board of Directors of the Radio Corporation of America is gratified in being able to find the men within its own organization who, by the record of their achievements in the service of the company, have proved themselves worthy of promotion and able to share in the highest management responsibilities.

"Frank M. Folsom, who now takes up the administrative load, has the background and experience to function also on the policy levels demanded by the many problems resulting from the healthy growth of RCA's business in a rapidly expanding art and industry.

"And John G. Wilson, who now

succeeds Frank M. Folsom, has proved by his work as Vice President and General Manager of the RCA Victor Division his capacity to head up the growing and extensive manufacturing and merchandising activities of the RCA.

"The Corporation has labored for more than 25 years to bring about the creation of a great television industry and other new services and products made possible by research and progress in the radio and electronic arts. Both of these officers have proved more than equal to their opportunities and responsibilities in the expanding management requirements of the RCA family."

## *Folsom Joined RCA in 1944*

Frank M. Folsom joined the Radio Corporation of America as a Director and Vice President in Charge of the RCA Victor Division on January 1, 1944, and he was elected Executive Vice President in Charge of the RCA Victor Division on June 1, 1945.

Prior to his association with RCA, Mr. Folsom had been active for 30 years in merchandising and had served for nearly two years as Chief of the Procurement Branch of the United States Navy Department. For outstanding service with the Navy, he was awarded the Medal for Merit by President Truman and received the Distinguished Civilian Service Award, the Navy's highest civilian honor.

Mr. Folsom was born on May 14, 1894, in Sprague, Washington. He is the son of Anna Wilson Folsom and Edward P. Folsom, a direct descendant of John Folsom who settled in Hingham, Massachusetts, in 1638. He attended schools in Washington and Oregon and received honorary LL.D. degrees from the University of San Francisco and St. Joseph's College, Philadelphia.

Mr. Folsom began his business career with Lipman Wolfe Department Store, of Portland, Oregon, in 1910. Three years later, he became an apprentice buyer at Hale Brothers in San Francisco and in 1914 joined the firm of Weinstock & Lubin in Sacramento, remaining there until 1917, when he entered the Air Service, U. S. Army.

At the end of World War I, Mr. Folsom resumed his position as buyer with Weinstock & Lubin, and continued there until 1923. He then rejoined Hale Brothers as General Merchandise Manager and in 1928 became a Director and General Manager.



JOSEPH H. MCCONNELL



JOHN G. WILSON

Four years later, Mr. Folsom joined Montgomery Ward & Company as Manager of Pacific Coast operations for both Mail Order and Retail Stores. In 1933, he was elected Vice President in Charge of Merchandising and a Director of Montgomery Ward, with headquarters in Chicago. He resigned in 1940 to become Executive Vice President of Goldblatt Brothers, Inc. of Chicago.

Mr. Folsom was one of the first industrialists to enter Government service prior to World War II. He joined the National Defense Advisory Commission upon its formation on July 1, 1940, as Assistant Coordinator of Purchases. He continued in that position through 1941, when the Secretary of the Navy appointed him a special assistant to the Under Secretary of the Navy and Chief of Procurement. He also served as Chairman of the Procurement Policy Board of the WPB, coordinating agency for procurement policy of all war services and agencies.

#### *Wilson Came to RCA in 1944*

Mr. John G. Wilson joined the Radio Corporation of America in June, 1944, as Administrator of Accounts and Finance for the RCA Victor Division. In June, 1945, he was elected Operating Vice President and two years later he was elected Vice President and General

Manager for RCA Victor Division.

Prior to his association with RCA, Mr. Wilson had been active for over twenty-five years in the accounting, financial, operating and merchandising fields.

Born in Alma, Illinois, on August 17, 1900, Mr. Wilson attended Illinois public schools and Northwestern University.

In the first World War, he served as a Captain in the Coast Artillery.

Mr. Wilson began his career at Price Waterhouse & Company, Chicago, in 1920. In 1924, he joined the Blackhawk Press in Chicago. Three years later, Mr. Wilson became associated with Montgomery Ward & Company as Assistant Controller and later as Controller. He remained at Ward's until 1940, when he left to become Vice President and Controller, and a Director, of Goldblatt Bros., Inc. in Chicago. A year before joining the Radio Corporation of America, he became associated with the United Wallpaper Company as Vice President and General Manager.

## McConnell and Buck Advanced to New Posts

Advancement of Joseph H. McConnell of the RCA Victor Division and Walter A. Buck of Radiomarine Corporation of America to new posts in the RCA organization were announced early in the new year.

*(Continued on page 31)*



WALTER A. BUCK

# New Phonograph and Record

*Unique Record and Record Player Introduced by RCA Victor Provide Finest Quality of Reproduction at Low Cost — 7-Inch Discs Operate at 45 Revolutions a Minute.*

**A**N entirely new system for the reproduction of recorded music in the home, resulting in a new type of phonograph and record which deliver the finest quality record reproduction at low cost in the history of the phonograph record industry, was announced by the RCA Victor Division of Radio Corporation of America, on January 10.

The new phonograph and record operate at 45 revolutions per minute and provide completely distortion-free music of unprecedented brilliance and clarity of tone. The small-size record, just under seven inches in diameter, is capable of handling, in a single disc size, all musical classifications from popular to classical.

In his formal announcement of RCA Victor's development of the new system for the reproduction of recorded music, J. G. Wilson, Executive Vice President in charge of the RCA Victor Division, declared:

"This is the best phonograph record ever made. It was developed jointly with its own unique record player. The combination of these two makes available to the American home recorded music of a quality and fidelity never before possible at low cost."

The new record player, Mr. Wilson stated, contains the fastest record-changing mechanism ever devised and its radically advanced design eliminates 75 percent of the problems encountered in conventional changers.

Another important aspect of the new system, he added, lies in the fact that the distortion-free, noise-free performance made possible by the new 45-rpm record player and records opens the way for the development of home instruments of wider frequency range and truer fidelity. RCA Victor, he disclosed, is planning along these lines.

The new record and record player climax more than 10 years of research and refinement in this field by RCA.

In addition to the record, three new instruments incorporating the new system have been announced. These instruments are an automatic record-playing attachment and a complete automatic phonograph, both remarkable for their small size, simplicity and ability to provide high quality performance; and a combination console instrument incorporating a radio, a conventional 78-rpm record player, and the new 45-rpm player in a cabinet smaller than conventional models.

The record developed for this new system is a light-weight, water-thin, non-breakable vinyl plastic disc unusual also for its 1½ inch center spindle hole.

Because of the operating speed of record and player, the short playtime requirements of popular selections as well as the lengthier playtime of symphonies and other classical selections, can be handled.

The record delivers up to five minutes and 15 seconds of playing time per side, and, with the rapid action of the new changer, up to 42 minutes of undistorted music.

The heart of the new instrument is a revolutionary automatic record changer mechanism, the outstanding characteristic of which is the large, 1½-inch red plastic-capped center spindle which houses the trigger-fast drop mechanism. It holds up to eight records. The action of the mechanism is entirely noiseless and even the drop of the record is scarcely audible.

## *Operation Virtually Noise-Free*

Each of the new instruments has a small tone arm, exerting a pressure of only 5 grams on the record, and equipped with a Silent Sapphire permanent-point pickup, contributing to virtually noise-free reproduction.

Emphasizing that for the first time the industry now has record playing equipment and records for



EIGHT OF THE NEW SEVEN INCH RECORDS, WHEN PLACED ON THE SPINDLE OF THE COMPACT AUTOMATIC RECORD PLAYER, PROVIDE 42 MINUTES OF UNDISTORTED REPRODUCTION.

the home that are made for each other. Mr. Wilson declared: "The new instruments and records represent a logical, significant advance in the evolution of recorded music.

"Recognizing this as an evolutionary advance," he continued, "we firmly believe that the market for conventional 78-rpm records will not be seriously affected immediately, but will continue strong for many years to come.

"In homes throughout America," he said, "there are 16 million record players designed for use with the 78-rpm records which have been standard for 50 years. This market must, and will, be serviced. Mindful of this, RCA Victor will continue a heavy production schedule on records of this type. The company will also continue to support dealers with the full weight of its advertising, promotion, and merchandising programs on Victor's 78-rpm records.

"All of our planning is based on our belief that the new 45-rpm reproducing system and record are of an evolutionary, rather than a revolutionary nature."

Pointing out that the introduction of this new system has been long

and thoroughly considered, Mr. Wilson stated:

"RCA Victor is the only manufacturer making both phonographs and records, and has the largest stake of any organization in both fields. Our confidence in the new system and the sound, constructive values inherent in our presentation of it to the industry at this time are implicit in our decision."

Joseph B. Elliott, Vice President in charge of the RCA Victor Home Instrument Department, revealed that the new record and instruments have been demonstrated to phonograph and record manufacturers, as well as phonograph equipment manufacturers.

"Manufacturers who have witnessed these demonstrations have expressed extreme enthusiasm," he said, "and many are now planning to adopt the new system, manufacturing rights to which are available to the entire industry in accordance with long-established RCA practice."

The new line of instruments and records, Mr. Elliott added, will be introduced in the early spring.

J. W. Murray, Vice President in charge of the RCA Victor Record Department, also disclosed that a substantial catalogue of the new 7-inch 45-rpm records will be available at that time. All new material,

he declared, is now being recorded simultaneously at 78 rpm and 45 rpm, and new releases will be made available in both types of records.

Although price schedules have not yet been determined, Mr. Elliott stated, instruments incorporating the new system will be at least competitive in price with comparable conventional record-playing instruments. He also pointed out that the small size and the non-breakable feature of the new vinyl plastic record are conducive to cost savings. It also effects savings in distributor warehousing facilities and dealer storage facilities.

#### *Background of Development*

In describing the background of the new development, Mr. Elliott pointed out that many of the major technical problems in the industry arose from lack of standardization, particularly in records, where differences exist in thicknesses of records, diameters, and other dimensions and record characteristics. Adoption of the new system, he said, would contribute measurably to standardization in the industry and the elimination of these former problems.

"It is worth noting that for the first time in the history of the industry," he explained, "a record and a record player have been specifically designed to complement each other."

It was also pointed out that the small size of record and changer will permit the housing of a complete library of about 1,000 records in an average-size console. This new record virtually eliminates the problem of record storage in the home.

Because this system permits smaller-size instruments, he added, radio-phonograph combinations can be reduced in size by 25 per cent.

"With the smaller, lightweight record," he said, "a customer can purchase several albums and carry them away in his topcoat pocket or under his arm like a book."

In outlining other important features of the new record player and record, Mr. Elliott called attention to the fact that the playing surfaces of stacked records do not touch each other, thus eliminating surface scratches and damage to grooves. This is achieved by creating a "collar" around the label area which is

thicker than the playing area. Air space between records is thus provided. He added that the seven-inch diameter and large center hole permit easy handling of records, eliminating touching surfaces with fingers.

Tremendous possibilities are foreseen for the use of a second record-player in the children's room, with the small-size albums easily stored in present bookcases.

In summing up his announcement, Mr. Elliott said: "RCA Victor is introducing not only a new phonograph and record, but an entirely new system of reproducing recorded music. We believe it has commercial advantages never before available to the industry and to the industry's allied distributor-dealer organizations. We will incorporate it in all our forthcoming record-playing instruments and we know that many other manufacturers in the radio industry, to whom this new system is available, will also incorporate it in their instruments.

"The new 45-rpm instruments and records offer advantages of undoubted appeal to all types of consumers, and we believe its enthusiastic reception by the American public is assured."

## 861 Veteran Employees Receive Gold Watches

**E**IGHT hundred and sixty-one active and retired employees of the RCA Victor Division and its predecessor companies, who have completed 25 or more years of service, received gold watches and gold service pins in ceremonies held at the various plant locations, during December. The presentations inaugurated a new Service Award Program for members of the Division.

Recipients of the award included employees in seven of the RCA Victor Division's ten plants and in the RCA Victor Distributing Corporation and the RCA Service Company, Inc.

Distribution of service pins to 20-year, 15-year and 10-year members of the RCA Victor Division will take place in the early part of 1949.

BECAUSE OF THEIR SMALL SIZE, HUNDREDS OF THE DISCS REQUIRE NO MORE STORAGE SPACE THAN A FEW BOOKS.





THOUSANDS OF BASEBALL FANS WATCH THE 1948 WORLD SERIES GAMES ON 100 RCA VICTOR TELEVISION RECEIVERS INSTALLED ON BOSTON COMMON.

## Television In Boston

*Excerpts from an address by Frank M. Folsom, President, Radio Corporation of America, before the Clover Club of Boston on December 4, 1948.*

AS AN historic center of culture, Boston promises to be a pre-eminent stage of television. In Boston, arts and sciences, traditions and teaching, schools and sports come into focus. Here waves the pennant of the National League Champions! And let us not overlook the Red Sox, the annual marathon, your hockey games and the numerous collegiate fields of sport which make this city—the Athens of America—a natural amphitheatre of television. No wonder Boston, with two stations on the air, is one of the first cities on the television map; no wonder the Federal Communications Commission has seven additional applications for stations to picture Bostonian activities and to televise dramatically its glory,

from the Puritans to the Revolution, from the Tea Party to Emerson, Thoreau and Longfellow, and from John L. Sullivan to the Braves!

Since symphony in Boston is ritual, and music an integral part of your social and cultural life, you will be interested in knowing that television has a natural affinity for music. When Arturo Toscanini first waved his baton across television screens in directing the NBC Symphony Orchestra, he opened a new era in musical performance. The 81-year old maestro is a dramatic television personality, for his face and hands are eloquently telegenic. The television audience looks directly into his face to note every expression and every gesture. First they see him close-up and then by a touch of magic the orchestra appears in the background; first in a complete ensemble and then by groups, as the score calls for musical emphasis. With spectacular ef-

fect, the image of the maestro also, from time to time, is superimposed on the orchestra, to reveal a new form of electronic artistry.

The Boston Symphony, the Boston "Pops" and the Berkshire Festival also are destined to be seen afar—as many millions of music lovers gain the added joy of seeing these renowned orchestras broadcast under the direction of Dr. Serge Koussevitzky, Charles Munch, Arthur Fiedler and others.

The famous paintings in your public library and in your Museum of Fine Arts will no longer be confined to gallery walls. They will be viewed on countless screens in homes and schools across the country-side. The monument on Bunker Hill, the crude bridge that arched the flood at Concord, the battleground of the Minute Men at Lexington and all your other landmarks and shrines of liberty, including Faneuil Hall, Longfellow's home, John Hancock's house and Hawthorne's House of

Seven Gables, will—thanks to television—become a part of living history in schools throughout the land.

Television not only dramatizes, informs and entertains, but it also is a practical teacher. In medical research and in teaching surgical techniques, television has already proved an ideal lecture hall, in which every student has a front row seat. Noted doctors, including Dr. Arthur W. Allen of Boston, President of the American College of Surgeons, have heralded it as "a teaching medium that surpasses anything we have had in the past."

### *Boston — Hub of Television*

So you see, if any American city is qualified intellectually, artistically and historically to become a hub of television, it is Boston. Topographically too, it meets the requirements of that science. Those of you who own television receivers are probably aware that the very short waves which carry the pictures behave quite differently from the waves of standard broadcasting. Television waves are more akin to light waves. They travel in a straight line-of-sight and go off into space at the horizon. This is why lofty hills and buildings are ideal for television stations, and why high antennas are helpful in plucking the passing pictures from the electronic cavalcade in space.

Boston, as we all know, is built on a ring of hills. Beyond are the Blue hills, Dorchester and Arlington heights, and we must not forget Bunker Hill. Geologically these hills are described as "faults"—but now, in these days of television, they are virtues that will put Boston within range of millions of eyes.

Paralleling the Boston Post Road to New York as the nation's Highway No. 1, there is a new radio route consisting of seven automatic radio relay stations located on seven hills that lie across the New England country-side in the direction of Manhattan Island.

Boston is to be congratulated upon the enthusiasm and spirit of pioneering with which it has taken up television. It may be surprising to you that since Boston's first television station—WBZ-TV—went on the air in June, this year, followed in September by WNAC-TV, this

community has spent approximately \$12,500,000 for television receivers. It is estimated that, in 1949, you will spend close to \$20,000,000. Today, the television audience in the Boston area numbers nearly 200,000. By this time next year it should reach 500,000.

Your television stations, with their engineers and showmen, keep alive the traditional New England spirit of pioneering. Through their efforts the gilded dome of your State House will be a symbol of American independence and culture on television screens throughout the country. And it will be seen as clearly as when viewed directly from the Boston Common! I wonder what the Colonists would have thought had they been here to see one hundred television receivers on the Common so that thousands might watch the 1948 World Series! Would they have called this witchcraft?

Fortunately, wireless, despite its mystery, was not linked with witchery. Much pioneering in telegraphy, radio and electronics has been carried on at Harvard, MIT, Boston University, Boston College, Tufts College and other institutions within this area, along with the historic experiments of Marconi and Fessenden down on the Cape, which put some of the first pulses of radio into the New England air. Radar too—a more recent development—was cradled in the Radiation Laboratory on the Charles.

### *Two-Way Television*

The day will come when Harvard will be seen at Oxford, and Oxford will be seen at Harvard. In fact—believe it or not—we may expect to watch transoceanic debates and interviews in which the participants will appear on your screens as if they were talking face-to-face in the same narrow room, although in reality they will be separated by the broad Atlantic. This will be made possible by two-way television.

Then, the President of the United States, speaking from the White House, may appear on the same screen with the King of England speaking from Buckingham Palace. Or a Metropolitan opera tenor in New York may sing a duet with a

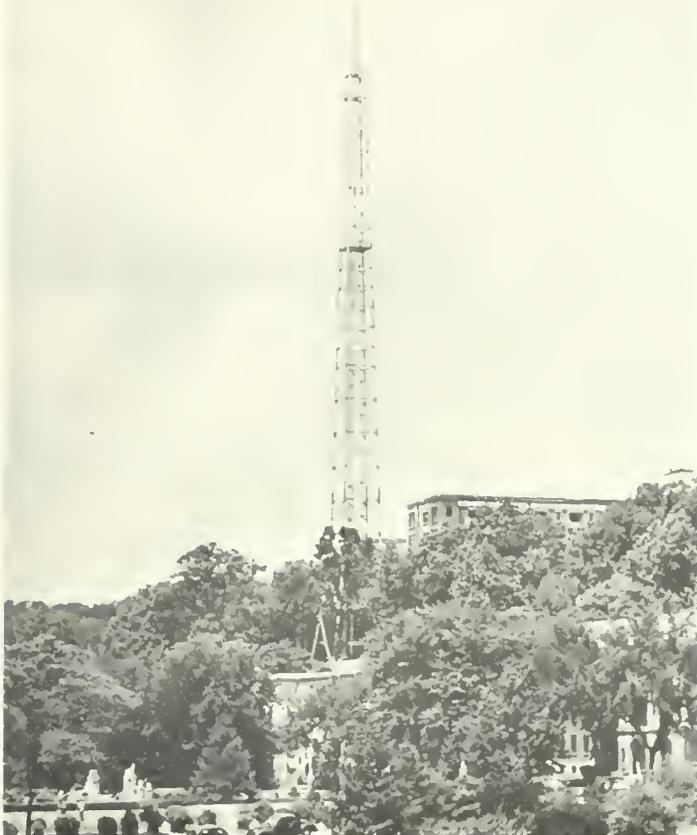
prima donna in San Francisco, both appearing side-by-side, although the continent separates them.

Television, as you probably realize, is not the stage, the screen or radio. It is a new art form, a most effective advertising medium, a great sales force, and has been heralded by Mr. Wayne Coy, Chairman of the Federal Communications Commission, as "The most powerful and profitable medium for mass merchandising yet devised". Indicative of its impact, 300 advertisers were sponsoring local and national television programs in June. Today there are more than 600.

Rapid progress has been made in every phase of television since the end of the war. It has been a gigantic task to get the wheels of this new industry turning in service to the public. Yet there is an even greater task ahead to meet the ever-increasing demands for television programs and for television sets. Every one of the 39 million homes now equipped with radio will want to see as well as hear what is going on in the world. When we stop to think that today there are 1,800 standard broadcasting stations and 700 FM transmitters authorized to serve more than 60 million radio receiving sets in the United States, it gives us some measure of the tremendous market that is anxious for television.

The radio industry, in 1948, will produce and sell \$50,000 television receivers. This means, that as we enter the new year, more than 1,000,000 receivers will be in use. The potential viewing audience will number approximately 6,000,000.

These statistics add up to the fact that television is the fastest growing new industry in the United States. It is rapidly establishing itself as one of the economic bulwarks of the nation. In 1949, it is estimated that 2,000,000 new television receivers will be added to the million already in operation. By 1953, the industry as a whole will be turning out 4,800,000 sets a year—so by the time of the following presidential inauguration in 1953, we may expect that there will be about 18,000,000 television receiving sets in this country, with a potential audience of 50 to 60 million persons.



SYNCHRONIZATION OF SIGNALS FROM STATION WNBW, WASHINGTON, D. C., SHOWN ABOVE, WITH THOSE FROM WNBT, NEW YORK, USING NEW METHOD DEVELOPED BY RCA, GREATLY IMPROVES PROGRAM SERVICE ON RECEIVERS INSTALLED IN "FRINGE" AREAS OF BOTH TELECASTERS.

## Television Coverage Extended

*Thousands of Viewers in New York and Washington Areas Benefit from Improved Reception as Result of RCA "Synchronizing" of Stations WNBT and WNBW.*

**F**IRST practical use of a newly developed method of extending television coverage by reducing interference between stations on the same channel is under way on a full-time basis between the New York and Washington television stations of the National Broadcasting Company, it was announced December 16 by Brigadier General David Sarnoff, Chairman of the Board of the Radio Corporation of America.

General Sarnoff disclosed that the new method, known as televi-

sion carrier synchronization, has been in regular operation since December 9, employing facilities at RCA Laboratories, Princeton, N. J. He then declared:

"The immediate effect of these operations has been to extend interference-free service to thousands of additional viewing families in the 'fringe,' or outlying service areas, of stations WNBT, New York, and WNBW, Washington.

"These operations, therefore, can be regarded as highly successful and point the way to application of

synchronization to stations in other parts of the country where the co-channel interference has become a problem.

"Use of synchronization permits a closer spacing of television stations on the same channel than is possible without this method of reducing interference between stations. It also enlarges the service area of television stations, thus enabling television to reach out and serve many more people than otherwise could be served. This is of particular importance to rural sections since it makes possible service to such sections which could not otherwise be obtained."

The announcement by General Sarnoff, who is Chairman of the Board of the National Broadcasting Company, followed by less than two weeks an engineering conference called in Washington by the Federal Communications Commission to review the problem of tropospheric interference, as the co-channel disturbance is known to the industry.

### *Reports on Experiments*

At that time, RCA-NBC representatives reported the results of extensive experiments on television carrier synchronization and recommended its general application to provide better service on present television channels.

Commenting on the operation, Niles Trammell, President of the National Broadcasting Company, said:

"Another great engineering advancement in television broadcasting has been achieved by the RCA Laboratories Division of the Radio Corporation of America and we at the National Broadcasting Company are proud indeed to have had the opportunity to put it into operation immediately, thus adding another 'first' to our list.

"We also take pride in the fact that the cooperation of NBC's engineers made possible the accomplishment of this new system of synchronization which already is being used to improve the service of our television stations in New York and Washington, WNBT and WNBW.

*(Continued on page 30)*

# Peace in a Changing World

*World Situation Represents New Era and New Challenge to American Thought and to the American People, RCA Head Declares in Address Before Phi Beta Kappa Alumni.*

**E**XPRESSING the belief that it is much easier to observe the changes going on in the world than it is to make peace, Brig. General David Sarnoff, Chairman of the Board of the Radio Corporation of America, declared on December 15 in an address before the Phi Beta Kappa Alumni in New York that the present situation — of neither peace nor war — represents a new era, a new challenge to American thought and to the American people.

"For, as a people," he continued, "we are not accustomed to living in a state of doubt. The temperament of the American people is such that we seek decision and demand conclusion. If the action we have to take is serious, we usually say, let us do it and get it over with. We don't like to live with uncertainty. Yet that is our lot today. And I fear it will continue to be our lot for years to come."

Speaking on the subject "Peace in a Changing World," General Sarnoff said that this uncertainty makes it necessary to reorient ourselves to this new situation, and added:

"Indeed, it calls for a psychological and mental reorientation which will free us from the daily irritations and the daily demands to do something about it, because there isn't anything conclusive we can do about it from day to day.

"The situation before us calls for patience, for restraint, and for wisdom. Above all, if 'action' is to be taken, it calls for 'timing' — a most important matter. The right act at the wrong time may cause defeat, whereas, the same act at the right time may bring victory.

"Therefore, my first answer to those who ask why wait, why not do something about it, is that it is better to wait, because in that way there may be an opportunity to achieve peace—and if that should prove impossible, to achieve victory by the use of force, when that finally proves to be unavoidable."

General Sarnoff stated further that it did not seem to him that the two major conflicting ideologies that are now in motion in the world can be reconciled by negotiation, or settled by force, in the immediate future. He said there were "certain forces" now abroad in the world that are "far more powerful than the minds of men."

He asserted that these forces, in one form or another, must have opportunity for further expression; that they must reach a point of definition and clarity where their positive and negative attributes become visible and can be understood by the masses of the people.

## *Conflict is Between Leaders*

"After all," he declared, "the conflict which is now going on — this

cold war — is not between the peoples of the world. It is between the leaders of certain countries of the world. In many countries, the people are wholly uninformed about the nature of the conflict or its cause, or its results, or the possible manner of its composition.

"However much we may dislike it, it appears to me that we are destined, for some time to come, at least, to live in a dangerous world, and we shall have to learn how to live dangerously."

Despite this state of affairs, General Sarnoff said, these very tensions, these very difficulties and problems, furnish us an opportunity for clear thinking and courageous action.

The question is posed for us more specifically from time to time, he added, by those who ask, "Why wait if you think that war ultimately may be inevitable? Why wait until the enemy acquires the same modern weapons that we now have — the atom bomb, guided missiles, and the like? Why wait until they get them? We have them now, and they presumably have not. Why not go ahead and finish the job now?"

Speaking for himself, and not in any sense claiming to be an authority on the subject, he said that he did not believe that war ultimately is inevitable. War may come, but no one can speak with certainty about its inevitability, he asserted.

"The reason it would not be wise, it seems to me, to go to war now is because waging a modern war isn't such a simple problem," General Sarnoff said. "Even if we were only to undertake what is sometimes called a defensive war, a real chance for victory would require the use of every modern weapon that we have or know about, including the atom bomb.

"Aside from our reluctance as civilized people to throw atom bombs on thickly populated cities, aside from all the humanitarian aspects of that question, the destruction of

"WITH CHANGING CONDITIONS IN A CHANGING WORLD, WE SHOULD BE WILLING TO CARRY ON DISCUSSIONS AND NEGOTIATIONS, HOWEVER FRUITLESS OR FRUSTRATING THEY MAY APPEAR AT THE TIME."



lives and the destruction of treasures would be such that the consequences of such a war cannot be predicted. Victory may be a very costly thing.

"We might also—if we undertook to move now—jeopardize our own freedoms. You can't fight a modern war against ruthless dictatorships and at the same time maintain your democratic principles. We have seen the difficulties others have had in maintaining democratic principles, even after a war, if it has been waged over a wide area and extended over a long period of time.

"So the very principles we fight to preserve may be jeopardized, if we undertake the task before we are fully ready, militarily, economically and politically. Nobody—not even the scientists—can measure with accuracy the uncertainties that would follow, in other parts of the world as well as in our own country, an atomic war launched at this time. That is one answer to the question—Why wait?

"There is another answer, and it is this: If you measure the actual knowledge that any one of us has about world affairs, or for that matter, about anything else,—and draw a circle around it, you will find circles of varying dimensions.

#### *Knowledge Based on Facts*

"The knowledge within any such circle would be based on facts we have learned and the things we can see. But often, the most important things that affect the safety and the progress of the world, lie outside that circle. These are the invisible factors, or the imponderables,—the things we can't see and the things we can't think about at all. There are times when these assume an importance greater than the facts which were within our view when we made up our minds with such finality.

"In the field of world politics these imponderables are tremendously important. Ultimately they are likely to prove the real factors that will determine whether we shall have peace or war.

"What are some of these imponderables? First, there is the possibility that better informed people in countries with which we

are in conflict, may change their governments. It takes time for people to become better informed. The methods of disseminating information are constantly improving. As I view it, no 'iron curtain' can permanently keep out the electromagnetic waves of radio."

Not only the "Voice of America," but one day, the "Voice of the World" will be heard everywhere from a central point speaking in the languages the listeners understand, he continued.

#### *Satellite Nations Affected*

It is also conceivable that some of the satellite nations, who do not seem to be too happy, may as time goes on be affected by the improvements in the standard of living in the neighboring nations who enjoy the benefits of freedom and democracy, he said, adding:

"These satellites may compare the restrictions and limitations imposed upon them by alien powers with the freedom and the better life enjoyed by those who are allowed to govern themselves. That is another imponderable that is working, I think, in the right direction.

General Sarnoff at this point recounted the advance of science, including the acceleration in war and peace of radio and television, technology and chemistry, and examined the need for firm national procedure.

"We must believe in the principles we stand for," he said. "We must believe in the purposes we espouse. And these principles and these purposes in no way involve any aggression on our part. We must be consistent and firm, and we must leave no doubts in the minds of others

about our policy, because evidence abounds that distress follows appeasement.

"With changing conditions in a changing world, we should be willing to carry on discussions and negotiations, however fruitless or frustrating they may appear at the time. I still believe that through discussion we learn something of the ideas and intentions of the other side, and they learn something of ours."

General Sarnoff urged continuation of aid to "our friends across the seas," and stated that we should encourage and advance the idea of a Federation of Western European States. He also urged a military guarantee for the security of the friendly democratic nations.

"No one of these things will, by itself, solve the whole problem," he concluded. "But this combination will, I believe, gain the time needed to increase our preparedness, and enable us to obtain the benefits of the 'imponderables' I have mentioned. This course should be our answer to the question, whether a fair, consistent and firm foreign policy, accompanied by adequate preparedness and a willingness to discuss and to negotiate, can avoid the catastrophe of another World War.

"But if all such honest efforts fail, and, if in the end we are called upon to resolve the issue by force, then the time we shall have gained should equip us to achieve victory. And so, my friends, I conclude as I began, with the thought that we must make time our ally in our efforts to secure peace in a changing world."

"NOT ONLY THE 'VOICE OF AMERICA,' BUT ONE DAY, THE 'VOICE OF THE WORLD', WILL BE HEARD EVERYWHERE FROM A CENTRAL POINT SPEAKING IN THE LANGUAGES THE LISTENERS UNDERSTAND."





A TWO-PIANO TEAM IN THE MAIN STUDIO AT 411 FIFTH AVENUE PROVIDES THE SOUND TRACK FOR A MUSICAL FILM.

## Film Recording at "411"

*Motion Picture Companies Make Growing Use of Modern Facilities in RCA's Fifth Avenue Studios; Work Done There Includes Music Scoring, Recording of Newsreel Commentaries and Dialogue*



By H. D. Bradbury

*Manager  
RCA Film Recording Studio  
New York City*

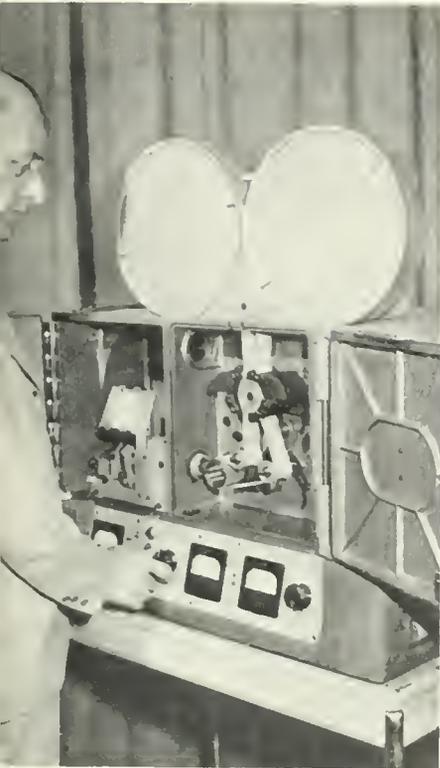
**W**HEN RCA entered the film recording field in 1928, offices and studios were established at 411 Fifth Avenue, New York. At that time, the studio combined photog-

raphy with recording, making full-length feature pictures. Later, as the recording industry grew, motion picture production was eliminated at "411" and sound facilities were expanded and improved. Today, two decades later, this section of the RCA Engineering Products Department, still at the same address, is rated one of the finest, most completely equipped film recording studios in the country.

The RCA Film Recording Studio, originally called RCA Photophone, Inc., has a staff of skilled technicians and facilities for recording commentary, dialogue, orchestral scores, and complex film track blending jobs, known as mixing. In addition, it has kept its license to produce full-length motion pictures.

Two modern studios at 411 Fifth Avenue provide adequate facilities for the increasing number of film organizations that avail themselves of this special service. These companies, some of them licensees, use the large Studio A principally for music scoring, for rerecording the work of large orchestras, and for mixing jobs too complex for their own facilities. The smaller Studio B is now used exclusively for voice recording.

In a Control Room at the rear of Studio A, technicians operate a mixer console or control board, and disc playback. Through the use of the mixer the engineer is able to combine as many as eight separate sound tracks, maintaining the desired volume with the aid of an oscilloscope.



SOUND TRACKS IN THEIR FINAL FORM, COMBINING COMMENTARY, MUSIC AND SOUND EFFECTS, ARE TRANSCRIBED ON THIS 35MM FILM RECORDER.

phonographs run off sound tracks containing commentary, musical scores, sound effects, etc., which are piped into the mixer console, combined, modulated, and returned to the Machine Room for transcription on RCA 35mm film recorders. The sound tracks are run off many times, and the exact cueing is thoroughly rehearsed by the mixing technician before the final re-recording is done.

#### *Blueprints Provide Cues*

For example, when Ben Grauer does his commentary at RCA for his series of technical films, his cues are provided by a blueprint of arrows on the film itself. Paramount's cartoons cue the musical director by means of a bouncing ball.

Prominent among the film producers using the "411" facilities is March of Time, a studio customer since 1938. Speech and sound effects are recorded by them on location, using RCA newsreel equipment, at the same time the picture is made. Later, Westbrook Van Voorhis, the March of Time voice, comes into the studio to do the commentary, and still later the M. O. T. orchestra records the musical score. Subsequently all these sound records are rerecorded (or mixed) to make the final release negative.

Famous Studios, producers of

"Popeye" and "Little Lulu" cartoons (Paramount releases), find studio A ideal for their music scoring and "mixing".

Other companies using RCA Film Recording Studios in New York are: RKO; Pathe, Inc.; Universal Pictures; Warner Bros. Pictures, Inc.; Columbia Pictures Corp.; Caravel Films, Inc.; Grantland Rice Sport Pictures Corp.; W. J. Ganz Company; Mode-Art Pictures, Inc.; and NBC Television.

#### *Early "Talkies" Recorded*

In the early Thirties, when the addition of sound to motion pictures was beginning to revolutionize the movies, the RCA film recording department made important contributions to the development and progress of talkies. Such early sound hits as "Sonny Boy", "Lilac Time", and Frank Buck's "Bring 'Em Back Alive", were mixed in the RCA Photophone Studios. About this time, when movie companies were investing heavily in screen tests of well-known stage and opera stars, Katherine Hepburn and Grace Moore made screen tests at "411". Special effects and a Hugo Reisenfeld choir of 100 voices were added to the DeMille classic, "King of Kings". This constituted a small, but important part of RCA's contribution to the early development of sound movies.

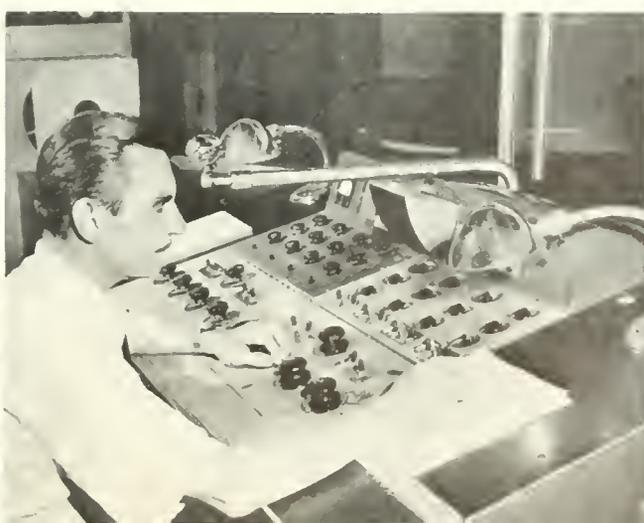
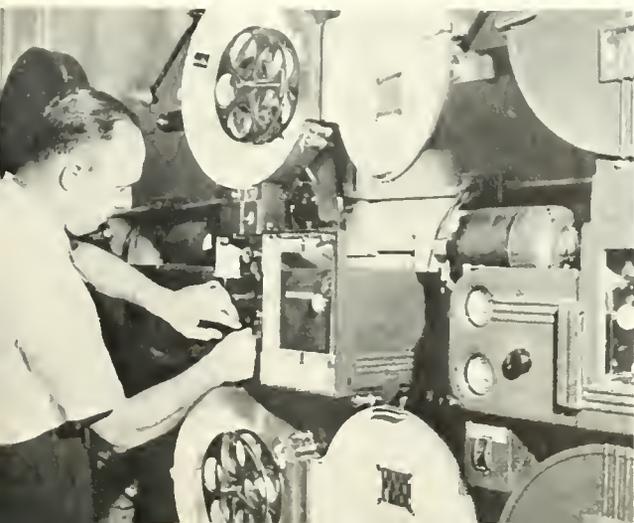
During the war, the RCA Film Recording Studios worked extensively with the Office of War Information, Army, American Red Cross, and Coordinator of Inter-American Affairs. Because of the

When necessary, the disc playback simultaneously cuts a record of the sound tracks being mixed so that the film company representative may recheck certain sections of the recording. The disc playback, as well as all other recording equipment in the RCA studios, is powered and kept in perfect synchronization by a highly accurate Selsyn motor drive system. This Selsyn power unit is installed in the Projection Room where standard 16mm and 35mm projectors are housed.

In the Machine Room, five film

FILM CONTAINING SOUND TRACKS ARE RUN THROUGH THESE FILM PHONOGRAPHS AND ACCURATELY CUED BEFORE THEY ARE FINALLY MIXED AND RERECORDED.

AT THIS CONSOLE THE MIXING ENGINEER FOLLOWS HIS CUES AND COMBINES SOUND EFFECTS, WORDS AND MUSIC IN PROPER RELATION FOR INSCRIBING ON THE FILM.



lack of negative film at that time, RCA had to conserve every possible piece of precious footage. Very often one job was completed, torn off the reel, and the next one started on the same roll of film. One amusing incident resulted from this procedure. After several re-takes for a Swedish customer, an RCA technician followed this method, but in his haste to record a Spanish track for an anxious March of Time Foreign Department representative, he omitted tearing off several hundred feet of previously recorded Swedish dialogue. When the film was developed, March of Time had to employ an interpreter to decode the strange language which prologued their Spanish film.

### Complex Problems Solved

Complex problems in recording are expertly solved by the studio staff. Frequently the RCA Record Department calls upon RCA film facilities when an exceptionally fine musical disc recording is required. First, the piano and orchestra are recorded on separate sound tracks in the best Hollywood studios, and

then sent to "411" where they are mixed, and sent by phone line to the RCA Disc Recording Studio at 24th Street, where the Master record is cut.

If a re-take on a Hollywood production is necessary when its star is relaxing in the East, the star can come to RCA's studio and re-record the desired changes for substitution in the original sound track. Recently the RCA Film Recording Department was called in when RKO needed a realistic Carnegie Hall background to record the work of Rubinstein and Ormandy. Portable equipment was sent into the Hall where two sound tracks were made on-the-spot, and two others piped over telephone lines to "411" for recording.

Extending the accommodations of the studios is a Mobile Recording Unit, designed to provide studio facilities outside, and on remote locations.

Apart from the income they produce, the New York studios perform the important function of demonstrating to customers and licensees the superior performance of RCA Film Recording Equipment. Sales

of this equipment are handled from "411" for all the United States, except for a narrow West Coast strip embracing Hollywood.

## NBC Video Programs Rank High in Poll

NBC's "Texaco Star Theater" with Milton Berle, ranks first by a wide margin in a poll of East Coast radio and television editors, conducted by *Television Daily* to determine "Your Favorite TV Program." Six other NBC video programs or stars were also honored in the poll, the first of its kind among TV editors.

Fifty newspapermen on the East Coast in cities served by television stations participated in the survey. They ranked variety programs first in preference; dramatic, second; sports, third, and forum, quiz and children's programs in a fourth place tie.

"Philco Television Playhouse," NBC's hour-long dramatic program, garnered a large share of the popularity votes from the editors. "Meet the Press," another NBC video program, was given high rating in the forum category.

In the "most promising new artists" category, NBC stars took four of the five places receiving the most votes. They are songstress Kyle MacDonnell, star of "Girl About Town"; Barbara Marshall, song stylist, who has been heard on "Musical Miniatures"; and Helen King, graphologist, topping the list in the women's division. Bob Smith and "Howdy Doody" lead the list of male artists in this category.

## Radiophoto Circuit Opens

A radiophoto circuit is now in operation between Shanghai and San Francisco, H. C. Ingles, President of RCA Communications, Inc., 66 Broad Street, has announced.

Radiophoto service to and from this Far Eastern center is expected to be widely used, particularly at this time, Mr. Ingles declared, pointing out that such circuits are capable of handling written and printed documents, in addition to news photos.

VOICES OF COMMENTATORS ARE RECORDED IN THIS STUDIO FOR MIXING LATER WITH MUSIC AND SOUND EFFECTS TO FORM THE COMPLETED SOUND TRACK OF A NEWSREEL OR TRAVELOGUE.





NEW TRANSMITTER BUILDING OF RADIOMARINE STATION WCC-WIM AT CHATHAM, MASSACHUSETTS.

# New Transmitter Building Erected for Station WCC

*Chatham, Mass., Selected as Site for Structure to House Modern Equipment and Facilities.*

THE modern equipment and more extensive facilities housed in the Radiomarine Corporation of America's newly constructed radiotelegraph transmitting station at Chatham, Massachusetts, have undergone a thorough trial and proved the superiority of the new location on Cape Cod, according to Walter A. Buck, President. WCC and WIM transmitters, operated at Marion, Massachusetts, for 25 years are occupying the new quarters. With the additional new equipment manufactured by Radiomarine, combined with the more efficient antenna location provided by the salt marshland along Nantucket Sound, Mr. Buck said, WCC-WIM is one of the finest coastal radio stations in the world.

Conforming to the locality, the new transmitter building is an adaptation of the Cape Cod style of

architecture. The main structure of brick and stone is 112 feet long and 36 feet wide with a 24- by 42-foot wing. The windows are formed of heavy glass blocks to protect the transmitting and control equipment against damage from the heavy gales common to the area. Offices, storage space and shop facilities occupy the wing.

The new modern 20-kilowatt transmitter operating on medium frequencies and also on the distress frequency of 500 kilocycles; a 10-kw low frequency unit and three 3-kw high frequency units supplement the three 40-kw high frequency transmitters transferred from the previous site to make an impressive and efficient complement of shore station facilities.

A 300-foot self-supporting steel tower on the edge of the marsh

radiates signals from the medium frequency transmitter insuring positive communication with ships in distress and in the handling of regular message traffic. The heavier volume of radiotelegrams to ships at sea goes out to all parts of the world over shortwave antennas for the various frequencies. These antennas are suspended between several rows of poles up to 80 feet in height.

The new station operates in conjunction with the companion control and receiving station located at Chathamport, six miles away. WCC-WIM provides radiotelegraph service for ships and aircraft throughout the world. Hundreds of messages, press dispatches, weather reports and SOS calls from vessels in distress flow through these stations daily. The transmitting equip-

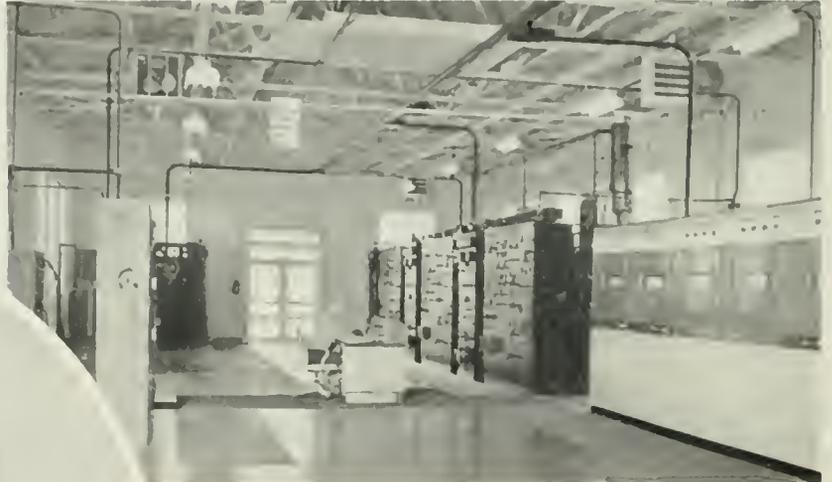
Receiving station of WCC-WIM houses the equipment which controls all transmitters.



New transmitter building (right) and cottage occupied by engineer-in-charge.



Beyond the lines of short masts supporting the station's high-frequency antennas is the high tower of Chatham's 500-kilocycle transmitter.



Interior of transmitter building showing high-frequency transmitters, in rear, and 500-kc transmitter (right). Frank Kremp, engineer-in-charge, at console.

## Scenes from Radiomarine Transmitting and Receiving Stations WCC-WIM at Chatham, Massachusetts.

Messages awaiting transmission to ships are kept in this revolving rack at the receiving station.



Operators at the receiving station keep a constant watch on frequencies used by ships throughout the world.



ment is constantly attended by trained technicians and the control receiving station is manned by a staff of thirty highly-skilled code operators who keep continuous "watch" on the numerous frequencies used by marine and aircraft.

The carrying power of WCC's signals has been demonstrated in communications with the Byrd expeditions to the South Pole; to aircraft over Iraq; the lighter-than-air craft, Graf Zeppelin; the ill-fated Hindenburg, and many others. Pilots and navigators of long-distance plane flights have used Chatham for the gathering of essential advance weather reports, and to contact their home bases while in flight. In 1938, when Howard Hughes made his round-the-world race against time, WCC brought continual news of his progress. Just ten years later, in 1948, when Pan American World Airways inaugurated its round-the-world clipper service, WCC linked the plane "America" with newspapers throughout the United States.

#### *Maintains Medico Service*

In addition to the normal message traffic handled by Chatham, RCA, in cooperation with the U. S. Public Health Service, also maintains a special service for the benefit of ill or injured passengers and crews of ships at sea. This service, called Medico, was established in 1921 and taken over by RCA in 1922. Since that time, thousands of vessels without doctors have made use of the facilities without cost. Chatham and the other coastal stations operated by Radiomarine, process 75 to 100 Medico cases a month. As each request for aid is received, details of the case are teletyped to the nearest Marine Hospital where doctors on duty study the reported symptoms and file a return message prescribing the method of treatment. Medico messages have been exchanged with ships in the South Pacific, the Indian Ocean, and, in fact, in all the seven seas.

The history of station WCC is the history of marine radiotelegraphy. These call letters, now instantly recognized by ship radio operators on all oceans, were first assigned in 1913 to a pioneer station of the Marconi Wireless Telegraph Com-

pany of America at South Wellfleet, Massachusetts, 30 miles east of the new WCC at Chatham. There, on the ocean side of the Cape, Guglielmo Marconi, in 1903, had erected a transmitter building situated in the center of four 210-foot lattice-work towers which supported an extensive system of antennas for his experiments in transatlantic communications. But the rapid evolution of radio was destined to out-mode the crude transmitting apparatus, and in 1911, Wellfleet was abandoned to weather and the seas.

In order to continue his operations, Marconi erected a new receiving station at Chathamport on the Bay side of the Cape, about three miles from the town of Chatham, and a new transmitting station was built at Marion, near where the Cape joins the mainland.

However, World War I soon intervened and both properties were taken over by the Navy. The government retained control until shortly before the Radio Corporation of America was formed in 1919.

For the first two years under RCA ownership, Chatham was a point-to-point station, exchanging messages with Germany, Norway and Sweden. Then in 1921, as plans were made to transfer all point-to-point activities to the newly built Radio Central on Long Island, the Company installed a 500 kilocycle transmitter, with call letters WCC, in the receiving station at Chathamport to serve as a ship-to-shore link. This was supplemented a year later with a second WCC transmitter designed to operate on 2200 meters, a wave length at that time considered ideal for long-range communications. The 500 kilocycle transmitter then assumed the call letters WIM.

#### *Interference Increased*

However, with the addition of the 2200 meter equipment, interference problems increased. At that time "wireless" apparatus, beginning to be known as "radio" was relatively crude in comparison with present day standards. To eliminate transmitter interference at the increasingly busy receiving positions meant the removal of the transmitting equipment a considerable dis-

tance from the receiving antennas. Accordingly, WCC's transmitters were moved to Marion.

Overland telephone wires were leased to connect transmitters with the operators' keys at Chatham. This arrangement worked satisfactorily during placid days on the Cape. But with the coming of winter storms, operations were sometimes interrupted by ice formations and by trees which had fallen across the wires. On these occasions, crews were rushed from both ends of the circuit to find the trouble and rejoin the wires.

#### *1927 Emergency Recalled*

Oldtimers still at Chatham recall the emergency they faced in 1927 when the Prince of Wales was on his way to this country aboard the *SS Berengaria*. At an hour when message traffic to and from the British liner was at its peak, a windstorm broke connections in several places between Chatham and Marion. With 300 urgent messages waiting to be radioed to the vessel, one of the crack operators, carrying his telegraph key, set out through the gusty night, feeling his way in the dark from pole to pole until he spotted the break nearest Marion. He connected his telegraph key into the line, and in this unorthodox manner, proceeded to operate the Marion station transmitter until the last of the messages had reached the *Berengaria*.

With the advent of "short waves" and the spanning of greater distances, message volume increased rapidly and it was essential that interruptions to service be eliminated. To insure this, RCA engineers in 1937 designed and installed a microwave beam system over which the transmitters at Marion were radio-controlled from Chathamport, replacing the long overland control wires. But the Government services recognized the value of the facilities available at Chatham and they were annexed to play their part in the World War II effort. Today, the new transmitting station with its associated control receiving station, embodying the latest design in electronic equipment stands as a model of efficiency to serve the maritime world.

# RCA FREQUENCY BUREAU

*Conference Work, License Processing and Publication of Reports Are Among Functions of Bureau's New York and Washington Offices. Expert Advice and Service on Frequency Matters Available to All RCA Divisions*



By Philip F. Siling  
*Engineer-in-Charge  
RCA Frequency Bureau*

AS EARLY as 1930, RCA recognized the need for establishing the frequency bureau, then a part of RCA Communications, Inc., as a separate department. This reorganization was desirable in order that all the Corporation's divisions and domestic subsidiaries could be serviced relative to frequency allocation, station licenses, and related matters. To accomplish this, the "RCA Central Frequency Bureau" was formed.

It continued in existence until 1935, when the allocation of frequencies became increasingly complex. Furthermore, complications from increased governmental and international regulations mounted rapidly and the need grew for expert Frequency Bureau service to aid in policy decisions.

The present RCA Frequency Bureau was established in 1935 to prevent duplication of work and avoid conflict in dealings with governmental agencies. Its scope was greatly enlarged to include more general representation of RCA interests in frequency allocations and allied subjects. In 1945 the Frequency Bureau was made a part of the RCA Laboratories Division, at which time its functions were further extended to include the coordination of aviation activities.

Among its many services, the

liaison work conducted by the Bureau is of primary importance. The RCA Frequency Bureau, maintaining offices in New York and Washington, is the normal contact channel between all RCA divisions and the FCC, other government departments, and international organizations. These contacts involve matters concerning frequency allocations, their uses, applications and assignments; interference between radio stations; station licensing, and policy decisions.

A very large percentage of this work relates to the Federal Communications Commission alone, for through the Frequency Bureau a continuous flow of information on RCA activities is channeled into interested offices and branches of the Commission.

Similarly, the RCA Frequency Bureau keeps interested officials of RCA and its affiliates continuously informed of all Commission actions which might affect their operations. Due to the lapse of time between

the issuance of new FCC regulations and their actual publication by the government, the Frequency Bureau set up its own publication system to make regulation changes promptly available to all concerned in the Company.

The analysis and distribution of all FCC reports, public notices, news releases, proposed frequency allocations, orders, hearing calendars, proposed and final decisions, has become an increasingly useful function of the Bureau.

## *Aviation Field Represented*

Other government agencies with which the RCA Frequency Bureau has regularly established contact include the State Department, War and Navy Departments, Bureau of Standards and Civil Aeronautics Administration. An aviation expert adequately represents RCA before all organizations in this category. With the objective of unifying industry views and adding to the store of information on frequency utilization, the Bureau performs informal contact work with the Washington headquarters of innumerable radio and allied administrations.

The RCA Frequency Bureau's principal foreign contact work consists in the clearance of cases and disputes arising from radio inter-

WAYNE MASON, (SECOND FROM RIGHT) MANAGER OF THE RCA FREQUENCY BUREAU'S NEW YORK OFFICE, DISCUSSES A LICENSE RENEWAL WITH GERALD GOULDRUP (SEATED), HEAD OF THE MARINE DEPARTMENT, AND FRANK TYSON, DEPARTMENT MEMBER.





FELIX SCHLEENVOIGT, (LEFT) ASSISTANT MANAGER OF THE BUREAU, AND PATRICK MORRIS, (SEATED, LEFT) IN CHARGE OF THE FREQUENCY MEASUREMENT SECTION, CONFER ON COMMUNICATIONS PROBLEMS.



THE AUTHOR (LEFT) DISCUSSES NEW GOVERNMENT REGULATIONS WITH RAY SIMONDS AND OTHER MEMBERS OF THE WASHINGTON OFFICE WHICH MAINTAINS CLOSE LIAISON WITH THE FCC.

ference. The discharge of this function, which frequently involves the State Department on diplomatic issues, serves to supply the Bureau with a variety of information useful in allocation questions, and in international conference participation.

Another important phase of Frequency Bureau liaison is the maintenance of inter-Company contact. It furnishes consultation on research and development projects, production and sale of equipment, and communications operations. By carefully watching allocations and prospective frequency assignments affecting RCA-developed or manufactured equipment, the Bureau is in a position to assist in guiding RCA organization policies, and to suggest to government authorities future RCA frequency requirements. This advisory service has been used extensively in connection with television and FM activities.

#### *Thousands of Applications Filed*

From ten to fifteen thousand applications for permits, authorizations and licenses, (including license modifications and renewals), are processed and filed annually with the FCC by the RCA Frequency Bureau. Through its understanding of the purposes of the original requests for these filings, as submitted by the Company's various services, the Bureau has been able to avoid duplicate and conflicting applications.

For RCA Communications, Inc.,

applications are processed covering frequencies, antennas, additions to licensed communications points, radiophoto material, and construction permits.

The Frequency Bureau assists the National Broadcasting Company in securing special authorizations to cover remote pickup programs, and by handling construction permits, licenses, and license renewals for standard broadcasting, television and FM stations.

On behalf of the RCA Victor and RCA Laboratories Divisions the Frequency Bureau obtains authorization for field tests and demonstrations of new equipment. The Bureau also secures type approval of new broadcast equipment and for modifications of existing equipment.

A separate Marine Unit of the Bureau processes coastal and ship-board licenses. The approximately 1800 licenses in these categories require frequent modification, assignment, reassignment, cancellation and renewal. An average of over two thousand radio operating matters, relating chiefly to marine service and involving either radio station equipment or radio operators, are handled annually by this Department.

Since the Bureau is responsible for radio frequency allocation mat-

ters, it participates in all FCC hearings on this subject. In carrying out this duty, special preliminary studies are made to aid the Corporation and subsidiary or division involved in presenting its side of the case. The Bureau also conducts and participates in informal engineering conferences preparatory to hearings, and furnishes staff members to give advice and act as expert witnesses.

#### *Participates in FCC Hearings*

The types of formal FCC proceedings in which the RCA Frequency Bureau has participated include hearings on general allocations, standards of engineering practice, establishment of new radio services, sub-allocations or regu-



THE AUTHOR AND ANNE LADD OF THE PUBLICATIONS DEPARTMENT EXAMINE ONE OF THE MANY REPORTS WHICH THE BUREAU PUBLISHES REGULARLY.

lations within a particular service, licensing and color television.

In the expanding field of international conference work, the RCA Frequency Bureau insures adequate RCA representation both in the extensive preparatory work and at the conferences themselves. This is of primary importance in maintaining RCA's position in international sales, manufacturing and operations. These conferences may be classified as general (Atlantic City Conferences, 1947) and special (North American Regional Broadcasting Conferences).

#### *General Information Compiled*

On the Atlantic City Conferences alone, preparatory work extended over a period of two and a half years, involving preliminary conferences at Rio de Janeiro, Bermuda and Moscow. Prior to both the preliminary and final conferences the Bureau figures prominently in government-industry planning to formulate United States proposals. It likewise participated in separate internal RCA and industry-wide meetings to resolve conflicts and obtain a united industry position. The results of these conferences have been reviewed and comprehensive reports distributed. The ever-increasing scope of international conclaves embraces, among others, those of the telephone, telegraph, radio technical, radio administrative and broadcasting fields.

Its general information service is another extremely valuable function of the RCA Frequency Bureau. In the Publications Department at 60 Broad Street, New York, a vast store of reference material on frequency allocation is compiled and kept on file. Among the voluminous listings are those on stations engaged in international high-frequency operation; active radio stations of the world, based on frequency measurements made at Riverhead, N. Y.; ship radio stations; and revised standard, television, FM, and international broadcasting station lists. One of the Bureau's most important publications is the color-coded frequency allocation chart, which has become almost indispensable to government radio officials and engineers here and abroad.

[24 RADIO AGE]



REPRESENTATIVES OF RCA LABORATORIES AND RCA VICTOR DIVISION MEET WITH STAFF MEMBERS OF THE SIGNAL CORPS ENGINEERING LABORATORIES IN THE FORT MONMOUTH AREA FOR A TWO-DAY DISCUSSION OF RESEARCH AND DEVELOPMENT PROJECTS. THE RCA DELEGATION WAS HEADED BY E. W. ENGSTROM (SECOND FROM RIGHT IN FRONT ROW) AND M. C. BATSEL (ON MR. ENGSTROM'S RIGHT). GENERAL LANAHAN, COMMANDING GENERAL OF THE AREA, AND GENERAL AKIN, CHIEF SIGNAL OFFICER, ARE FIRST AND FOURTH RESPECTIVELY IN THE FIRST ROW.

## RCA Participates in N. Y. Book Festival

"Interpreting Industry to the Public by the Printed Word" was the theme of the RCA display at the recent Book Festival of the New York Museum of Science and Industry, in Radio City. During this event, which continued from November 3-11, more than 100,000 persons including businessmen, school children, members of the armed forces and sightseers visited the museum to study the displays of 49 exhibitors.

In the center of RCA's display were copies of the booklet, "RCA What It Is . . . What It Does" opened to pages showing pictures of the activities carried on by the various services of the Corporation. Also in the exhibit were books,

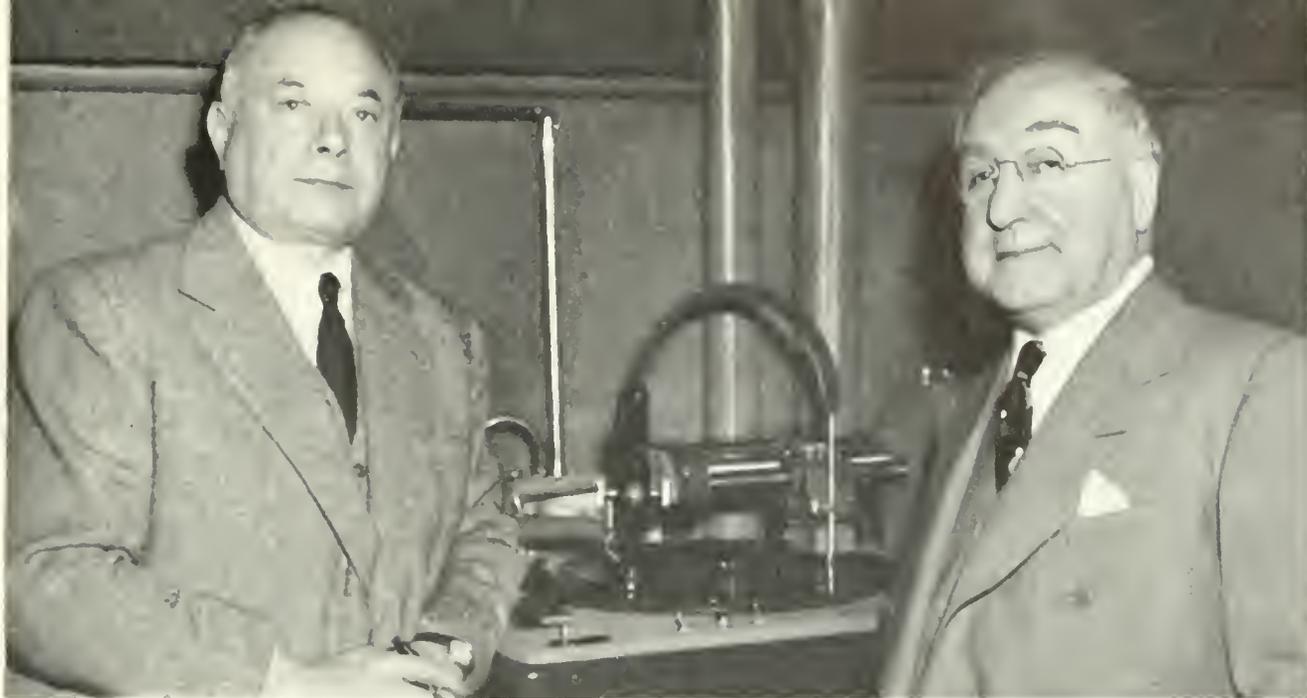
brouchures, catalogues, promotional material and pamphlets published by the Company.

Of the thousands of RCA booklets and pamphlets given away to visitors, the most popular were "The Magic of Making RCA Television Picture Tubes," and RCA Victor's "In the Groove" and "Record Review."

More than 25 books written by RCA employees were gathered for the display. Among them were volumes by Dr. Vladimir K. Zworykin, vice president and technical consultant of RCA Laboratories; Dr. James Hillier and other members of the Laboratories staff: John L. Hallstrom, general merchandise manager, RCA Victor Division, and Charles O'Connell of the Victor Record Department.

PUBLICATIONS OF RCA AND BOOKS BY RCA AUTHORS WERE DISPLAYED AT RECENT BOOK FESTIVAL IN RADIO CITY, NEW YORK.





BRIG. GENERAL DAVID SARNOFF (LEFT) AND JAMES C. PETRILLO, PRESIDENT OF AMERICAN FEDERATION OF MUSICIANS, AT SIGNING OF CONTRACT ENDING BAN ON THE MANUFACTURE OF RECORDS.

## PACT ENDS YEAR-OLD BAN ON RECORD MANUFACTURE

FOR the first time since January 1, 1948, musicians began making new phonograph records on December 14, following the signing of an agreement by James C. Petrillo, President of the American Federation of Musicians, and officials of record-manufacturing companies.

The five year agreement, which had been approved by the Department of Justice, provides for a welfare fund for unemployed musicians. The fund is to be financed by imposing a royalty of one to two and a half cents a record, depending on its retail price. The money will be spent to produce free concerts staged by unemployed musicians who will be paid for their services. Samuel R. Rosenbaum, a director of the Philadelphia Orchestra Association was installed as impartial trustee of the fund, which, it is estimated, will receive \$2,000,000 a year from royalty payments.

Within two hours after official notice of the signing of the agreement had been received at the RCA Victor recording studio, 155 East 24th Street, New York City, RCA artists resumed the making of records.

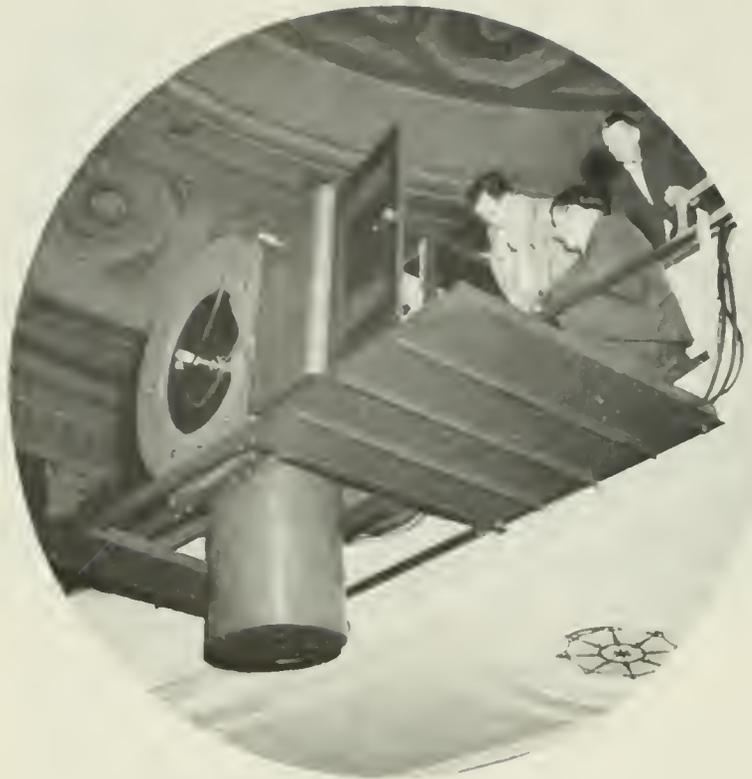
### *Petrillo's Comment*

"I feel that something should be said about a great man who brought

this about, for this is another victory for all of us" said Mr. Petrillo, after the pact had been signed. "And feeling that one man in the industry was a fair man, I went to see General Sarnoff, some five-six months ago and I said 'General, what are we going to do about this thing. Are we going to fight it out like we did before, or are we gonna settle this matter in a nice manner like Americans should?' And he said: 'Jimmy, there shouldn't be any fights; we ought to get together on this thing.' And we did get together. He grabbed hold of the bull by the horn himself, called in the industry—did a swell job—advised me as to what he thought was right and wrong. I mean when I say advised me, he said: 'This is the thing we can do, and this is what we will do, and no more than this,' and so on, and I believed every word that man said. And, Ladies and Gentlemen, believe me that everything he said was God's honest truth. Night and day, when he says this is the truth, this is what's gonna happen—that's exactly what happened. I can't say too much for that man in this industry, and I think that labor has a friend in General Sarnoff."

### *Triumph for Industry and Labor*

"This is almost as great an emotional surprise for me as seeing the first record cut here after a year of silence," said General Sarnoff in reply. "I don't know any appropriate response that I could make to so generous a statement as Jimmy Petrillo has just made about me. All I can say is that this is not the work of any one man. It took patience, restraint, wisdom and some skill in negotiations on both sides to arrive at this settlement. At this happy time of the year I think it is especially fitting to call attention to the fact that there can be harmony between men as well as harmony between singers. In these negotiations Mr. Petrillo has been fair and worked hard, and so did his counsel, Mr. Milton Diamond, who was a resourceful man at all points where we struck snags. As a general, I am a man of peace. And so I preferred a just and peaceful settlement to an unnecessary slugfest. I think this is a great triumph for both industry and labor, but the greatest triumph of all for the American people who will now be free to get selections of their own choice from a highly competitive industry."



DEVELOPMENT MODEL OF LARGE-SCREEN TELEVISION PROJECTOR SUSPENDED FROM THEATER BALCONY. PICTURES AS LARGE AS 18 x 24 FEET HAVE BEEN PROJECTED WITH THIS APPARATUS.

## Large-Screen Television

*Two Basic Methods of Projecting Theater-Sized Images Now Undergoing Series of Practical Tests*



By Ralph V. Little, Jr.,

*Engineering Products Dept.,  
RCA Victor Division*

**L**ARGE-screen television systems for theaters and auditoriums have been developed in two forms, both of which are undergoing a series of practical tests. One is the direct projection system by which high-brilliance kinescope images are projected through an efficient reflective optical system; the other,

an intermediate film system using standard motion picture projection technique, after the television images have been photographed on motion picture film and suitably processed.

The direct projection television system consists of three major elements. One is the projection kinescope which is the source of the light image, the second is the optical system which projects the image onto the screen, and the third is the screen from which the final image is viewed.

The kinescope used in the direct system is similar to the direct viewing tube used in the conventional television receiver, except that projection kinescopes have a much greater light output due to higher voltage operation, for which they are specially designed.

The elements of the optical system consist of a spherical mirror, a correction lens, and a projection kinescope tube. The lenses now used

in large projection systems are made of plastic, formed in glass moulds by a cold-setting process. Lenses as large as twenty inches in diameter have been made by this process.

Reflective optics have been adapted for large screen projection up to 18 by 24 feet. The largest system ever built consisted of a 42-inch mirror, a 26-inch lens and projection kinescopes of either 12- or 15-inch diameter, operating at 80,000 volts. The high cost of the 42-inch mirror system has indicated the advisability of concentrating on smaller optics and increasing the voltage capabilities of the seven-inch projection kinescope in order to make a compromise system which would be successful commercially.

### *Three Units in Intermediate Plan*

The alternate system of large screen television projection is the intermediate film method which consists of three major units. The first is the television recording unit with a quality television monitor and a special 35mm motion picture camera; the second consists of a high-speed processing machine, and the third, the conventional 35mm theater film projector. Such a system can be so integrated that the time elapsing between the appearance of the image on the kinescope and its projection on the viewing screen is less than one minute.

A special camera was devised which would compensate for the difference between the 30 complete images per second as used in television and the standardized rate of travel of motion picture film at 24 frames per second. This camera also provides for sound-on-film recording.

In this camera a precision shutter is required to give the proper exposure to the film. In terms of the television system, the exposure must be accurate to less than one-half of a scanning line or one part in 30,000. Improper exposure shows up as a black or white band when the wrong number of television lines is re-

*(Continued on page 30)*

# Casting for Television

*Stars of Broadway and Hollywood, Once Skeptical of Television, Now Look Upon New Medium as Potent Showcase for Talent*



By Owen Davis, Jr.

*Director of Program Preparation  
and Procurement  
National Broadcast Company*

THE casting picture at NBC has changed greatly since, let us say, two years ago. Talent in those days was pretty hard to get; the industry was small, it offered little money compensation and the overhead lights were a great deal less comfortable than those used now. This is not to say that we were unable to obtain top-name stars. We could and we did, for even then there were actors and actresses genuinely interested in learning the ins and outs of the medium.

But today—with many commercial programs on the air and a growing number of dramatic productions seeing the light of day—actors are literally flocking to our doorsteps for a chance to appear on television.

The reason is simple: television is something they want. They like it artistically and they are afraid to be left out of it financially. And since art and finances are the two chief concerns of any actor, we are having little trouble getting good talent for our shows.

All actors today either remember or have been told about the early days of radio, when radio was screaming for talent and the great majority of Broadway and Hollywood actors were ignoring the screams. What happened was that those few who paid attention to the plaintive cries got in on the ground floor and have been making money

ever since. But those many who gave radio the brushoff have had good cause to regret it.

This is something today's actors don't want to have repeated. They see television as something that can coin them a lot of money even if, at present, many of them are not getting rich on it.

If one fact about casting for television stands head and shoulder above all others it is that stage experience is an actor's best qualification. We have auditioned thousands upon thousands of hopeful aspirants for video programs and in virtually every case, the actor who has trod the board, "has it".

## *Stage Actors Preferable*

Stage actors, accustomed to acting with their whole bodies and able to memorize hours of script in comparatively short periods of time, are generally preferable to radio people whose voices are better actors than their bodies and who are better script readers than script memorizers. I say "generally" because there are, of course major exceptions. As to film people, they are in general, too far from us geographically and at present too hard to

get hold of to permit any generalizations.

The actor today sees television as a mighty potent showcase. When an actor goes on television, he knows that his audience may reach into the millions. It would take him many years of appearing on stage to play to that kind of audience.

By and large it is the stage actor—the actor trained to play before "live" audiences without a script—who thus far has been most successful in television. It is the actor who has felt that "rapprochement" with his audience—whose gags or whose lines are timed split-second with the audience's reaction. Actors have told me that appearing on television is like one "first-night" after another on the stage. Once the show is under way on television there are no re-takes, and once the show is over, it is not repeated hundreds of times by the same actors as a stageplay is. So there is something to the attitude of "first-nighters."

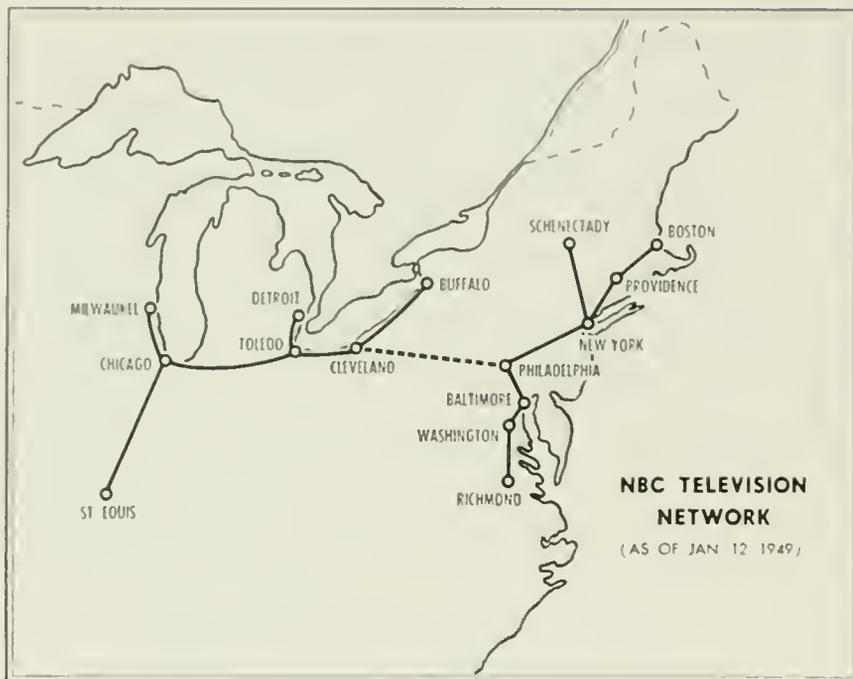
Generally speaking, of course, a good actor will be a successful one in television as he would be in any other medium. Talent, wherever it is found, is talent.

That television can benefit actors and actresses is demonstrated by the list of Broadway and Hollywood contracts that have been signed as a result of appearances on NBC. Ann Irish, Kathleen McGuire, Olive Stacy and Vaughn Taylor all came

*(Continued on page 30)*

PAT GRAY AND MAURICE MANSON, TELEVISION PLAYERS, AUDITION FOR THE AUTHOR (AT RIGHT).





COMPLETION OF THE COAXIAL CABLE SPAN INDICATED BY THE DOTTED LINE LINKS THE EASTERN AND MIDWESTERN TELEVISION NETWORKS.

## TELEVISION NETWORKS JOIN

*Eastern and Midwestern Chains Linked January 12 Making NBC Programs Available to 15 Stations.*

WHEN President Truman takes his oath of office January 20, millions of people from Boston to St. Louis will be viewing the event, an accomplishment made possible by the completion on January 12 of the coaxial cable link joining NBC's East Coast and Midwest television networks.

The new, interconnected network consists of fifteen stations, eight in the East and seven in the Midwest. Another eight outlets, not yet connected by coaxial cable or microwave relay, will be serviced with kinescope recordings of major NBC television programs, bringing the total to 23.

Of the 23 stations, five are owned and operated by the National Broadcasting Company. This is the limit of ownership permitted by the Federal Communications Commission for any one company. Four of these stations—in New York, Washington, Chicago and Cleveland—will be part of the interconnected network. The fifth, in

Hollywood, is operating, but will not be joined to the rest of the NBC network until a coast-to-coast connection is available at some time in the future. The remainder of the stations are independently owned affiliates of NBC.

This constantly-expanding network is the outgrowth of two stations existing in 1940, WNBT, New York, and WRGB, Schenectady. Television activity was brought to a standstill during the war, but since 1946 the development of video in the fields of set manufacture, programming and station and network construction, has been phenomenal.

### *Joined by Cable and Relay*

NBC's East Coast network was expanded to include Washington, Philadelphia, Baltimore, Boston, Richmond, and, very recently, Providence. These stations are joined by coaxial cable or microwave relay.

During this time, the Midwest web was taking form. NBC affiliates

came into being in Buffalo, Detroit, St. Louis, Toledo and Milwaukee. Linkage was completed between these stations, and on September 20, 1948, the NBC Midwest network was officially launched. Soon after that, their number was increased by two, as NBC's owned and operated stations in Chicago and Cleveland began telecasting.

Early in November the American Telephone and Telegraph Company notified NBC that service by coaxial cable between New York and Chicago would be available in January 1949. Unlike the East Coast connecting cable, which NBC uses full-time, the cables that join both the individual Midwest stations and the main East-west link must be shared with the other networks. This, however, is a temporary difficulty which is expected to be remedied as facilities increase.

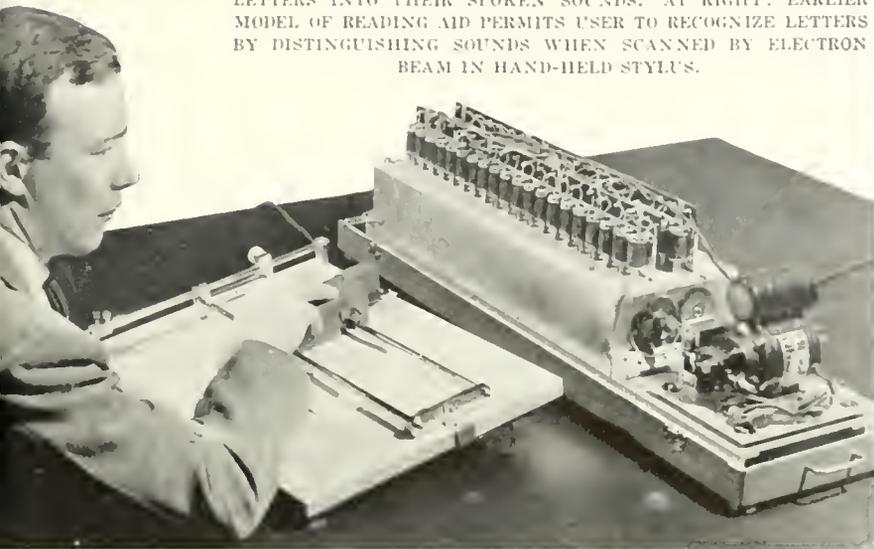
NBC was the first television broadcaster to develop a video network and continues to pioneer in networking its television shows. The role of a network in the development of the new medium is one of vital importance. Although individual stations may operate without the aid of networks, they have found it especially difficult to provide good program fare unless they are located in or near talent centers. Networking of programs, it has long been acknowledged, is the most practical way in which to get the highest quality program to the largest number of viewers at the lowest possible cost.

## Signal Corps Purchases 217 RCA Radar Units

Two hundred and seventeen commercial-type marine radar units have been purchased by the U.S. Signal Corps for installation aboard ships of the U.S. Transport Service, according to an announcement by Walter A. Buck, President of Radiomarine Corporation of America.

The units consist of the latest surface-search 3.2 centimeter commercial radars, and represent one of the largest single radar orders received by Radiomarine to date. Other government sales have included units to the U.S. Coast Guard, Army Corps of Engineers and U.S. Navy.

BELOW: THIS MODEL OF ELECTRONIC READING AID CONVERTS LETTERS INTO THEIR SPOKEN SOUNDS. AT RIGHT: EARLIER MODEL OF READING AID PERMITS USER TO RECOGNIZE LETTERS BY DISTINGUISHING SOUNDS WHEN SCANNED BY ELECTRON BEAM IN HAND-HELD STYLUS.



## Electronic Reading Aids

*Latest Experimental Model Automatically Converts Letters into their Normal Sounds—May be Useful in Translating Coded Patterns.*

A LABORATORY model of an electronic device which converts reading matter into the sounds of individual letters has been developed by the RCA Laboratories Division of the Radio Corporation of America. The development work was carried out by Dr. V. K. Zworykin, L. E. Flory and W. S. Pike of the Laboratories staff.

In operation, a line of type is scanned letter by letter with a scanning mechanism containing a miniature cathode-ray tube and an optical system. Each printed letter is scanned vertically with a pinpoint of light at a rate of 500 cycles per second. The scanning, however, is not continuous but is carried out so that the scanning spot pauses momentarily at several points along its path thereby creating the effect of a series of scanned spots arranged in a vertical line. To facilitate the recognition of signals from the individual spots of light, the spots are not present continuously, but are made to appear one after the other in a time sequence. If the series of spots forming the vertical line is now moved manually along the lines of type, the light, normally reflected by the white paper, will be interrupted by the

black portions of letters. These interruptions can then be transformed into electrical impulses by means of a phototube and amplifier.

As a result of the high speed vertical scanning and the manual scanning along the lines of print, the signal output of the phototube amplifier will be in the nature of the scanning frequency, modulated by the interruptions of light.

Five to eight channels or spots of light are present in each vertical sweep of the scanning beam and are separated by a timing circuit and counted by electronic means. The total number of pulses from all channels is unique for most letters of the alphabet.

One of the ambiguities exists in the case of b and d, since the number of counts derived from these two letters is the same. But closer examination of b and d will show a difference in the sequence in which the pulses in the various channels occur. In b, for instance, none of the scanning spots will be reflected at the start of the scanning because of the letter's vertical portion on the left. By contrast, the solid vertical portion of d is encountered by the scanning spots at the extreme right. The informa-

tion thus collected by the scanning process can be combined with the balance of the scanning information to differentiate between the two letters.

The output from the selector circuits is used to operate a magnetic reproducer arranged so that, as a letter is recognized, a single recording of that letter is reproduced through a loud speaker. The individual letter sounds are recorded on separate discs driven by friction from a continuously rotating shaft.

The instrument is believed to have possibilities as a recognition device for the translation of coded patterns such as those which form the basis of teletyped messages.

## INDIA PURCHASES THREE SOUND FILM RECORDERS

Three RCA sound film recording systems, purchased by the Indian Government for the production of educational motion pictures and newsreels are expected to play a large part in India's plans to acquaint the people with the duties of citizenship in the new free state, according to official reports received by Meade Brunet, RCA Vice President and Managing Director, RCA International Division. Under the plans, films covering a wide range of progressive topics in social and economic fields will be produced in Bombay and distributed to all parts of the country by the Indian Ministry of Information.

# Television Coverage Extended by New Method

*(Continued from page 13)*

"This new system will make the fine programs of these two stations available in more perfect form to many thousands of additional television viewers who live in a wide area between New York and Washington which heretofore has not received satisfactory service. The use of synchronization will soon be extended to other areas which are troubled with the problem of interference where two stations or more are on the same channel."

Reduction of tropospheric interference between television stations on the same channel became an urgent objective of industry engineers after the decision of the FCC in September to impose a freeze on processing of applications for the construction of television stations.

The interference, which occurs for the most part in fringe areas of television coverage, shows up on the screens of television home receivers as moving horizontal black bars, which may be described as a "Venetian blind" effect. The interference is due to characteristics of the troposphere, or upper air masses, which cause television signals to be refracted over long distances with signals from several transmitting stations being received simultaneously in certain localities. The extent of interference depends on the strength of the interfering signal and the difference in carrier frequencies of the stations involved.

Ray D. Kell, head of the Television Section of RCA Laboratories and long a pioneer in the development of television, conceived the idea of synchronizing the carrier frequencies to reduce the cross-bar interference. As the difference in carrier frequencies is reduced, the number of interference bars diminishes; when there is no difference in frequencies, there are no bars.

Mr. Kell's development work, in cooperation with RCA associates and NBC engineers, resulted in the equipment now in use between New York and Washington stations of NBC. This equipment consists of two units. The first is at RCA Laboratories in Princeton, the second

at television station WNBT in New York.

When the system is in operation, signals from New York and Washington stations are compared electronically at the output of two radio receivers located in Princeton.

Information regarding frequency differences of the two distant transmitters is carried as frequency modulation of a 1,000-cycle tone by telephone line to New York. The frequency shift of this tone is utilized to change the frequency of the New York transmitter to maintain it on exactly the same frequency as the Washington trans-

mitter. The operation of the system is entirely automatic and will require little or no attention.

It was pointed out that a similar system could be established, when equipment is available, to synchronize any two or more television stations operating on the same assigned channel. There are 12 channels assigned to television in the country at the present time with a total of 51 television stations using them. Seventy-three applications for construction permits have been granted by the FCC, and 310 applications are on file with the Commission awaiting the end of the freeze.

## Casting for Television

*(Continued from page 27)*

to the attention of stage and film people through NBC video. Then there's Kyle MacDonnell, who had appeared in "Make Mine Manhattan" for about several months without achieving any great fame. After a half dozen shows on NBC Television she had received more publicity—including a cover picture in *Life*—and more big-time offers than she had ever dreamed of getting in so short a time while she was on Broadway.

Actors are notoriously unconventional in their desire to add artistic satisfaction to economic gain. Money, they admit, is important, but so is the pleasure of acting in a medium that provides their acting talents with full outlet.

And television is just such a medium. In television, an actor is not just a voice, as in radio, nor does he portray his part a few minutes at a time over a period of several weeks, as in the movies. In television he gets the artistic and emotional gratification of creating a complete, head-to-toe character every time he appears before the cameras. To the outsider this may appear to be a quite secondary consideration, but to anyone who knows the members of the acting profession, it is as important as the money to be made and the fame to be won.

One trend I've noticed lately is quite significant. Several major radio actors are giving up good money and putting in hard hours during the summer to play before stock company audiences. They're doing it as practice for television.

## Large-Screen Television

*(Continued from page 26)*

corded on the film and will be seen as a region where a gap or overlap occurs making a white line for under-exposure and a black line when over-exposure occurs.

The next unit of a film system is the rapid processing equipment. The Eastman Kodak Company has found that rapid processing, at higher solution temperatures, is entirely feasible. The film generally selected for this purpose is a fine grain positive stock normally used for theater release prints.

The final link in the film system is the standard 35mm motion picture projector.

In performance, large screen projectors are now limited by the quality of signals available for projection. The technical possibilities of the projection system are equal to the best studio television equipment and an inferior picture on the screen is caused usually by a deterioration of the signal between camera and projector.

## Dr. Zworykin Receives Poor Richard Club Award

Dr. Vladimir Kosma Zworykin, Vice President and Technical Consultant of RCA Laboratories, Princeton, N. J., has been named by the Poor Richard Club of Philadelphia to receive its 1948 Award for Achievement, an honor given annually "to the most deserving of contemporary American citizens." Dr. Zworykin will receive the award at the Franklin Institute, on January 17, at ceremonies highlighting the annual Franklin Day celebration which will be attended by the Governor of Pennsylvania and other state officials.

After selecting television as the most timely subject, the Club's members, composed largely of executives of newspapers, magazines, advertising agencies, printing concerns, and radio and television stations, unanimously voted that Dr. Zworykin, in developing the all-electronic system, was mainly responsible for bringing television out of the laboratory and making it commercially practical.

In addition to his invention of the iconoscope, television's first electronic "eye", Dr. Zworykin developed the kinescope, electronic picture tube of the television receiver. Presentation of the award coincides with the 25th anniversary of his invention of the iconoscope.

Additional citations have been received by Dr. Zworykin for his research and developments in the video art. In 1934, he received the Morris Liebmann Memorial Prize from the Institute of Radio Engineers. He was given the Overseas Award of the British Institution of Electrical Engineers in 1937 for a paper on the iconoscope, and in 1938 received the honorary degree of Doctor of Science from the Brooklyn Polytechnic Institute. In 1940, the National Association of Manufacturers presented him with the Modern Pioneers Award, and in 1947 Dr. Zworykin was awarded the Howard N. Potts medal of The Franklin Institute. His most recent citation was the Chevalier Cross of the French Legion of Honor which

he received from the French Government in 1948.

Past recipients of the Poor Richard Club award include Brig. General David Sarnoff, Chairman of the Board, Radio Corporation of America,

who received the medal in 1939 for outstanding achievements in radio; Will Rogers; Walt Disney; Capt. Eddie Rickenbacker; Will H. Hays, and Generals Dwight D. Eisenhower and H. H. Arnold.

## Changes in RCA Management

(Continued from page 8)

Election of Mr. McConnell as Vice President in Charge of Finance of the Radio Corporation of America was announced on January 7 by Frank M. Folsom, President of RCA.

In 1941, Mr. McConnell joined the Legal Department of the RCA Manufacturing Company, now the RCA Victor Division. A year later, he was named General Counsel of that organization, and in 1945, he was elected Vice President and General Attorney of the RCA Victor Division. He has been Vice President in Charge of Law and Finance of the RCA Victor Division since April, 1947.

Mr. McConnell, who is a native of Davidson, N. C., was graduated from Davidson College in 1927, and in 1931 received a Doctor of Laws degree from the University of Virginia. He practiced law in West Palm Beach, Fla., and in Charlotte, N. C., then in 1933 joined the legal staff of the National Recovery Administration, serving part of the time as head of one of the three sections of the NRA legal department.

Upon leaving the NRA in 1935, Mr. McConnell became an associate in the New York law firm of Cotton, Franklin, Wright & Gordon (now Cahill, Gordon, Zachry & Reindel), where he specialized in legal phases of government regulation of corporate enterprise.

Mr. McConnell is a member of Phi Beta Kappa, Kappa Alpha, and Phi Delta Phi fraternities.

Announcement of Mr. Buck's election as Operating Vice President of the RCA Victor Division, Radio Corporation of America, was made by John G. Wilson, Executive Vice President in Charge of that Division on January 7.

Mr. Buck, a retired Rear Admiral of the U. S. Navy, has served since March 15, 1948, as President of

Radiomarine Corporation of America, a service of RCA. In retiring from the Navy last March, Mr. Buck ended a distinguished career of 30 years in the Navy, the last two of which he served as Paymaster General and Chief of the Bureau of Supplies and Accounts. For his wartime services he was awarded the Legion of Merit.

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

He was commissioned an Ensign in the Navy on July 30, 1917, and served in World War I as supply officer on the *USS Canandaigua*. After the war, he received a variety of assignments, including four years in the Planning Division of the Bureau of Supplies and Accounts.

In World War II, he rose from Commander to Rear Admiral, serving with distinction on the staff of Arthur L. Bristol with the Atlantic Fleet, and later with the Office of Procurement and Materiel in Washington. In 1945, he was named Director of the Navy Materiel Redistribution and Disposal Administration and then Chief of the Property Disposition Branch, Materiel Division. Before his promotion to Paymaster General and Chief of the Bureau of Supplies and Accounts, he served for seven months as Assistant Chief of that Bureau.

## Wins H. P. Davis Award

Howard Reig, staff announcer of WGY, Schenectady, New York, has been named national winner of the H. P. Davis National Memorial Announcers' Award for 1948. He received a gold medal and a cash prize of \$500.

*Another RCA First!*



## RCA SPECIAL RED TUBES

### *Minimum life—10,000 hours!*

• These new RCA Special Red Tubes are specifically designed for industrial and commercial applications using small-type tubes but having rigid requirements for extra reliability and long tube life.

As contrasted with their receiving-tube counterparts, RCA Special Red Tubes feature vastly improved life, stability, uniformity, and resistance to vibration and impact. Their unique structural design makes them capable of withstanding shocks of 100 g for extended

periods. Rigid processing and inspection controls provide these tubes with a minimum life of 10,000 hours when they are operated within their specified ratings. Extreme care in manufacturing combined with precision designs account for their unusually close electrical tolerances.

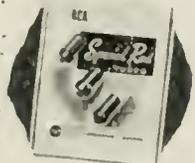
RCA Application Engineers are ready to co-operate with you in applying these new types to your designs. Write RCA, Commercial Engineering, Section DR75, Harrison, N. J.

#### TABLE OF RECEIVING-TYPE COUNTERPARTS

5691 . . . . .	65L7GT
(0.6 A. heater) . . . . .	(0.3 A. heater)
5692 . . . . .	65N7GT
5693 . . . . .	65J7

RCA Special Red Tubes can be used in most cases as replacements for their counterparts in equipment where long life, rigid construction, extreme uniformity, and exceptional stability are needed.

SEND FOR BULLETIN . . .  
Booklet SRT-1001 contains complete technical data on RCA Special Red Tubes. For your copy write: RCA, Commercial Engineering, Section DR75, Harrison, N. J.



THE FOUNTAINHEAD OF MODERN TUBE DEVELOPMENT IS RCA



TUBE DEPARTMENT

**RADIO CORPORATION of AMERICA**

HARRISON, N. J.

# RADIO AGE

RESEARCH • MANUFACTURING • COMMUNICATIONS • BROADCASTING • TELEVISION

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APRIL

1949

NEW NOTE IN MUSIC



*Powerful RCA radio transmitter—Venezuelan Army  
Part of a fleet of 80 mobile units, Radio Policial, Caracas*

# VENEZUELA

## expands its uses of modern RCA radio equipment

ONE OF THE MOST significant trends in Venezuela is the expanding use of radio... for intercity, government, police and military communications.

Citizens in towns formerly without long-distance telephone service now talk freely with other cities by RCA radio-telephone equipment.

Municipal police forces use fleets of fast RCA radio-equipped cars... as modern as any in the world.

The RCA-equipped radio networks of the Venezuelan Army contribute to efficient military communications.

Venezuela's people are enlightened and entertained through RCA-equipped radio broadcasting stations.

Today, countries throughout the world depend upon RCA quality equipment and upon the specialized radio experience of RCA and its distributors.



*Radio Caracas—completely RCA-equipped for radio at its best.*



RCA INTERNATIONAL DIVISION

**RADIO CORPORATION of AMERICA**

745 FIFTH AVE., NEW YORK, N.Y., U.S.A.

# RADIO AGE

RESEARCH • MANUFACTURING • COMMUNICATIONS • BROADCASTING • TELEVISION



VOLUME 8 NUMBER 3

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OVER

RCA's recently introduced 45-rpm record player and colorful, high-fidelity records are the result of 10 years of research.



Services of RCA are:

RCA Laboratories Division

RCA Victor Division

RCA Communications, Inc.

Radiomarine Corporation of America

RCA National Broadcasting Company, Inc.

RCA Institutes, Inc.

RCA Service Company, Inc.

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RCA Building, New York 20, N. Y.

DAVID SARNOFF, *Chairman of the Board*

LEWIS MACCONNACH, *Secretary*

FRANK M. FOLSOM, *President*

ARTHUR B. TUTTLE, *Treasurer*

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# BUILDING A CAREER

EDWARD J. NALLY

*A Director of  
Radio Corporation of America,  
and its first President,  
from 1919-1922.*



*On his 90th birthday, on April 11, Edward J. Nally was asked if he had a message for youth that might be drawn from his long years of experience in the realm of communications. He turned to this brief essay of his, which appeared originally in the SATURDAY EVENING POST of 1896 and remarked that the thoughts it expresses are as pertinent today as they were 53 years ago.*

**T**here is a foundation stone to each man's success in business. In my personal experience this is represented by the first of the familiar graces, Faith, and with it is coupled concentration of purpose and energy.

In the years of youth opportunity is a secondary consideration; confidence is the important thing. My start was inauspicious. I began as a messenger boy. But I held firmly the conviction of success, even then; and this confidence never left me.

It is in Faith that courage is born. And thus is bred Hope, the energizer of work. Finally, out of work—constant, tireless, unremitting—is the fabric of achievement woven.

Definite objectives must be sought, and perpetually striven for, one by one, with each attainment the compelling force for the next.

Always, there must be a single aim, and concentration upon it.

In commercial life this objective is usually the job higher up, and it is always waiting for the boy who has utilized his spare moments to acquire knowledge outside the prescribed limits of his own routine duties; to familiarize himself with details of work regarding which he is not compelled to be informed.

The boy who is paid fifty dollars a month and earns what he gets, and no more, is the boy who sticks in a fifty-dollar position and is not advanced on the payroll. On the other hand, the boy who draws only fifty dollars but works as if he were being paid eighty is invariably the one to be chosen for promotion to the eighty-dollar place.

Jealousy of holidays and off-hours indicates in a boy the presence of the microbe of failure. The men who are given to signing petitions and round robins also betray the same defect. They petition for opportunities instead of making them.

If I would lay emphasis on one thing more than another, it would be obligation to duty, duty to one's self and to those about him; and, in the simple words of the Good Book, "Leaving nothing undone, and doing all things well, missing naught."

# New 45-rpm Records and Record Players Acclaimed by Industry

*Enthusiastic Response of Nation's Phonograph Retailers Hasten RCA Plans for Increased Production of High-Fidelity System*



By J. B. Elliott

*Vice President in Charge of Consumer Products, RCA Victor Division*

ON the basis of the enthusiastic response from the country's phonograph retailers it is believed that between 2,500,000 and 3,000,000 instruments equipped to play the new RCA 45-rpm records will be produced and sold this year by the industry. To help meet this demand RCA Victor has planned for increased manufacturing facilities in its Indianapolis, Ind., plant. In addition, approximately 29 leading manufacturers are now incorporating 45-rpm record reproduction mechanisms in their instruments, or plan to do so.

Merchandising meetings arranged by RCA Victor's field staff had capacity turnouts wherever they were held. Nearly 12,000 dealers have demonstrated their approval of the new system with on-the-spot orders. Many dealers now handling instruments alone have expressed the wish to add records to their lines, because of the sales potentialities inherent in the high quality, convenient size, colorful appearance, and low price of the 45-rpm records.

A product of ten years of laboratory research and development, the new 45-rpm system represents the first records and players ever developed side by side as complemen-

tary units, with the specifications of each selected to meet the requirements of the other. This system offers music free from all discernible distortion and surface noise on a small, 6 $\frac{7}{8}$  inch, non-breakable disc that plays up to 5 $\frac{1}{3}$  minutes, equal to the playing time of the standard 12-inch record. The new disc, offering a small, standard size for all classifications of music, goes a long way toward solving the consumers' record storage problem in the home.

A unique feature of the system is its unusual new record changer—the fastest ever developed—which has been designed to eliminate the traditional problem of chipping, cracking, and breaking records during changer operation.

### *Spindle Houses Mechanism*

In a marked departure from most conventional systems, the drop mechanism is housed in the player's center spindle, which has been enlarged from the previous  $\frac{3}{4}$  inch diameter to 1 $\frac{1}{2}$  inches. By centering the drop mechanism, RCA Victor found it possible to eliminate the usual outside record posts, speed up the changer cycle, simplify the changer mechanism, silence its action, reduce the overall size of the player, and eliminate many costly and intricate moving parts.

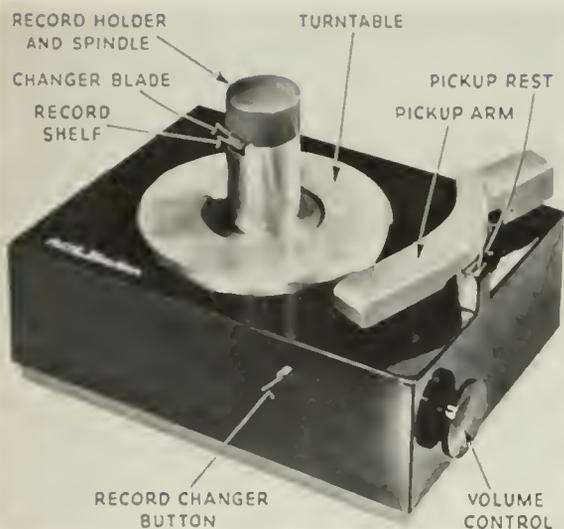
The new 45-rpm records have been designed with a raised shoulder between the playing area and the center rim, providing air spaces between the playing surfaces and center rim of stacked records. In most conventional systems, the record separating blades are required to force their way between the stacked records. This forcing action is often the cause of record damage. With RCA Victor's new design, the blades move into the air spaces provided by the raised shoulders of the records.

Departing from the varied-size black records, translucent plastic phonograph records in gay, cheerful rainbow colors are making their appearance in the 50-year-old record industry. Single-size discs for all classifications of music are featured, with the various categories identified by bright shades of red, green, blue, yellow, cerise, and other hues.

The selection of characteristic colors resulted from a study by a board of color and design experts headed by John Vassos, nationally known industrial designer. The color assigned to each of the seven classifications of recorded music represents, in the board's opinion, the psychological and aesthetic color connotation of the type of music represented—ruby red for classical music, midnight blue for semi-classical, jet black for popular, lemon-drop yellow for children's,

MAESTRO ARTURO TOSCANINI CALLED THE NEW RECORD AND RECORD PLAYER "A SIGNIFICANT ADVANCE IN THE FIELD OF RECORDED MUSIC."





THIS 45-RPM AUTOMATIC RECORD PLAYER ATTACHMENT PERMITS THE NEW DISCS TO BE PLAYED THROUGH CONVENTIONAL RADIO, PHONOGRAPH OR TELEVISION SETS.

grass green for Western, sky blue for international, and cerise for blues and rhythm. Labels for each category are of a color blending harmoniously with the hue of the vinyl plastic record material used.

The new colored records, which represent savings up to 50 per cent in record cost, will aid the consumer in classifying, storing, and identifying the various categories of recorded music in home libraries. The discs are packaged individually in cellophane envelopes.

For dealers, constantly faced with the problem of attractive record displays, the new gaily colored all-purpose discs, together with the 45-rpm record playing instruments, mark a significant merchandising departure from the varied-size traditional black records. For the first time, dealers will have a small, single-size record for all music classifications, and record filing will be merely a matter of matching colors on the shelves. Color indexing will insure permanently equalized displays—for at a glance the dealer will be able to determine which record classification requires supplementing.

It is expected that color indexing of records will also speed service in the store. A proper display of the musical classifications by color will enable the customer to locate easily

the type of music he prefers and serve himself. Each color category will bear a standard price, making it easy for the customer to determine the cost of his purchases, and helping the salesman to figure prices.

While RCA Victor's initial catalog of 45-rpm records—approximately 200 currently popular hits—is made up of repertoire transferred from conventional master recordings, it will be augmented shortly with new releases recorded on 45-rpm masters. RCA Victor will continue to make available on 78-rpm records all musical selections recorded for the new 45-rpm system. The 78-rpm releases will continue to be made in the customary black compound and in the special de luxe red vinyl plastic series.

Anyone may have the new 45-rpm system. To enable those who already have a conventional radio, phonograph or television combination to use it in playing the new records, RCA Victor has produced an automatic record player attachment, in addition to six other instruments incorporating 45-rpm facilities—three Victrola console models and one table model radio-phonograph, a television console combination, and a self-contained automatic pho-

nograph with built-in amplifier and loudspeaker.

The attachment comes with a cord and plug for use with a phonograph input jack, and is easily connected to the amplifier and loudspeaker system of almost any radio or television instrument already in the home. The four console instruments also provide AM and FM radio reception, and the television combination and one of the Victrola radio-phonographs include a second changer for 78-rpm records.

Enthusiasm for the new RCA Victor 45-rpm system has been expressed by many experts in the field of music including two of the world's foremost artists. Maestro Arturo Toscanini, conductor of the NBC Symphony Orchestra, said "I was very impressed with the speed and smoothness of the automatic record changer and consider both the record and the instrument a significant advance in the field of recorded music." Jascha Heifetz, celebrated violinist, declared that the 45-rpm system "is the most faithful reproduction of music on records I have heard so far. . . . I consider the new development the solution to the present-day problem of building a record library in a limited storage space."



ONE OF THE NEW RCA VICTOR MODELS HAS FACILITIES FOR PLAYING BOTH 78-RPM AND 45-RPM RECORDS, IN ADDITION TO FM AND AM RECEPTION.

# Communications—Key to Victory

*General Sarnoff, in Address to Armed Forces Communications Association, Envisages Enlarged Role of Television in Complex Modern Warfare and Tells Members Victory Could Well Go to Side Which Sees "Farthest", "Soonest"*

COMPLEXITIES of modern war with supersonic speeds, guided missiles, danger of "surprise attack" and the extensive use of television as a military aid give a different meaning to far-sightedness. Brig. General David Sarnoff, Chairman of the Board, Radio Corporation of America, told members of the Armed Forces Communications Association at their third annual meeting in Washington on March 28. Because of the strategic importance of television, already demonstrated in naval, military and air operations, he proposed a revision of the old saying that the battle goes to those who get there "fastest" with the "mostest." In another struggle, he said, the victory could well go to the side which sees "farthest", "soonest."

In his address to more than 500 executives of the communications and photographic industries and members of the armed forces, General Sarnoff as retiring president of the Association, urged America's large corporations and small businesses, together with their best men, to "make company and personal sacrifices to come to the aid of preparedness planners in this country."

## *Projects Gain Needed Time*

"My recent visit to Europe convinced me more than ever of the need for the Marshall Plan and the North Atlantic security pact," General Sarnoff said. "These may not prove to be solutions in themselves, but together they offer hope and encouragement to the peoples of Western Europe, a fact which amply justifies their existence. Moreover, through the combined operations of the two projects we are enabled to gain the time so sorely needed to work out the complicated problems which are astringent in a world that is neither at war nor at peace.

"Time also is required to gear our industry toward a mobilization



BRIG. GENERAL DAVID SARNOFF (CENTER), DWIGHT G. PALMER (LEFT), PRESIDENT, GENERAL CABLE CORP., AND ADMIRAL JOHN D. PRICE, DEPUTY CHIEF OF NAVAL OPERATIONS, AT THE SPEAKERS' TABLE AT THE ANNUAL MEETING OF THE ARMED FORCES COMMUNICATIONS ASSOCIATION IN WASHINGTON, D. C., ON MARCH 28.

plan that would be effective in the event that an emergency cannot be avoided—effective without confusion and without delay. But actually we need more than time, if we are to be fully prepared to meet successfully a possible emergency of modern dimensions. We need also, the interest and experience of the best brains in American research laboratories and in industry to work with our military planners.

## *Sacrifices Must Be Made*

"I cannot emphasize too strongly that all the large corporations and small businesses, together with their best men, must make company and personal sacrifices to come to the aid of the preparedness planners."

General Sarnoff said that he knew from personal observation that communications were the key to success in our advance in Europe in World War II, and declared that they had an equally important role in the Pacific war.

Expressing assurance that Amer-

ican military leaders understand the importance of communications and will take care of their effective use, he added: "Our job in industry is to do all we can to assure that such advances as we make in the communications art are promptly made available to the appropriate military service and thus help to strengthen our national security. That is certainly one of the principal purposes of our Association and the main reason for its existence."

General Sarnoff recalled that at the meeting of the Association last year at Wright Field he had warned that to ignore the swift advances of science would court disaster, and had commented upon the probable use of television as an aid to victory in battle.

Since then, he said, it had been demonstrated by the aircraft carrier *Leyte*, at sea off New York, how television can be used to direct tomorrow's battles.

"In this first ship-to-shore tele-

*(Continued on page 24)*

# THE STATUS OF TELEVISION

*Extension of Television into Higher Frequencies, when Authorized by FCC, will not make Present Video Receivers Obsolete*



By J. G. Wilson

*Executive Vice President in Charge of  
RCA Victor Division*

**P**REDICTIONS that a future shift of television broadcasting to higher frequencies will make present receiving sets obsolete are absolutely unfounded, and are not based upon scientific or economic facts.

It is true that research scientists are exploring the higher frequencies in an effort to determine their possible usefulness in television. But these investigations have not reached the stage that will permit the establishment of commercial standards and the early opening of new channels for television, except for experimental purposes. If, eventually, it is found that television can operate successfully on the higher frequencies, then new equipment, new transmitters and new tubes must be developed on a commercial scale — and all that takes time.

But even if the higher frequencies are found to be practical for television broadcasting, present sets will by no means be obsolete. It already has been demonstrated that a suitable converter can readily be applied to sets now in use so that the sets will not only receive the twelve channels for which they are designed, but will tune in broadcasts on the higher frequencies as well.

Up to the present, neither the Federal Communications Commission nor any other group, technical or otherwise, has made a concrete and authoritative proposal as to which particular high-frequency channels may some day be opened for television.

Until it is definitely known which higher-frequency channels will be available for television it is impractical to design a set and unjustified to assert that it will efficiently pick up all channels by the mere adjustment of the tuning turret.

If, as, and when the Federal Communications Commission decides that the higher frequencies are to be utilized for television, then and only then can the proper sets be designed. But when that day comes, the simple converter can be used with present sets to extend their tuning range into the higher-frequency spectrum.

## *Ten-Year Old Sets Still in Use*

It is interesting to note that RCA Victor television receivers first introduced to the public in 1939 are still in use, although more than ten years have passed. In that period television has made great and fundamental advances. Similarly, there is no indication today that receivers of 1949 design will be obsolete in 1959, or even later than that date.

Naturally, the majority of manufacturers in designing their television receivers have the public interest continually in mind, and they adhere to standards set by the industry and by the FCC. But they cannot build receivers today for the future when it is not known what channels will be used. Engineers must know which higher frequency channels will be allocated to television and what the standards will be to supplement those already in use, before they can design the set of the future.

## *Adaptation would be Costly*

For any manufacturer to boast economic superiority for a television receiver that will not be obsolete eventually because it is provided with a few components for receiving higher frequency channels is unjustified and misleading. And to adapt such a set to receive higher frequencies would be an expensive job, probably more costly in total than the simple converter needed to keep present receivers in line with

progress. With such a converter no modifications whatever are required inside the set.

RCA Laboratories, one of the world's foremost centers of radio, television and electronic research, has led and continues to lead in the exploration of the high-frequency spectrum. As rapidly as discoveries are made and can be applied commercially, the RCA Victor Division will bring the new improvements to the public in the form of television receivers. Television will continue to advance, and every effort will be made by RCA to increase the service to the public.

Never in the history of wireless, radio broadcasting, or television have scientists and engineers been able to guarantee "positive built-in assurance" that a receiver *will not* be made obsolete by any contemplated changes in channels. Such a statement is no more true in radio and television than in the automotive, aviation, or any other field which thrives upon science and continually improves and advances in bringing new and added benefits to the public.

## *Research Achieves Progress*

Every new art or business based upon the technical sciences must deal continuously with the factor of obsolescence. That is why American industry continues research to achieve progress and to lift the American standards of living. Every new development in radio and television, whether it be a device or system, involves some obsolescence of former methods, but obsolescence is nothing to be feared—for the American people know that through the ingenuity and creativeness of scientists and engineers, every effort will be made to keep pace with the new, while taking effective measures to keep the old in useful service.

The Federal Communications Commission has not proposed that the existing television channels be replaced by others. On the contrary, Chairman Coy stated on March 23, as reported by the Associated Press, that the twelve channels "will not be eliminated" and that "present television sets available on the market will get service from these channels continuously." Service on these channels is constantly expanding.

and thousands of new receivers for these channels are reaching American homes daily.

If and when additional channels in the higher frequency band are opened to television, their function will be to supplement, not to replace, the channels already in use. Instruments now in service will continue to serve, and new instruments also will come into American homes in much the same way that a new streamlined automobile takes to the road alongside cars that are 10, 20 and even 25 years old—and all continue to give service to the public.

The Radio Corporation of America has done more to investigate the ultra-high frequencies (UHF) than any other manufacturer or broadcaster. Its experiments go back many years, and have been on a virtually continuous basis ever since. These experiments, described in articles widely read throughout the industry, have provided the main basis for the consideration of television in the UHF band at the hearings held by the FCC. With this background of experience, unique in the industry, RCA presents the following facts regarding television today and its possible lines of development in the future:

#### *Original Channels Retained*

In 1945, the FCC established 13 channels for commercial television broadcasting between the frequencies of 44 and 216 megacycles. These channels have remained unchanged to the present day, with the exception of Channel #1, from 44 to 50 megacycles, which was transferred to another service before it was put into commercial use. The only commercial television authorized by FCC is on the 12 channels from 2 to 13, inclusive. All RCA Victor television receivers and nearly all other television receivers have been engineered and manufactured to these standards, the only standards authorized by the FCC. These frequencies are referred to as VHF (very-high frequencies) in contrast to UHF (ultra-high frequencies).

The continuance of channels 2 to 13 for television broadcasting is unquestioned. As previously mentioned, FCC Chairman Wayne Coy has stated positively that this is so.

It is well recognized in the industry that a need does exist for *additional* channels to supplement the present ones, in order that all sections of the country may have full enjoyment of television service. The only space available for these additional channels is in the ultra-high frequencies. Therefore, it is assumed that the FCC will authorize these frequencies for television use if and when experiments, including field tests, prove them practical and reliable for regular service to the public.

#### *Where UHF Stands Today*

Although UHF has been studied intensively, and numerous tests have been conducted by RCA and others, much information necessary to its practical operation is still to be developed. The situation as of last September was summarized in a report to the FCC by the Joint Technical Advisory Committee of the Institute of Radio Engineers and the Radio Manufacturers Association, as follows:

“JTAC finds that there is no commercial equipment for UHF television available at this time. It estimates that a period of not less than one year, possibly two or three years, will be required to develop and produce transmitter tubes suitable for short-range coverage, for the 475-890 megacycle band and UHF television receivers suitable for commercial production. The development of equipment, particularly receivers, must await the adoption of performance specifications, which in turn depend on the availability of further engineering information.”

It will be noted that this statement emphasizes the development period of UHF *transmitter tubes*—only one element of many involved in the establishment of a practical UHF television system.

RCA began its more recent UHF tests from the Empire State Building, New York, early in 1946. A second field test was conducted in the Washington, D.C. area during the Fall of 1948. During this test television programs were broadcast simultaneously on VHF and UHF to provide comparisons between these

two frequency bands. Full technical reports covering the operation of these stations have been published. The information needed is still far from complete and RCA is now undertaking the erection and operation of another UHF television station in Bridgeport, Conn., with the objective of obtaining solutions to remaining problems. This station is expected to begin operating for tests late in 1949.

It is impossible for anyone to predict with accuracy when UHF television will become a practical reality. The approval of FCC, the setting of standards, the designing of transmitters and receivers, all have to follow the solution of engineering problems.

RCA Victor television receivers are designed and manufactured to provide the customer with the finest obtainable television *at the lowest possible price*. While keeping the customer's future needs constantly in mind, nothing has been added to increase the cost of his equipment *today*. If a manufacturer has partially provided for possible conversion to UHF in current receivers, the customer is paying for such provision today for an arrangement which may prove inadequate tomorrow.

#### *Facts for the Customer*

The customer should be told these facts:

- (1) The *additional cost* to the buyer of equipment built by the manufacturer into receivers *today* for possible use on UHF *tomorrow*.
- (2) The still *further cost* of making this equipment usable when UHF comes.
- (3) Whether the UHF equipment built into the television receiver *today* will be sufficient to receive on any UHF channels which the FCC may allocate eventually.

To determine the real cost to the consumer of converting his receiver to UHF, it will be necessary for him to add these first two factors together—that is, the initial extra cost of built-in UHF equipment and the future cost of adapting it to actual use. In the RCA Victor method previously referred to, the

*(Continued on page 27)*

# 16-Inch Metal Kinescope

*Teegarden Declares Field Tests Prove New Tube Has Numerous Features Advantageous to Television Set Owners*

**T**HE new 16-inch direct-view metal-cone kinescope tube, introduced recently by Radio Corporation of America after 13 years of research and engineering development, has been enthusiastically accepted by leading television set manufacturers, according to L. W. Teegarden, Vice President in Charge of Technical Products, RCA Victor Division.

During demonstrations of the tube at the Annual Convention of the Institute of Radio Engineers in March, Mr. Teegarden pointed out that the tube provides an ideal picture size between that supplied by the popular 10-inch kinescope and the large screen of projection models. In addition, he said, the metal kinescope has proved through extensive field tests that it possesses electrical and mechanical features that are specially advantageous from the view point of television set owners.

The use of metal as a material for the envelope of a large-size television picture tube, Mr. Teegarden added, was based on several factors. There is a plentiful supply of chrome steel; metal can be formed and shaped to exact dimensions with greater ease; the weight is substantially less; the finished product has greater durability and the tube assembly is more readily adapted to mass production. All this adds up to a bigger and better television picture at lower cost to

the television public.

The most unusual feature of the new tube is the glass-to-metal seal which joins the glass neck and glass face-plate to apex and base respectively of the metal cone. So perfect is this seal, applied through techniques developed and perfected at RCA tube plants, Mr. Teegarden said, that tests far more severe than would ever be encountered in actual use, have failed to rupture the joint. In one test, RCA engineers placed a metal tube in boiling water, then in liquid air at a temperature of minus 374°F., and once again in boiling water. Examination showed no effect on the seals from this treatment.

## *Gives Greater Screen Brilliance*

Through the 16-inch tube it is possible to obtain a large picture size without sacrificing screen brilliance and contrast when operating the receiver from low-cost power supplies. Although the 16-inch metal tube functions with the relatively low voltages of present 10-inch tube sets, it was pointed out, its advanced design permits the application of much higher voltage to the tube with consequent increase in screen brilliance.

While the metal surface of the tube is electrically charged, receivers are so designed that it cannot be reached from the outside of the cabinet. The tube itself is covered with a permanent plastic hood hav-



THE 16-INCH METAL-CONE TELEVISION PICTURE TUBE PROVIDES AN IDEAL PICTURE SIZE BETWEEN THAT OF THE POPULAR 10-INCH KINESCOPE AND LARGE SCREEN PROJECTION RECEIVERS.

ing high insulating properties. This safety precaution is in addition to the coat of insulating paint which is applied to the tube at points where electrical leakage might occur under operating conditions of high humidity. Receivers utilizing the 16-inch metal tube have received full approval of Underwriters Laboratories.

Envisaging the enthusiastic public acceptance of the new tube with its assurance of larger, clearer pictures, Mr. Teegarden said, RCA recently broke ground for an ultra-modern tube plant in Marion, Indiana, whose entire output will be devoted to production of the new 16-inch metal tube, supplementing the present production of the world's largest picture tube manufacturing plant, owned and operated by RCA at Lancaster, Penna.

"Our primary purpose," Mr. Teegarden said in conclusion, "is to produce the best possible tube at the lowest possible cost, and in the largest possible quantity to help meet the enormous public demand for picture tubes. We feel that the 16-inch metal tube represents an important step in this direction."

STANDARD RCA VICTOR TELEVISION RECEIVERS—LEFT TO RIGHT: TABLE MODEL WITH A 10-INCH GLASS TUBE; TABLE MODEL WITH A 16-INCH METAL-CONE TUBE, AND A PROJECTION-TYPE CONSOLE.



# Electron Microscope in Industry

*In Only Eight Years, this Versatile Instrument, a By-product of Television, has become Indispensable in the Research Laboratories of the Nation's Leading Manufacturers and Processors*



By Paul A. Greenmeyer

*Scientific Instruments Section,  
RCA Victor Division*

**I**N THE past eight years, electron microscopy has established itself as a basic science in the modern industrial research laboratory. From the day that the first RCA electron microscope left the factory destined for industrial use, this powerful electronic servant has become increasingly indispensable in the commercial world.

A by-product of RCA research into television, the electron microscope gradually took shape in the mind of Dr. V. K. Zworykin, Vice President and Technical Consultant of RCA Laboratories, as he brought electron lenses, power and vacuum systems to the required degree of refinement. Sufficient progress had been made by 1937 to place further development in the hands of a group of engineers and physicists headed by Dr. James Hillier. In 1940, this group of pioneers had perfected the first commercial instrument, forerunner of the more than 300 instruments in use in practically every part of the globe.

Microscopy has always played a significant role in the development of industrial processes and products. Since magnification under the electron microscope goes far beyond the limits of the light microscope, it found ready acceptance in industrial laboratories. Approximately 75 percent of the electron microscopes in the United States are in

commercial use. The remaining 25 per cent are employed by medical research scientists who, through their appreciation of the potentialities of the instrument, gave electron microscopy its greatest initial forward impetus.

The electron microscope is a versatile tool. As proof of this, American industry has put it to work on chemicals, ores, textiles, metals, plastics, rubbers, foods and drugs, dyes and colors, pigments and paints, dusts and fumes, polishes and finishes, soaps, greases, etc. In laboratory procedure, the microscope is used for: *basic research* (discovery of new principles and uncovering new knowledge); *development research* (finding the answer to specific problems); and *quality control* (forecasting the properties of a material or product).

### *Minute Particle Size Determined*

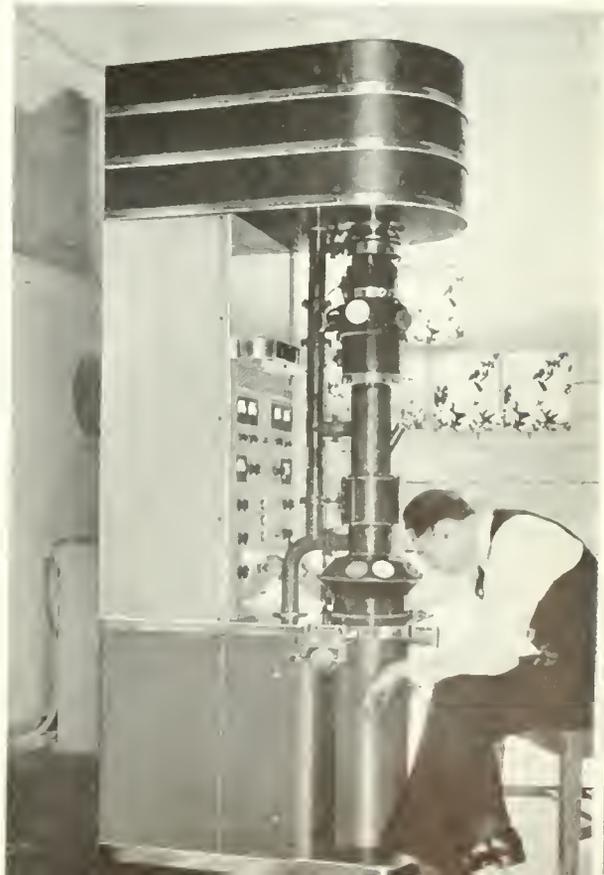
As the RCA electron microscope began opening doors to the unknown, research physicists were able to explore a wider universe and discover new facts. An amazing wealth of detail regarding the size of minute particles was uncovered, and characteristics of matter were discovered which have fundamental bearing on the quality and value of industrial products. Continued studies have proved the truth of some surprising and unclassified facts first revealed by the microscope. Industrial scientists have adapted this new knowledge to the development of more desirable raw materials, and to the improvements in the processing of finished products.

The Hercules Powder Company, a pioneer in electron microscopy, employed this new approach to its papermaking problems. Its scientists studied the penetration of pigments, the effect of cooking procedures on wood fibers, and the variations in particle size and shape of clays, fillers, sizes, binders, adhesives, impregnants and inks. By

this means they discovered ingredients which made finer and more economical chemicals for paper products. These discoveries, in turn, created a more profitable market for their chemicals. Today, these scientists are delving deeply into the minute structure of basic cellulose fibers, because the chemical behavior of cellulose during processing is closely related to the physical properties of its fibrils. Application of these studies achieves a more efficient use of cellulose during processing and a final product of superior quality.

Research physicists have long sought to discover the qualities in a "grade A" product that make it superior. The RCA electron microscope, with its enormous resolving and magnifying power offered fascinating possibilities for discovering the factors underlying these "superior" characteristics. In this

DR. LA VERNE WILLISFORD, GOODYEAR TIRE & RUBBER COMPANY, USES RCA ELECTRON MICROSCOPE IN HIS STUDIES OF NATURAL AND SYNTHETIC RUBBERS.





FIRST RCA ELECTRON MICROSCOPE TO BE BUILT (LEFT) WAS ACQUIRED BY THE AMERICAN CYANAMID COMPANY AND CONTINUES IN USE AS AN ESSENTIAL TOOL IN THE FIRM'S LABORATORY AT STAMFORD, CONN.

respect, the Goodyear Tire & Rubber Company was faced with two important questions: "Why does synthetic rubber exhibit so much greater mechanical stability?" "Why does synthetic rubber impregnate fabrics more readily than natural rubber?"

Goodyear scientists, through the electron microscope, found the answers. They discovered that natural rubber particles have dimensions from 4 to 160 millionths of an inch, while synthetic particles vary from 1 to 7 millionths of an inch. This information gave Goodyear and other rubber manufacturers the long-desired solutions to their important questions. With these new-found facts, it was possible to check for the particle size that results in a better product.

#### *Assigned to Quality Control*

Today, another rubber firm, the B. F. Goodrich Company, is discovering that the large research model RCA electron microscope is so frequently assigned to quality-control applications that it can be used only sparingly for research. It was for situations such as this that the budget-wise console model RCA electron microscope was introduced. Desk-like in appearance, this sim-

plified, convenient-to-operate instrument is completely self-contained and can be easily moved from place to place, bringing its great resolving and magnifying power close to the production line. Goodrich has found that this mobility speeds up both research and quality control.

Another leader in American industry that has responded to the challenge of new knowledge is the Aluminum Company of America. By means of the electron microscope, Aluminum Research Laboratories have disclosed hitherto unknown significant aspects of metal structures. In the same way, Dow Chemical Company metallurgists are conducting a tireless search for data relating to the structure and properties of metals and alloys, and are being aided by the RCA electron microscope's enormous capabilities. After Dow physicists had discovered the structure of pearlite crystals, through their microscope research, a steel company was able to improve surfaces of pearlitic steel because of facts disclosed under a magnification of 10,000 diameters.

#### *Helps Setting of Standards*

The record of industrial achievements through electron microscopy goes on almost unendingly. Through the "eyes" of the microscope Aluminum Ore Company scientists saw the detailed structure of alumina for the first time. They had known that a certain alumina made the best reinforcing pigment for rubber, because tests by rubber com-

panies had proven this fact; but after the electron microscope had identified the particle size, this information was used to establish standards.

The Calco Chemical Division of the American Cyanamid Company employs both the large research model and the desk-type electron microscope in developing new and improved dyes, pigments, and textile finishes. Calco scientists have found the microscope particularly well suited to the study of pigments and insoluble dyes. "For maximum hiding power, tinting strength, and coloring value" they have stated, "the primary particle size of pigments must be well below the dimensions that can be resolved with visible light." The electron microscope, using electrons instead of light waves, has a resolving power many times that of the ordinary light microscope, and shows with great clarity the outlines of the individual particles. It reveals not only the shape and surface smoothness, but frequently the structure of secondary aggregates. Calco scientists report that "studies made possible with the electron microscope have contributed materially to the development of pigments with improved properties and performance."

The West Virginia Pulp and Paper Company has found the electron microscope to be indispensable in its research on pulp, paper, and related by-products. In the manufacture of precipitated calcium carbonate, the shape and size of particles (none of which can be satisfactorily resolved with an optical microscope) determine its characteristics for a variety of applications. The direct observation of these chalk particles with the electron microscope has led to the



THE WEST VIRGINIA PULP AND PAPER COMPANY EMPLOYS THE DESK-MODEL RCA ELECTRON MICROSCOPE IN THE DEVELOPMENT OF BETTER PRODUCTS FOR ITS CUSTOMERS.

development of an ultra-fine calcium carbonate.

"What takes place when glass is polished?" was one of the questions facing the W. F. and John Barnes Company. Its scientists also sought to find those characteristics which affect the polishing power of materials such as cerium oxide, rouge, and rare-earth oxides. Answers to these questions were found in the study of particles with details approximately 1/50,000 of an inch in diameter—too small for any other type of microscope to reveal.

#### Aid to Customer Service

Godfrey L. Cabot, Inc., one of the instrument's more recent users, has installed the Universal model of the electron microscope in its Boston laboratories for increased service to the rubber, paint, ink and other industries using Cabot carbon black. Its scientists use the microscope both for research and as a part of the customer service program which it has followed for many years. Each day the Company's manufacturing plants, located in areas thousands of miles from Boston, send samples of their output to the Cabot Electron Microscope Laboratory. After the samples are photographed, the resulting micrographs are available for customers as a part of descriptive specifications. Such customer service is

MARY MARTIN, OF THE LABORATORY STAFF OF GODFREY L. CABOT, INC., BOSTON, STUDIES MICROGRAPHS OF CARBON BLACK PARTICLES OBTAINED WITH AN RCA ELECTRON MICROSCOPE.



DR. F. A. HAMM "FINGERPRINTS" DYED NYLON WITH THE LATEST MODEL RCA ELECTRON MICROSCOPE INSTALLED IN THE RESEARCH LABORATORIES OF GENERAL ANILINE AND FILM CORPORATION.

an invaluable business asset.

Taste, texture and appearance of many familiar food products are being improved with the aid of this powerful electronic "super eye". At General Foods Central Research Laboratories, scientists have found answers to many problems that have baffled food technologists for years. The physical and chemical changes which are exerted on natural foods as they are processed can now be viewed through the microscope.

By greatly increasing the range of research in many fields, the RCA electron microscope is helping industry to plan tomorrow's products. This is evident from the Libbey-Owens-Ford development called *Electrapane*. Ordinarily, glass provides high resistance to electric current, but *Electrapane* is a glass that conducts current. Libbey-Owens-Ford research achieves this anomaly by coating glass with an invisible, microscopic film. The Company's scientists carefully study specimens of experimental conducting films under the electron microscope, which clearly reveals the crystalline film structures formerly invisible under light microscopes.

#### Makes By-Product Profitable

Another ease of how this remarkable instrument is helping develop products for the future is illus-



trated in an article which appeared recently in *Life* magazine. The U. S. Rubber Company used the RCA electron microscope in the development of a new and better starch, made of tiny plastic particles. The new liquid plastic, which keeps clothes starched through eight washings, doubles the life of garments. This is an interesting example of how a by-product has become extremely profitable for both the manufacturer and the American housewife.

The lasting shade of her nylon

(Continued on page 26)



THREE TYPICAL EXAMPLES OF ELECTRON MICROSCOPY MADE POSSIBLE BY THE RCA ELECTRON MICROSCOPE. LEFT TO RIGHT: FORMATION OF PEARLITE IN STEEL; SAMPLE OF FACE POWDER MAGNIFIED 15,000 TIMES, AND DUST PARTICLES WHICH CAST THEIR SUBMICROSCOPIC SHADOWS AFTER AN ENLARGEMENT OF 24,000 TIMES.

# Education By Radio

Six Leading Universities Cooperate with NBC in Home Study Courses in Literature, Music and Economics



By Sterling W. Fisher

Manager  
NBC Public Affairs and  
Education Department

WHEN I was invited to speak last May at Ohio State University's annual Institute for Education by Radio, I decided to snap good-naturedly at critics who complain about radio's failure to help the public get educated.

Why talk about how little radio is doing in the educational field (I asked the professors) when what it is doing is not being utilized?

The greatest shortcoming, I said, has been the lack of provision for the organized and systematic use of broadcasts by listeners. Haphazard, unguided listening alone, on the basis of a dial turned at random when the listener happens to have a little free time, may prove at times informational, but hardly educational.

To my surprise, I found the educators and network officials in warm agreement. What's more, they wanted to help me do something about it. Mayor Charles P. Farnsley of Louisville, Kentucky, was on the phone offering money and assistance to experiment at the University of Louisville with a plan to bring college courses into listeners' homes. The result was that NBC, in cooperation with WAVE, our Louisville affiliate, and the University of Louisville, established last summer a home-study course in Anglo-American literature,—a course built around the "NBC University Theater" broadcast series. *Variety* heralded the experiment with a bold, prominent headline over a

page-one story, and the general press was equally enthusiastic. We three partners ran the initial test during the nine-week summer session at the University of Louisville, trying out a variety of teaching techniques. Encouraged by the results, we entered upon a full-scale experiment during the fall semester. The method followed was this: first, students who registered by mail with the University were required to listen to the "NBC University Theater" dramatizations; second, they read the novels that had been dramatized as well as the study guides sent them by the University; third, they prepared written reports based on their listening and reading and sent them to the University, which marked, graded and returned them. Participants who met University requirements received regular college credits for work done.

## Other Universities May Join Plan

There are now six universities cooperating with the network in its home-study NBC University of the Air project, and we expect many others to join later.

Besides the University of Louisville, three other universities are

now offering college credits for a course in Anglo-American literature in connection with "NBC University Theater." They are the University of Tulsa, Washington State College, and Kansas State Teachers College at Pittsburg, Kansas.

The University of Chicago has built two courses—one in economics, the other in world politics—around the "University of Chicago Round Table" broadcasts. The University of Southern California has built a music course based on the network's "Pioneers of Music" series. Within two weeks after the first announcement that a listener's guide to this series was available at 50 cents, the first printing of 10,000 copies was sold out.

There are two ways for listeners to participate in these home-study courses. One is intended for those not interested in college credits or not qualified to obtain them; the other, which involves more work on their part, is for persons who want to acquire college credits without leaving their own homes. The non-credit students obtain certificates showing their successful completion of the radio course. The fees for students range from \$10 to \$30 for those trying for college credits; less for those who are not.

With some 1,750 inquiries coming in weekly from all parts of the United States and Canada, the success of the NBC University of the Air with listeners seems assured.

ADVISORY BOARD FOR NBC UNIVERSITY THEATER: SEATED; LEFT TO RIGHT — LIONEL TRILLING, PROFESSOR OF ENGLISH, COLUMBIA UNIVERSITY; HARVEY WEBSTER, ASSOCIATE PROFESSOR OF ENGLISH, UNIVERSITY OF LOUISVILLE; AMY LOVEMAN, BOOK-OF-THE-MONTH CLUB; AND NORMAN COUSINS, EDITOR, SATURDAY REVIEW OF LITERATURE. STANDING — ROBERTSON SHAWN, PROFESSOR OF LANGUAGE AND LITERATURE, KANSAS STATE TEACHERS COLLEGE.



# European Outlook Brighter

*Returning From Business Trip Abroad, General Sarnoff Reports Less Evidence of "War Scare Psychology"*

RETURNING aboard the S.S. *America* from a six weeks business trip abroad, Brigadier General David Sarnoff, Chairman of the Board of the Radio Corporation of America, reported upon his arrival March 5 that "provided the United States maintains the diplomatic initiative we now hold, the outlook for Western Europe is brighter than it seemed a year or two ago."

Strongly favoring both the Marshall Plan aid program and the proposed North Atlantic Security Pact, General Sarnoff explained in a shipboard interview that "American help toward Western European recovery is the basic factor in preventing the advance of Communism across Europe.

"Conditions in England, France and Italy are visibly better than they were a year ago, and the same is reportedly true of the other countries aided by the Marshall Plan," said General Sarnoff. "But the basic financial, economic and political problems of Europe as a whole remain unresolved. In my view sound solutions to these vital problems are not likely to be found so long as the 'cold war' between East and West continues and so long as Russia blocks the completion of the Austrian and German peace treaties."

During his trip General Sarnoff testified at the British Arbitration Tribunal on the nationalization of Cables and Wireless, Ltd. He also had private interviews with Prime Minister Clement Attlee, Winston Churchill, and heads of American diplomatic missions as well as leaders of the French Government and European businessmen.

The General said he found much less evidence of "war scare psychology" and a much calmer resolve among the peoples living under difficult conditions.

"My best impressions are not negative," he continued. "The very crises which Russia is creating by her actions on the Continent have brought about a closer affinity in

Western Europe than has ever been known before in times of peace.

"The five powers of Western Europe are today working on a central parliament, a single customs union, and a single defense plan. This has all come about, first, through the proximity of militant Communism and, secondly, through the common denominator of American aid. Therefore, I am strongly in favor of the principles of both the Marshall Plan and the North Atlantic Security Pact. These are not solutions in themselves, but combined into a single American program for encouragement and hope for the peoples of Western Europe they can gain the necessary time in which further progress can be made."

## *Does Not Foresee Recession*

General Sarnoff warned that a serious setback in the American economy would have grave repercussions in Europe. He added that he does not foresee any major economic recession in America.

Speaking specifically of France, General Sarnoff said that any predictions on the political scene there are "as hazardous as ever." But he was favorably impressed with the success of the French Government's domestic loan which "increased the value of the franc and the strength of the center group parties, at the expense of the extreme Left and the extreme Right."

On Britain, General Sarnoff did not hesitate to point out that British Laborites would soon have the delicate choice between protection of human rights and expanding socialistic theory.

"I have no doubt that this experiment is not intended to deprive Englishmen of their individual rights nor to abolish democratic processes in that country," he continued. "However, it is radically altering the face and life of Britain and I seriously question whether the introduction of Socialism on so vast a national scale can in practice adequately preserve the human

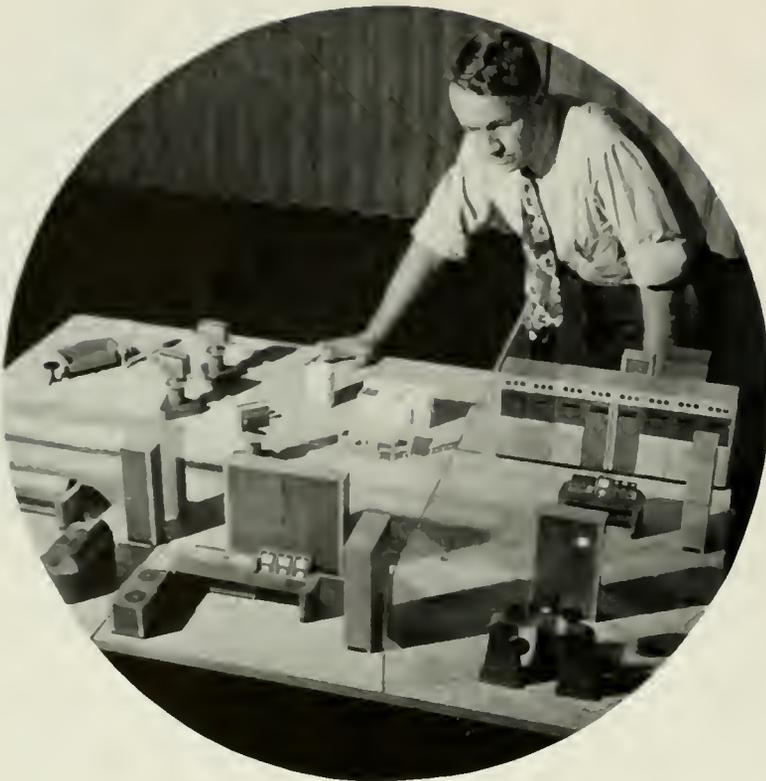


GENERAL SARNOFF AND SON, ROBERT W. SARNOFF, RETURN FROM STUDIES OF ECONOMIC AND TELEVISION ACTIVITIES IN ENGLAND AND THE CONTINENT.

rights, including the rights of labor itself. Responsible leaders in Britain told me that recent election trends indicate the Labor Government probably will be returned to power next year by a somewhat smaller majority than it presently holds. Its policy of nationalization will go forward, and after steel—which is the industrial heart of Britain—it will probably nationalize the chemical industry, and others. This will take the socialistic experiment a considerable distance over its charted course of making the State a monopolistic employer, producer and trader."

The General was accompanied on his trip by his son, Robert W. Sarnoff, Assistant to the National Director of Television Programs of the National Broadcasting Company.

"My son's mission was to make a detailed study of television in England and France," the General stated. "Every facility was afforded us by the British and French authorities to study the television situation in their countries. We feel progress is being made by British television and plans are also under way to advance television in France. However, we saw nothing in British or French television as far advanced as are the techniques and services in the United States. Britain and France are the television leaders of Europe."



## Cutouts Aid TV Station Planners

*Scale-Model Miniatures of Units for Television Transmitters and Studios Permit Engineers to Work Out Best Arrangement of Equipment.*



By Marvin L. Gaskill

*Engineering Products Department,  
Radio Corporation of America*

SCALE-MODEL paper cutouts are being used by RCA sales engineers to help broadcasters solve some of their television station planning problems. Each cutout—there are two books of them—represents a major TV broadcast unit in miniature, but in exact proportion and general appearance. The cutouts can be assembled or re-arranged in different groupings to permit accurate cost-and-space

studies of projected television stations.

Engineers, draftsmen, artists, photographers and writers collaborated in producing the realistic models. The cutouts were drawn, checked from blueprints and care-

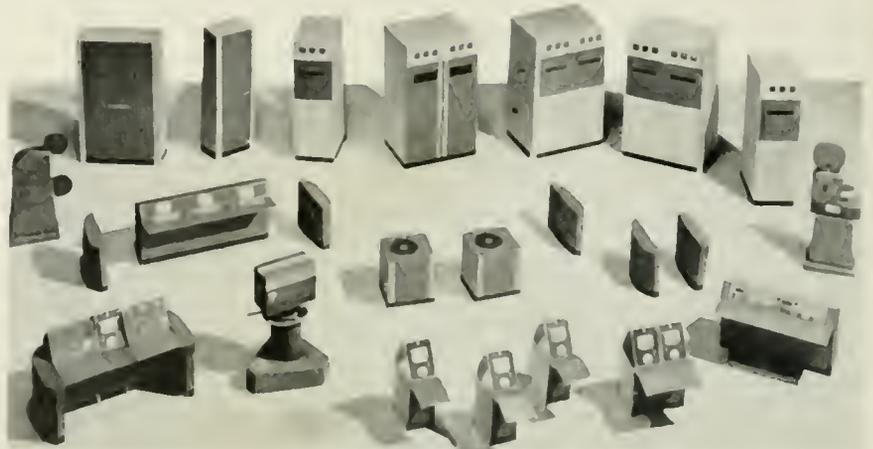
fully scaled to the proper height, width and depth of the actual equipment. Even the panels on the models are photographic reproductions of those on the original units. Reproduced in two tones of brown to resemble the umber gray shades of the actual equipment, the miniatures are printed on heavy paper that will withstand considerable handling.

Development of the cutouts can be traced to the use of working models by advanced RCA engineering groups. Later, dealers used television equipment miniatures, some of them elaborate and costly, for display and advertising purposes. These models, however, were designed primarily for window displays and little stress was placed on accuracy of proportions.

As the video industry grew, a greater demand for scaled models arose. Design engineers, faced with a variety of planning problems involving equipment needed realistic, proportional facsimiles that could be used to simulate studio scenes. These cutouts, scaled one inch to the foot, appear to solve the problem. The easily-assembled miniatures can be made even more durable when cemented to wooden blocks and coated with clear lacquer.

Since the amount of equipment required for a television studio installation varies widely, depending on the type of station, the size of the community in which it is to be

*(Continued on page 15)*



PAPER MINIATURES INCLUDE CORRECTLY-SCALED REALISTIC MODELS OF ALL MAIN UNITS OF RCA TV EQUIPMENT. TRANSMITTER UNITS, VIDEO CONSOLE UNITS AND RACKS MAY BE GROUPED IN ANY TENTATIVE ARRANGEMENT.

# Admiral Wynkoop Elected Head of Radiomarine

**E**LECTION of Rear Admiral Thomas P. Wynkoop, Jr., United States Navy (ret.), as President of the Radiomarine Corporation of America was announced March 11. His retirement from the Navy became effective on March 1.

Admiral Wynkoop served in the Navy for 31 years, most of which time he was active in the construction and design of warships. His assignments included eight years in the Navy Department, Washington, D. C., and duty in some of the Navy's largest shipyards. His last office was that of Commander of the Naval Shipyard, Long Beach, Calif., where he served from November, 1946 to January, 1949.

While Production officer at the Naval Shipyard in Norfolk, Va., during World War II, Admiral Wynkoop supervised construction of the noted aircraft carriers *Tarawa* and *Lake Champlain*.

A native of Philadelphia, Admiral Wynkoop attended the United States Naval Academy at Annapolis and was commissioned an Ensign on June 7, 1918. He served on a U. S. destroyer out of Queenstown during World War I, and following the Armistice took a postgraduate course in Naval architecture and



THOMAS P. WYNKOOP, JR.

warship design at the Massachusetts Institute of Technology from which he received a Master of Science degree in 1922.

The following year, Admiral Wynkoop joined the staff of the Navy Yard at Mare Island, in San Francisco Bay, where he served until 1926. After a detail aboard the *U. S. S. Rigel*, he was transferred to Cavite Naval Station in the Philippine Islands.

In 1931, he returned to the United States for a tour of duty in the Bureau of Construction and Repair, Navy Department, Washington, D. C., remaining there until 1935, when he was assigned to the Puget Sound Navy Yard. From 1939 to 1941, he was a member of the United States Naval Mission to Brazil and assisted that country in its construction program for which he was decorated with the Order of the Southern Cross.

Shortly before the United States entered the war, Admiral Wynkoop was detailed to the Shipbuilding Division of the Bureau of Ships in Washington, where he served for the next four years. During the latter part of the war, he was Production Officer at the Norfolk Naval Shipyard. He was promoted to the rank of Rear Admiral on June 28, 1943.

Admiral Wynkoop has received many honors and awards for his distinguished service. They include the Victory Medal with Bronze Star, World War I; American Defense Medal, American Area Medal, World War II Victory Medal, the Cruzeiro de Sul of Brazil, Secretary of the Navy Commendation Medal and the Legion of Merit.

## Cutouts Aid TV Station Planners

(Continued from page 14)

located and the scope of operations, studio planners have adopted the cut-out system to great advantage.

The tiny models give engineers and planners a completely accurate picture of how studios and entire stations can be arranged for best acoustical and space results. They also are made to give the prospective customer an idea of what his money will buy. Since television calls for large expenditures, station owners naturally want some idea of what equipment they will require, and what method of installation is best.

As architects, shipbuilders, designers, and decorators have discovered in the past, the lowly cutout is an ideal solution to the problem.



TWO BOOKLETS OF SCALED PATTERNS PROVIDE ALL MATERIAL NEEDED IN THE ASSEMBLY OF MODEL LAYOUTS.



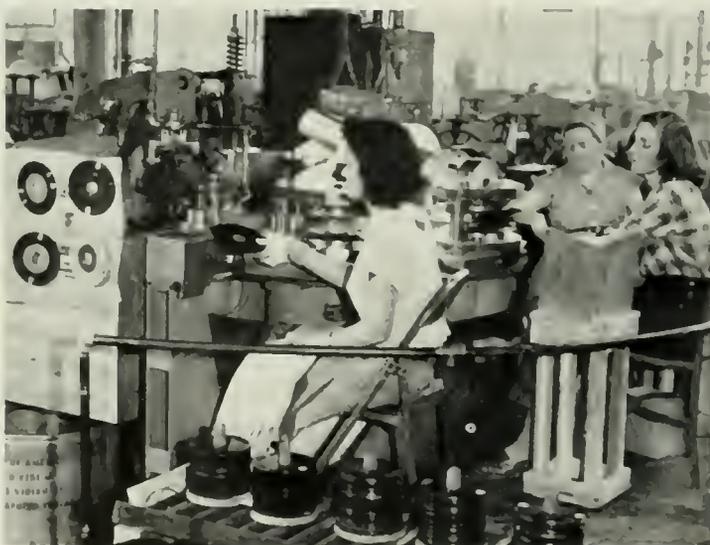
1 Sheets of translucent plastic are reduced to proper thickness under the heated rolls of this huge machine.



2 A 45-rpm record complete with labels is removed from one of the many powerful presses in the Indianapolis plant.



3 Excess plastic material, called "flash," is stripped from the outer rim of the recording following the pressing process.



4 Each of these semi-automatic machines punches out the record's large center hole at the rate of 30 discs a minute.



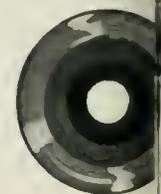
5 Exact centering of a 45-rpm record is assured by checking the movement of the outer rim under a microscope.



6 Here the finished records are placed in envelopes and then packed in containers for shipment to dealers and users.

# Making the 45 rpm and Record

THESE scenes show the steps in the production of the records at the Indianapolis plant of the RCA Victor Company. The steps include the increasing quality of the records, the high-fidelity records, the large diameter, and the record-changing





# The new records

# players

From the Indianapolis, Ind., Victor Division reveal some of the steps followed in producing the new, colorful, 45-rpm records, only 6 7/8 inches in diameter. The fast, quiet, trouble-free mechanisms.



Maximum performance of the 45-rpm record player is assured by testing its operation with a sensitive oscilloscope.



Quantity production is achieved on the assembly and testing lines for the new 45-rpm record players at the RCA plant in Indianapolis.



Record players undergo a listening test, one of the final steps in the manufacture of the high-fidelity instruments.



Assembling one of the basic components of the trouble-free automatic changing mechanism of the 45-rpm record player.



5 An inspector checks the operation of the disc-changing cycle of a record player.



6 A moving conveyor separates the assembly group on the left from testers and inspectors of the finished product on the right.

# Television Bolsters U.S. Economy

*Expanding Demand of Video Industry for Wide Range of Basic Materials and Component Parts Will Act as Powerful Stimulant to Many Other Industries*



By John K. West

*Vice President in Charge of  
Public Relations,  
RCA Victor Division*

*Excerpts from an address by Mr. West before the American Management Association in New York, March 17.*

**D**URING the war, our economists figured that it would be necessary to hold our national income at 208 billion dollars to keep us out of trouble. Last year we hit somewhere between 225 and 250 billion. Now, with some economic factors giving evidence of being spent, we are fortunate in having television as a jack to help hold our economy up—an industry that will be the sturdiest of any since the automobile was invented.

Television, America's greatest new industry, is bolstering our economy in many ways. It stimulates supplier industries. It is a vast business of itself. And all this is dwarfed by television's ability to move goods. First, let's see how television stimulates other industries. Television, as a market, is still taking shape. 1949 marks only the third full year of its postwar activity. Yet we are quite confident that the industry will produce over 2,000,000 television receivers this year. The annual rate of production is stepping up so rapidly that, barring unforeseen restrictions, by 1953, television should hit an annual going rate of around 5,000,000 receivers.

## *Television a Boon to Industries*

This means a great deal to the mines and mills and factories in our country. It means a vigorous, growing market for industries as far apart as New England textile mills weaving intricate cabinet grille cloths and Southwestern silver mines whose product is used for television tuner contacts.

A television receiver has about 1100 components. That's ten times as many parts as the ordinary radio. Television absorbs the products of hundreds of component manufacturers and sub-assembly manufacturers directly and those of thousands of suppliers indirectly. This means business for business all over the country.

The receiver and the antenna on the roof take around 40 pounds of steel. Multiply that by 5,000,000 units a year, and you find television using 200,000 tons of steel, per year.

There are so many little pieces of copper wire connecting parts in a television receiver that, if they were all put together, they'd make a single piece over 100 feet long. All told, each receiver requires about 9½ pounds of copper. At the 5,000,000 going rate television will soon reach, television's annual copper requirements will hit 47½ million pounds! Add 40 million pounds of aluminum and the 83 million pounds of glass which will be used in picture tubes alone and the proportions of this industrial giant begin to be seen. In cabinets, television will use enough wood every year to make an inch-thick dance floor of four square miles!\*

There's a pound of rubber in each set. There are plastics, ceramics, mica, carbon, nickel, tungsten and paper.

All of these figures are only the slightest indication of the real economic effect of television's material

requirements. This raw material must be fabricated into billions of component parts before it becomes a part of your home entertainment.

We mentioned previously that over 2,000,000 television receivers are forecast for this year. Let us translate that to dollars. At the retail level, these 2,000,000 television receivers add up to around \$650,000,000 worth of business. There will be approximately \$25,000,000 spent on television by advertisers this year. Some 40 new stations will go on the air during 1949 to bring the total past 90. Each of these new stations represents an investment approximating a quarter-million dollars. A.T.&T. is expanding television networks this year to link thirteen more cities to the present fourteen on the East-Midwest lines and is increasing the number of circuits joining the most important television cities.

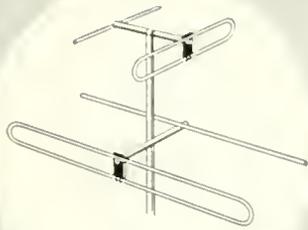
## *Billion Dollar Industry in 1949*

Add it all up and we see that television, in 1949, only its third full year, should account for business activity totaling over a billion dollars! Imagine how big this baby will be when it really grows up!

Industry, as well as agriculture, has always been involved with the cycle of planting seed, working to assist growth, and then harvesting the results. Television has grown so rapidly that it's easy to see this cycle in it. There was investment needed—investment in men, laboratories, intricate equipment; investment in dollars, energy, genius and time. RCA alone spent \$50,000,000 on television in research, experimentation, development and facilities. Its harvest is the phenomenon of commercial television.

It is as an advertising medium that television's impact on marketing methods has been most felt and recognized. We learn how, in three weeks, two \$35 spot announcements weekly resulted in 2,270 New York outlets taking on a new food product. We hear about Macy's at Christmas time offering a \$9.95 doll, fashioned after the little NBC marionette, "Howdy Doody" — selling 10,000. We see the "Texaco Star Theatre" getting the incredible sponsor identification of 95½ percent! We find Donald Stewart, ad-

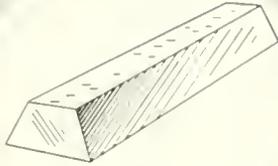
\* Over 103,000,000 board feet.



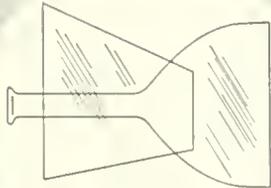
**STEEL**  
200,000 tons



**COPPER**  
47½ million lbs.



**ALUMINUM**  
40 million lbs.



**GLASS**  
83 million lbs.



**LUMBER**  
103 million  
board feet

ESTIMATED MATERIALS REQUIREMENTS OF THE TELEVISION RECEIVER INDUSTRY FOR 1953, BASED ON A PREDICTED ANNUAL PRODUCTION OF 5,000,000 RECEIVING SETS.

vertising manager of the Texas Company, writing "the most amazing thing is the number of people — about 75 percent of those writing in — who say they are going to switch to Texaco products."

When results like these get around, we're forced to devote some study to advertising's modern Merlin. Television simply refuses to be ignored.

Still we must retain our perspective. This year the industry will manufacture over 2,000,000 television receivers. This same year it will manufacture over 11,000,000 radios. The circulation of newspapers and magazines remains high and effective. Billboard space is still scarce — and radio is still America's greatest means of communication.

All these established advertising services still continue to do their jobs. At RCA Victor we still use

them all. But we recognize that now is the time for extra effort in advertising and promotion. That's why we've added television. Just as radio carried many little-known or unknown brands to the top brackets, so will television create new brand names. Forty-two percent of the advertisers using network television during 1948 were not radio advertisers.

Let's watch it in action.

Can you picture a youngster going into a store and asking for a toy, not by its name, but by the general name of its manufacturer? A manufacturer — Unique toys — started using a children's program before Christmas to plug its line of merchandise. Soon the small fry were asking for them in stores, visits to Santa Claus, and Christmas hints to their parents by the manufacturer's name. An item that had been notably slow-moving in

the Unique line sold out. Last season this company enjoyed the greatest demand in its history. Unique has now signed a long-term television contract to make the toy business a year-round instead of a seasonal one.

### Brand Name Strengthened

Disney Hats, in contrast, used television to strengthen its brand name by having the company's distinctive trade-mark "come to life" at the beginning and end of its network newsreel. Local retail outlets in each city were encouraged to use the time spot following the network show. During the last three months, hat sales in general have been slipping. During those same three months, John David, the New York dealer who tied in with the broadcast here, has increased its Disney hat sales by 49 percent.

Esso conducted a survey to find the percent of television owners using its products. Then Esso used television to tell its complex product story of "controlled volatility". Later the audience was surveyed again. Esso users were found to have increased by 10½ percent! Television makes messages easy to remember.

There were only 42 advertisers using television in February, 1947. They'd grown to 210 by January, 1948, and 1099 by January, 1949. Television has proved itself as an advertising medium, and its career is only beginning.

Here is television's promise: to be an increasingly effective force for favorable influence on the distribution pattern of consumer goods and services

In New York today, television receivers are already in the hands of nearly 14 percent of the families. By next January 1, they should be in over 21½ percent of New York homes. And let's see how many are expected to be in other cities by then: in Philadelphia, 20 percent; Washington, 19; Los Angeles, 15½; Baltimore, over 18. Here are some cities which should have more than 13 percent of their families equipped with television by next New Year's Day. Boston, Chicago, Cincinnati, Cleveland, Detroit, Milwaukee and St. Louis.

# NEW TUBE HAS "MEMORY"

*Graphechon, Developed at RCA Laboratories as a Teleran Adjunct, Can Store Visual Information for More Than a Minute.*

**R**ADAR signals or oscilloscope traces, which occur in less than a millionth of a second and which remain in view only a few seconds on fluorescent screens, can now be "stored" for more than a minute by a new electron tube that has "visual memory".

The tube, called the Graphechon, is based upon the discovery that certain materials may be used both as insulators and conductors of electricity. It was described by Louis Pensak, research physicist of RCA Laboratories, Princeton, N. J. at the March convention of the Institute of Radio Engineers in New York. The first major use of the tube will be in Teleran, the television-radar air navigation system under development by RCA.

The Graphechon is a "booster" device which is employed between the stage where a radar beam is received and where it is reproduced on a television kinescope. It retains for more than a minute images that have a life of less than one-millionth of a second.

With the Graphechon the radar signal is kept in the form of an electrical charge, which is "written" on the tube target by the radar beam and "read" from it by an iconoscope-type beam, similar to that used in telecasting. The signal is

then amplified and applied to the kinescope, the television viewing screen. Here it can be observed, or monitored, and picked up from the kinescope, by the television camera, retaining the brightness and good contrast of the screen image.

The Graphechon makes it possible to observe a radar pattern on a bright-screen kinescope, instead of the dim radar scope, in a normally lighted room and without any special preparation.

## *Electrons "Write" and "Read"*

The heart of the Graphechon is a metal target, 3 inches square, coated on one side with a layer of pure quartz, 20 millionths of an inch thick. In the original model, two beams in the legs of a V shaped tube are aimed at this target. One is the radar beam, which "writes" on the quartz surface: the other is the iconoscope-type beam — such as is used in a television camera — which "reads" from it. Unlike a fluorescent screen, the target is not light sensitive, but is sensitive to electrical charges.

The beam of electrons from the "reading" gun strikes the target and every electron knocks off secondary electrons, which fly to the conducting coating that lines the tube. Removal of negative electrons

builds an increasing positive charge on the target surface, until a maximum point of equilibrium is reached. When this occurs the excess of secondary electrons, over the beam current, returns to the target, maintaining the electrical status quo. The quartz coating is now acting as an insulator and permits the charging of the surface to a higher voltage than the metal sheet.

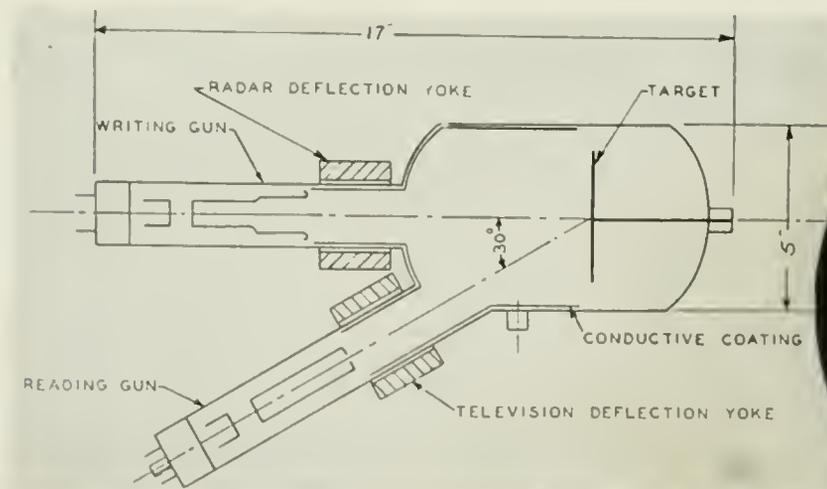
At this point the iconoscope beam has prepared the target for the radar beam, which will "write" on it. When the radar receiver picks up a reflection — of a plane, some point of the terrain, etc. — the signal turns on the radar beam of electrons which crashes through the quartz layer, makes it conducting at that point, and there discharges the voltage.

In short, the action of the iconoscope type beam is to put a uniform positive charge over the entire surface of the insulating film. The action of the radar beam is to make the insulator conducting at the points of impact, and so discharge the film in some pattern. The iconoscope type beam then proceeds to charge up the film once more.

The iconoscope scanning beam then knocks secondary electrons

*(Continued on page 27)*

LOUIS PENZAK OF RCA LABORATORIES HOLDS ORIGINAL MODEL OF GRAPHECHON TUBE WHICH HAS A "VISUAL MEMORY."



CROSS-SECTION OF Y-TYPE GRAPHECHON TUBE SHOWING RELATIVE POSITIONS OF "READING" AND "WRITING" ELECTRON GUNS.



# NBC Documentaries Extended

*Network Expands Public Service Features through New "Special Programs" Project. Hour-Long Problem Dramas are Widely Acclaimed*

ON the second floor of New York's Radio City, NBC has established headquarters for the network's new project called, simply, Special Programs. Its business: to build and supervise the network's "Living—1949" series and "NBC University Theater" as well as full-hour documentaries and other "special" shows.

Special Programs reflects the increasing importance of high-quality public service broadcasts on the NBC log. This is a trend which had its beginnings late in 1947, and resulted in radio's first and only documentary-a-week series. The program was called "Living—1948," and was supervised by Wade Arnold, who now heads Special Programs, and directed by James Harvey, now assistant to Arnold.

Currently the series is known as "Living—1949," but its aim remains the same as it was at the start: to set Americans thinking more about currently important issues and arouse them to intelligent action. Its carefully researched subjects have ranged from mental health to elections, and each broadcast has mirrored Arnold's two cardinal rules of programming, viz., be adult, and never be dull. The response from both public and press has reached a high-water mark of enthusiasm.

Out of "Living" grew the realization that some subjects need more extensive treatment than 25 minutes allow. This important series has been supplemented, therefore, with a series of full-hour drama-documents. The first was "Marriage in Distress," a reasoned and challenging study of the status of marriage and the family in a

changing society. The program was aired last September 1 under Arnold's supervision and was rebroadcast a week later in response to appeals from listeners and critics. At year's end it won an award from the National Council on Family Relations.

The second hour-long documentary, produced December 19 under the aegis of Special Programs, was "Mother Earth," a study of the problem of world hunger.

## *Pioneer in Documentaries*

"The increasing popularity of the documentary is one of the significant phenomena of the radio scene today," Arnold said, "but the format is nothing new. As long ago as 1933, NBC pioneered in the hour-long documentary field. That year the network did at least three: 'The New York Sun: 100 Years of American Journalism'; 'Headquarters,'

a report on the working of the New York City Police Department, and 'Chapter One: the Story of 1933,' a dramatic account of Roosevelt's first year in the Presidency."

Another current Special Programs enterprise is "NBC University Theater." It was this series of which the *New York World Telegram's* radio critic Harriet Van Horne said: "I think it would be nice today to bow our beads briefly and thank heaven (not to mention NBC which foots the bill)."

This series, constructed much like a college course in British and American fiction, has recently presented dramatizations of novels of E. M. Forster, Aldous Huxley, John Dos Passos, Ellen Glasgow and Graham Greene, among others. It attempts not only to convey the story and basic ideas of each novel, but also tries to lead the listener to the novel itself for an intimate discovery of the writer's method and style. It forms the core of an NBC education-by-radio project at the University of Louisville and will be similarly adapted for other schools.



WADE ARNOLD, HEAD OF NBC SPECIAL PROGRAMS, STUDIES A "DOCUMENTARY" SCRIPT AS JAMES HARVEY, HIS ASSISTANT, AND NANCYANN WOODARD, MEMBER OF THE RESEARCH STAFF, LOOK ON.



DR. HARRY F. OLSON



WENDELL L. CARLSON

## Receive I.R.E. Fellowships

**T**WO scientists of the RCA Laboratories, Princeton, N. J., and one from the RCA Laboratories, Rocky Point, N. Y., received their certificates as newly-elected Fellows of the Institute of Radio Engineers at the Institute's annual banquet in the Hotel Commodore, New York, on March 10.

Honored for distinction in the profession were Dr. Harry F. Olson, director of the acoustic research laboratory, and Wendell L. Carlson, supervisor of the radio receiver research laboratory, both of Princeton, and Philip S. Carter, research engineer at Rocky Point.

Dr. Olson was cited "for his outstanding developments and publications in the field of acoustics and underwater sound". His association with RCA research goes back to 1928. He pioneered in the development of directional microphones, which are now almost universally employed in radio, television, sound motion pictures and other sound systems, and, in particular, the velocity microphone. He developed the first successful electronic phonograph pickup and has done outstanding work in the field of sound absorption.

Important contributions were made during the war by Dr. Olson's group in the fields of air and underwater sound under contracts with the National Defense Research Committee, the Naval Ordnance Laboratory and the Bureau of Ships. Sonar systems, microphones

and loudspeakers were developed, along with other devices still classified as secret.

He received his education at the University of Iowa, where he took the Bachelor of Engineering, Master of Science, Doctor of Philosophy and Electrical Engineering degrees. In addition to the IRE, he is a member of Tau Beta Pi, Sigma Xi, and the American Physical Society, and is a Fellow of the Acoustical Society of America. Dr. Olson was chosen as one of America's Young Men in 1939 and, the following year, received the Modern Pioneer Award. He has received 35 patents and is the author of three books and many technical papers.

The IRE Fellowship was awarded to Mr. Carlson "in recognition of his contributions over many years to the development of radio receivers and their components". Mr. Carlson was a pioneer in the early development of broadcast receivers; starting with the first RCA superheterodyne-type home receiver in 1924. Under his supervision an international shortwave receiver which set the standard for home use was developed in 1933, and in 1940 his group devised the first RCA personal-type radio receiver. During the war Mr. Carlson supervised important developments for the Navy on radar altimeters.

He was born in Jamestown, New York, and was graduated from the Bliss Electrical School, Washington, D. C. He is a member of Sigma

Xi and in 1940 received the Modern Pioneer Award. He has received over 60 patents, most of which relate to broadcast receivers.

Mr. Carter's citation was "for his many contributions in the fields of radio transmission and communication systems". He is an expert on antennas, developed the folded dipole antenna for television and FM reception, which is a common sight in most of the nation's cities. It is estimated that 40 per cent of all the TV and FM antennas used in the U. S. are of this type.

Associated with RCA since 1920, Mr. Carter has been issued more than 60 patents and is the author of a number of technical papers. He is a member of the American Mathematical Society and Sigma Xi, and received the Modern Pioneer Award in 1940. Mr. Carter was educated at Stanford University, receiving a Bachelor of Arts degree in Mechanical Engineering, and served as a lieutenant in the Signal Corps in World War I.

Following World War II, he received a Certificate of Appreciation from the Air Force for his work on counter-measures employed against German V-2s and, he was awarded a similar certificate by the Army and Navy.

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## Communication Service To China Extended

Radiotelegraph service to Tientsin, Tangshanhop, Tangku, Tsinghai and Chinwangtao, via Shanghai, has been resumed, RCA Communications, Inc., has announced following receipt of information from the Chinese Ministry of Communications at Shanghai.

According to information received, a censorship is being imposed on all messages. Code and cipher messages, as well as reply-paid service, are still suspended. All messages must be prepaid, the report said, noting that these restrictions also are being imposed on traffic for Peiping. It was further reported that, due to unsettled conditions in China, messages for Northern China points, which are beyond RCA terminals, are accepted only at the sender's risk.

# Kinescope Recordings

*Thirty Hours of Video Programs on Motion Picture Film  
Syndicated Weekly by NBC Television*



By Carléton D. Smith

*Director, Television Operations,  
National Broadcasting Company.*

picture films made separately), and the other two of which can record either double- or single-system (sound and picture recorded on same film).

NBC Television is the only video concern which makes and develops its own film.

From an operation which one year ago produced one kinescope recording on an experimental basis a week, the system has burgeoned into a nation-wide service to television in which 28 programs are regularly recorded and shipped each week.

Except for a special job done on the LIFE-NBC coverage of the national political conventions last June, the kinescope operation was not put into regular commercial service until September, 1948.

At that time, seven programs were recorded each week. As technical progress was made and more equipment was pressed into service, the system jumped from the original seven to double that number in a matter of weeks. Advertising agencies, program sponsors, and new television stations created a tremendous demand for the recordings which in a short time leaped from an experimental film process to an essential part of video programming.

The number of prints and the amount of footage doubled from November, 1948, to January, 1949,

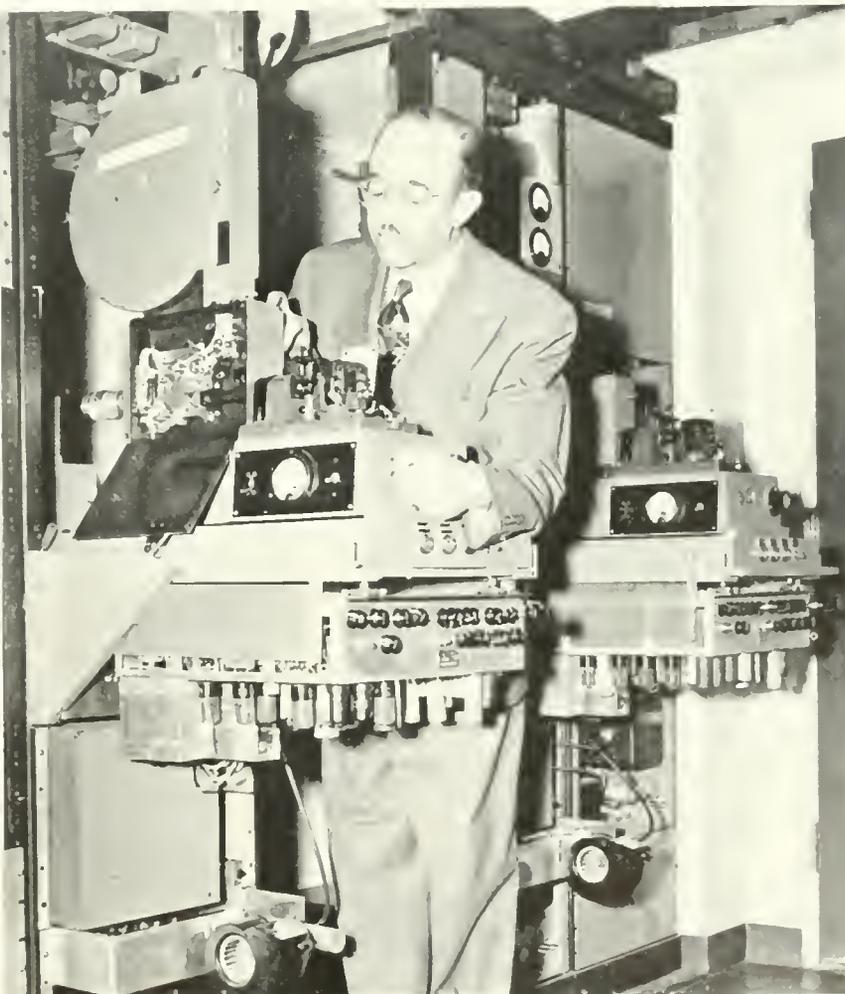
**T**HE production of kinescope recording motion picture film at the National Broadcasting Company has far outstripped on an annual average the total production of the major motion picture studios.

In an operation which has increased by over 100 per cent since January and which saw a comparable 100 per cent increase from Nov. 1948, to January, the kinescope recording system now regularly syndicates 28 commercial and sustaining NBC Television programs a week with a total often reaching 30 hours a week.

The total output of film by the major motion picture companies in 1948 was 369 feature length films—or about 550 hours of product. At the average rate of nearly 14 hours a week of kinescope film, NBC Television is producing an average of almost 700 hours of entertainment product per year. This is virtually 50 per cent more than the Hollywood studios' output.

By far the greatest producer and distributor of kinescope recordings in the television industry, NBC is currently shipping an average of 223 prints a week to video outlets from coast to coast. This compares with the shipping schedule of a major motion picture exchange.

Installed at a cost of \$250,000, the new equipment in use by NBC includes four kinescope recording cameras, two of which record on the double-system only (sound and



O. B. HANSON, NBC VICE PRESIDENT AND CHIEF ENGINEER, STANDS BETWEEN TWO KINESCOPE RECORDING UNITS IN THE NETWORK'S HEADQUARTERS, NEW YORK.

and increased another 100 per cent from January to the present.

As of now, the scope of the operation can only be compared in size, speed, and efficiency with normal motion picture processes of recording, processing, editing, and distributing. In terms of rapidity of recording and speed of reproduction, few if any film operations in the world can approach it.

Because of the close time schedules the operation from the laboratory in New York to television screens in such faraway places as Albuquerque, N. Mex., plane, train, bus, and motoreycle schedules have played an important part in the operation. Often one can of recording must be completely re-routed from a grounded plane, to a bus, to the nearest railroad terminal, and even back to another plane to make certain of its arrival at the destination at the appointed hour. Multiply this single can of film by the 35 prints which leave NBC Television nightly and the shipping operation becomes, indeed, a vital factor.

NBC uses two developers for processing the film, one of which develops the sound track, the other the picture. The processing time is approximately 2 to 1. In other words, one hour of program requires two hours of developing.

In addition to the regular commercial weekly programs kinescoped by NBC are the so-called rush "specials." One such special was the kinescoping of the Presidential inauguration January 20. The event took five hours on the air but had to be edited down for out-of-town stations to one hour and twenty minutes of programming. Working round the clock NBC Television film editors developed the early portion of the film in the afternoon and the afternoon portion was in the laboratory until 10:15 p.m. that night. By that time, the entire production of an eighty-minute negative had been completed and the film was rushed to the printer.

By eight o'clock the following morning fifteen prints has been completed and rushed to the airport for delivery to outlying stations. The films were seen Jan. 21 in every television city outside the range of interconnecting facilities.

After the picture and sound track are carefully edited and synchronized into one strip of negative film, the film is sent to an outside laboratory where test prints are made. Using the "step-light" printing method, film technicians in the laboratory can then increase the light intensity in any frames to bring about an equality of light in the entire film. In this way, the finished print often looks better in light quality than the image on a television screen of the original production.

Employed in the project currently are five men at the Film Exchange at Radio City; two cutters

and editors at Radio City; seven library men; and three at the Film Exchange at NBC's 106th Street studios. In addition, a total of 15 engineers and technicians are employed in the kinescope recording laboratories in Radio City.

The kinescope recording division of NBC is under the direct supervision of N. Ray Kelly, assistant director of the film division. Frank C. Lepore, manager of film operations, and Victor Borsodi, assistant manager of film operations work under Kelly's direction. On the engineering staff, Herbert deGroot is technical supervisor of film recordings.

## Communications—Key to Victory

*(Continued from page 5)*

cast in history," he continued, "an estimated two million viewers in the East, including high-ranking Naval personnel in Washington, D. C., watched the flat-top, some 200 miles away undergo a mock attack by its own planes in maneuvers known as TASK FORCE TV.

"The Navy noted officially that the unrehearsed action, from the briefing of pilots to the return of the planes to the ship, was presented with a smoothness and technical perfection which made the experimental nature of the telecast all the more impressive and significant.

"The strategic importance of television in naval, military and air operations in this modern age was thus revealed dramatically. The event was declared by the Navy to be 'a milestone of technical achievement and patriotic service to the Navy and the citizens whom it serves.'

### *Takes on New Meaning*

"Far-sightedness takes on a different meaning in the great complexities of modern war, with supersonic speeds, guided missiles, and the danger of 'surprise attack'. It used to be said that the battle goes to those who get there 'fustest' with the 'mostest'. The victory, in another struggle, could well go to the side which sees 'farthest', 'soonest'."

General Sarnoff paid high tribute

to former Prime Minister Winston Churchill, with whom he conversed privately during his recent trip abroad. General Sarnoff, describing Mr. Churchill as a keen student of military history and a brilliant World War II leader, said he was pleased to learn of the British statesman's intimate understanding of the part communications must play in modern military action.

General Sarnoff congratulated members of the Association upon their selection of Fred Lack as their next President. He praised Mr. Lack as a veteran in the field of communications who has shown keen interest in the Association since its inception and predicted continued progress under his leadership. Sincere appreciation was expressed to Major General Harry C. Ingles, retired Chief Signal Officer of the Army, through whose vision the Armed Forces Communications Association was conceived and through whose encouragement it has steadily advanced. He also expressed appreciation to Brig. General S. H. Sherrill, U. S. Army (ret.), for his success as Executive Secretary of the Association.

"We pledge anew to our Country, and to all services of the Armed Forces," concluded General Sarnoff, "the wholehearted cooperation of the industry and its workers towards helping to secure the blessings of peace for our own Nation and for freedom-loving peoples everywhere."



FRAN ALLISON, RADIO AND TELEVISION STAR, IS THE ONLY "LIVE" CHARACTER FEATURED REGULARLY WITH "KUKLA" AND "OLLIE", THE DRAGON.

## "KUKLA, FRAN & OLLIE"

*Television Puppet Show, Sponsored by RCA Victor, Appeals to Old and Young in Areas Served by 17-Station Network.*

**A** WIDE-EYED, bald little fellow, about a foot high with a nose shaped like a billiard ball, stands before the television cameras and captures the affection of hundreds of thousands of viewers. He is Kukla, the almost legendary puppet personality starring on the RCA Victor-sponsored program, "Kukla, Fran and Ollie."

The strange little character and his fellow Kuklapolitan Players began their present series of telecasts in October, 1947, as "Junior Jam-boree" under the sponsorship of the RCA Victor Distributing Corporation in Chicago over Station WBKB.

When Kukla protested to his audience that television station executives wouldn't let him operate the cameras, the station officials were swamped with indignant letters in childish scrawls demanding that their favorite television performer be permitted to run a camera any time he pleased.

When a distinguished milliner first saw Madame Ophelia Oglepuss, a haughty-visaged interpretation of

an ex opera star, he was so delighted that he made an assortment of elaborate little hats for the miniature artist.

### *Adult Audience Attracted*

Tens of thousands of letters, thousands of gifts, and a wide variety of awards—ranging from recognition by the Chicago Advertising Club as the outstanding television program of the year, to a police department citation for the show's valuable lessons in safety—all testified to the standing of the program, easily the most popular television fare in Chicago. One of the most impressive revelations was that the subtle humor and preposterous situations of Kukla and his puppet friends attract an audience that is about 60 percent adult!

One tremendously important factor in the show's success is the highly telegenic stage, radio and television star, Fran Allison—the only live "regular" appearing before the cameras on the show. Her

adroitness in integrating her conversation and action with the puppet troupe lends realism to the little people. Her conversations with the Kuklapolitan Players are expertly ad libbed and she and Puppeteer Burr Tillstrom are ideal personality foils for each other.

### *Lends Realism to Programs*

Tillstrom, who prefers to be thought of as the "Manager" of the Kuklapolitans, is the crew-cut, youthful-looking man whose brains, voice and actions regulate the entire group of miniature mummies. Each tiny figure has a distinctly delineated personality which Tillstrom has enacted for so long that it never steps out of character and grows in realism.

In addition to Miss Allison, Kukla and Madame Oglepuss, the cast includes Ollie, Kukla's sad-eyed, fuzzy-topped little dragon pal (not a fire-eating dragon because his father inhaled while swimming the Hellespont); the bewildered-looking Cecil Bill Ryan, who speaks in a language intelligible only to Kukla; Fletcher Rabbit, a hard-working, flop-eared cottontail; Colonel Crackey, a bespectacled Southern Gentleman addicted to loud plaid shirts; Beulah Witch, whose professional techniques employ modern electronics rather than old-fashioned potions, and Madame Coo Coo, who came directly to television after personal appearances in a coo-coo clock in Santa Claus's workshop.

### *Many Strange Situations*

Together on television, this merrymaking group gets involved in all sorts of situations ranging from Ollie's efforts to make pear-shaped tones under Madame Oglepuss's tutelage, to Fletcher Rabbit's impassioned protests to Colonel Crackey that, since rabbits don't go around shooting people, why should people go around shooting rabbits?

When Kukla's invention, an electronic permanent wave machine, took off all of Ollie's hair, the audience set about solving this prob-



PUPPETEER BURR TILLSTROM VIEWS THE CAST OF MINIATURE MUMMERS TO WHOM HE GIVES VOICE AND ACTION.

lem with mighty enthusiasm. They sent all types of hair restorers, wigs and even grass seed—appropriately green and hairlike for dragons. Kukla chose the latter device for rectifying Ollie's coif, put seed on the dragon's head, watered it with a sprinkling can—and up sprang flowers. Eventually the electronic permanent wave machine that caused all the difficulty was brought out again. Since, when turned on, it took the hair off, with Kuklapolitan logic, when thrown into reverse, it put the hair back.

Shenanigans like these are always presented ad lib from outlines worked out by daily program staff discussions.

#### *Busiest Man in Television*

Once the program outline is firmly set in all the participants' minds, the show is ready to begin. Burr goes backstage and becomes the busiest man in television. In addition to being puppeteer, he watches the show on a television receiver, notes time, switches characters and voices with lightning speed. Hundreds of props are stored within his convenient reach. Agile, adept and versatile, Tillstrom has gained a reputation as the nation's top puppeteer from these superlative performances.

The wholesome nature of the program has particularly attracted attention from parent-teacher, safety, civic, and other groups, more than

a dozen of which have presented the show with citations. Kukla's Clean Plate Club, an exclusive organization with membership restricted to those who eat their entire meals, has won the gratitude of parents throughout the listening-looking audience. Health, safety, neatness and other desirable habits are "sold" to the children without preaching at them. And no violence or action even approaching the borderline of poor taste ever appears on the show.

This canny evaluation of how to both entertain and hold public favor has been developed by Tillstrom through more than 15 years of professional puppetry, beginning when he was a high school student in Chicago. He studied the work of the nation's foremost puppeteers and also engineered marionette shows. During one of these shows, 12 years ago, Kukla was born.

For a production of "Saint George and the Dragon," in which the noble-nosed little man played Saint George, a dragon of comparable whimsy was needed. That was when Ollie joined Tillstrom's troupe, and he's been an indispensable part of the activity ever since.

#### *Performed at World's Fair*

The redoubtable team and many of its fellows first performed in behalf of RCA at a 1939 department store television demonstration in Marshall Field & Company.

Chicago. In Spring, 1940, Tillstrom went to Bermuda, again for RCA, to participate in the Company's first overseas television demonstration.

Immediately recognized as television "naturals", Tillstrom and his little people were brought by RCA to the New York World's Fair. There the tiny troupe presented some 2,000 shows, a few of which were telecast over the NBC station in New York.

During the war Kukla became a favorite in bond drives, service encampments and with Red Cross units. Tillstrom still carries on this between-shows activity by entertaining at such places as orphans' homes and hospitals. He finds this direct contact with audience stimulating and secures many of his ideas for programs from the material that brings unexpectedly rewarding laughs from these audiences.

## Electron Microscope

*(Continued from page 11)*

stockings is also an important matter to the average woman. In order to improve the color fastness in stockings and countless other nylon fabrics, the General Aniline and Film Corporation studies the structure of dyes and pigments through the RCA electron microscope. Dr. F. A. Hamm, of General Aniline reports that micrographs of dyed nylon before and after steaming substantiate the two following theories: first, that post-dye steaming increases the average size of dye crystals in nylon, which accounts for a decrease in their hiding power and an increase in their fastness to fading; and second, that the larger crystals on the surface can be "rubbed off" more easily than the smaller crystals, with a consequent loss in fastness.

Dr. Hamm has successfully unlocked secrets of "color fastness" by combining American ingenuity with knowledge obtained through the RCA electron microscope. He is, in this respect, representative of the many scientists who daily labor in research laboratories everywhere to improve the products of everyday living.



## New Television Antenna Reduces Interference

**P**ERFORMING like a traffic policeman in a one-way street, a new television antenna has been developed which will receive signals from only one direction at a time and will greatly improve reception of set owners in fringe areas which lie between stations on the same channel. Development of the antenna was reported by O. M. Woodward, Jr., research engineer of RCA Laboratories, Princeton, N. J.

Consisting of an array of four eight-foot dipoles in the form of a square, with the opposite members eight feet apart, the antenna can be made to receive from one direction or the other by flipping a switch placed near the receiver. Interconnection of the dipoles through a diplexing network makes this one-way effect possible.

The Woodward antenna, it has been emphasized, is not an answer to any and all antenna difficulties, but is effective in cutting down co-channel interference when the re-

O. M. WOODWARD OF RCA LABORATORIES STAFF MAKES ADJUSTMENT ON COMBINATION HIGH- AND LOW-BAND TELEVISION ANTENNA WHICH HE DEVELOPED.

ceiver is located between two stations and on the fringe of their transmission areas, and to reduce interference of adjacent channel stations where the receiver is insufficiently selective.

Interference experienced in Princeton between Channel 2 stations in New York and Baltimore and between Channel 4 transmitters in New York and Washington has been largely eliminated by the new array.

Efficient reception on high and low bands is achieved with the new device by attaching short pieces of wire in the shape of "V's" to each leg of the four dipoles. This, in effect, "shortens" the dipole, which is designed for low frequency reception, and permits optimum reception of high frequency signals.

## Tube has "Memory"

(Continued from page 20)

from that spot on the target in an effort to bring it back to equilibrium. This removal of the electrons produces a signal on the target which is amplified and applied to the kinescope.

The iconoscope scans 30 times a second and can take as long as 2,000 scans to bring the signal area of the target back to equilibrium — or read off the signal completely.

## The Status of Television

(Continued from page 7)

total conversion cost will not exceed, and may be less, than if partial conversion equipment were included in present receivers. None of this cost will be incurred by the customer until UHF television broadcasting becomes a reality in his community, and then only if he elects to make the conversion, assuming that he may need it at all. Moreover, a converter will enable the receiver to pick up programs on any ultra-high frequency channels which the FCC may allocate eventually.

RCA Victor considers it economically unsound to add to the price of existing equipment, costs that might not eventually be justified. This includes turret tuners or any other

device built in to provide only *partial* coverage of the full range of ultra-high frequency channels which may be allocated by the FCC in the future.

In any method of converting sets for UHF, the services of a trained television technician will undoubtedly be required. This will be true not only for installation or activation of the UHF tuning unit, but also for the probable antenna changes that will be required for satisfactory UHF reception. Changes in antenna, lead-in or antenna location would apply equally to the product of any manufacturer. With its nation-wide organization of television service experts, RCA can and will provide its customers with conversion service as efficient and

as economical as can be obtained.

In summary, the Radio Corporation of America has been active in the exploration of the ultra-high frequencies, and has contributed more to their development, than any other company. Its leadership is as pronounced in this field as it is in all other phases of television, where the sum total of its experience in manufacturing, in field testing, in the design and construction of both television transmitters and receivers, and in television servicing, is unequalled. RCA will continue to pioneer in UHF and, as in the past, to make its findings available to all for the advancement of television as an art and industry in service to the public.

## Dr. Zworykin to Receive Lamme Medal for 1948

Dr. Vladimir Kosma Zworykin, Vice President and Technical Consultant, RCA Laboratories Division, Radio Corporation of America, has been named to receive the Lamme Medal for 1948, awarded annually by the American Institute of Electrical Engineers for "meritorious achievement in the development of electrical apparatus or machinery." Dr. Zworykin will receive the medal during the Summer General Meeting of the Association in Swampscott, Mass., June 20-24.

The Lamme medal was established 20 years ago by Benjamin Garver Lamme, then Chief Engineer of the Westinghouse Electric Corporation. Mr. Lamme assigned to the Institute the responsibility of selecting the recipient and presenting the award.

Dr. Zworykin, who joined RCA in 1928, has made many notable contributions to electronics, among them the invention of the iconoscope television camera tube and the development of the kinescope television picture tube.

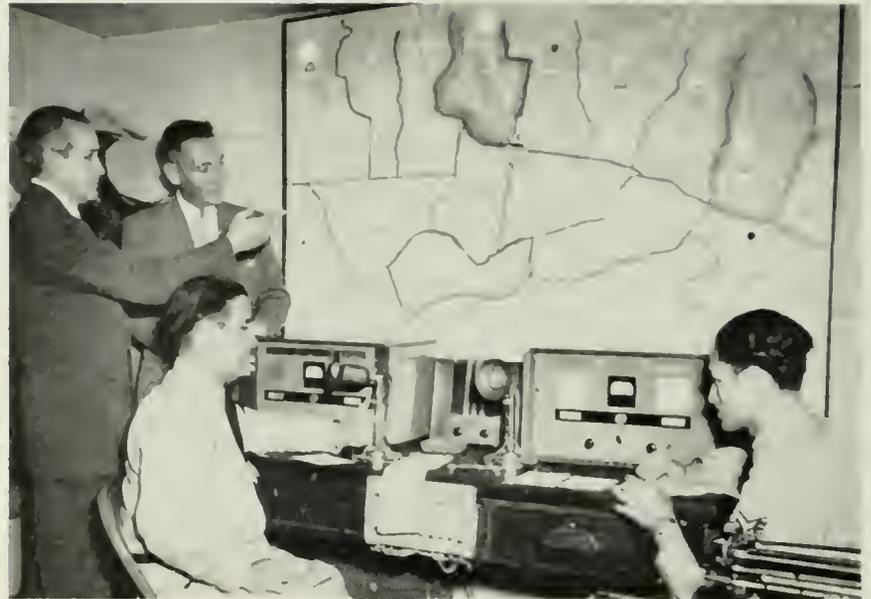
Dr. Zworykin was cited specifically by the A.I.E.E. for "his outstanding contribution to the concept and design of electronic apparatus basic to modern television."

## RCA Radios for Caracas

A high-frequency radio network employing the latest equipment developed by the Radio Corporation of America has been set up by the Police Department in Caracas, Venezuela.

In addition to two 250-watt transmitters at central police headquarters, the network comprises six 60-watt fixed stations at other points in and around the city that are operated by remote control from police headquarters.

Sixty patrol cars of the Caracas police force are equipped with RCA two-way radios linked to the network. A mobile criminological laboratory also forms part of the radio-equipped law enforcement body in Caracas, as do vehicles of various departmental chiefs. The system is under the direction of Inspector Miguel Angel Padilla.



HEADQUARTERS OF CARACAS POLICE DEPARTMENT, CONTROL CENTER OF THE CITY'S RCA-EQUIPPED RADIO NETWORK. POLICE INSPECTOR MIGUEL ANGEL PADILLA IS AT EXTREME LEFT.

## Work Begins on New Tube Plant

GROUND-BREAKING ceremonies for a new manufacturing center for the mass-production of RCA 16-inch metal-cone picture tubes for television were held March 3 in Marion, Indiana. Construction of the first unit of the center will begin at once.

The new Marion plant is to serve as a major "feeder" plant supplying kinescopes or television picture tubes to the industry.

The new building will provide 100,000 square feet of manufacturing space. This is exclusive of the 160,000 square feet of factory buildings already acquired by the RCA Tube Department in Marion.

According to present schedules, the new building is tentatively expected to be completed by early Fall. In the meantime, plans are underway to install temporary production machinery in plant buildings already existing on the site. These facilities are scheduled to produce their first 16-inch metal picture tubes by summer. The entire new plant, with its high-speed automatic machinery, is expected to begin full-scale output of the large metal tubes early in 1950.

In appearance, the new building will be a low-lying one-story ultra-

modern brick and steel structure, air-conditioned and fluorescent-lighted throughout. An extensive landscaping program will be undertaken to provide an exterior view in keeping with the modern character of the new building. Machinery to be installed will be similar to the high-speed automatic equipment especially designed and developed by RCA engineers and now turning out television picture tubes at the rate of more than one a minute at the Tube Department's Lancaster, Pa., plant. The Marion plant will utilize conveyor belts in moving tubes from one operation to the other.

## Language Course Recorder

A recorded language course prepared by RCA for teaching English to Spanish-speaking people has been announced by Meade Burnet, Vice President of the Radio Corporation of America and Managing Director of the RCA International Division.

Entitled "English in the United States," the two album course is designed to introduce students to American speech, customs of American life and the essentials of English grammar.

# Suppresses TV Interference

*Electronic Device Developed by Capt. Reinartz Traps Signals Which Sometimes Affect Quality of Television Pictures*

**R**ADIO amateurs who have been forced to restrict their dot-dash or vocal conversations with other hams because their signals interfered with the operation of nearby television receivers are likely to find relief through the development of an effective "harmonic suppressor" by Capt. John L. Reinartz of RCA's tube department, Harrison, N. J.

Essentially, the Reinartz device consists of a system of electrical circuits, connected into the transmitter, which "trap" certain trouble-causing frequencies called harmonics, and dissipate them before they can reach the antenna and spread through the "ether".

In describing the procedure that amateurs should follow in making their transmitters harmonic-proof, Reinartz pointed out that an amateur station may be operated in full conformance with FCC regulations on harmonic radiation and still interfere with nearby video receivers. With the Reinartz suppression circuits in effect, the "ham" is able to police his own transmitter with benefit to all concerned.

To demonstrate the effectiveness of his system, Capt. Reinartz assembled a typical amateur transmitter and operated it only ten feet from a television antenna and receiver. Even under such rigorous conditions, all six television channels in the local area were sampled and found to be clear of transmitter interference to a degree previously considered unattainable.

Harmonics are not peculiar to radio. They are present in many media where vibrations or oscillations are present. In music, for instance, harmonics are the supplementary tones or frequencies that give distinctive timbre to different musical instruments. Without them much of the delicate shadings of musical tones would be lost.

But the presence of harmonics in radio is not always such a fortunate circumstance. If they are permitted to go out on the air from radio transmitters, they are more than



CAPT. JOHN L. REINARTZ HOLDS ONE OF THE HARMONIC SUPPRESSORS WHICH HE DEVELOPED TO ELIMINATE INTERFERENCE BETWEEN AMATEUR STATIONS AND TELEVISION RECEIVERS.

likely to interfere with some of the other radio services. Television is particularly sensitive to their presence.

Although the desirability of suppressing harmonics in amateur transmitters has been recognized for many years, it was the upward public surge of television in 1946-47 that focused attention on these spurious radiations because of their

serious, sometimes disastrous, effect on television pictures. When harmonics were found to be present in excessive strength in the amateur's signal, he was required to reduce the interfering waves below a figure established by FCC as a safe level. Until Reinartz introduced his simple method of suppression, amateurs often had difficulty in reaching this objective.

## NBC and Northwestern Join in Summer Radio Courses

In collaboration with the National Broadcasting Company, Northwestern University will offer twelve courses in professional radio training during sessions of the Summer Radio Institute from June 27 to August 6. In making the announcement in the University Bulletin, it was stated that the subjects covered will include station management, publicity and promotion, sales, dramatic writing and announcing. The faculty will be comprised largely of NBC personnel.

Admission to the Institute is limited and members are selected on a competitive basis. Anyone whose educational background meets the regular admission re-

quirements of Northwestern is eligible to apply for membership.

Institute members normally will be enrolled for a maximum of nine quarter-hours in the six-weeks session. All courses carry three quarter-hours of credit, with the exception of radio production procedures which represents six quarter-hours. The normal program will consist of three courses in addition to twelve lecture-discussion sessions featuring prominent guest speakers.

The tuition fee for nine quarter-hours will be \$115. However, students registering for fewer than nine-quarter hours will be charged \$12.50 a quarter-hour with a minimum tuition of \$45.

## Television Projector Suspended from Ceiling

*Provides 6- by 8-Foot Picture Suitable for Auditoriums*

A NEW life-size television projection system, featuring an optical barrel which can be suspended from a convenient ceiling mounting, has been announced by RCA.

The system is especially adaptable for use in night clubs, hospitals, taverns, clubs, hotels, industrial plant recreation and lunch rooms, custom-built home installations, churches, schools, and in television broadcast studios for monitoring, sponsors' viewing rooms, and overflow audiences. The optical barrel which is focused on a screen up to 6 by 8 feet in size, of either front

or rear-projection type, is connected to the control console by a 40-foot cable. The console, containing television and audio components, as well as controls, can be built-in if desired, or placed in an out-of-the-way location.

The unit has a 30-watt amplifier, with facilities for microphone and phonograph inputs so that the installation may be used as a public address system when television programs are not on the air.

ADJUSTMENT OF TELEVISION PICTURES FROM CEILING-MOUNTED PROJECTOR IS CARRIED OUT BY A CONTROL CONSOLE LOCATED AT ANY CONVENIENT PLACE IN ROOM OR AUDITORIUM.



## Tubes in "Clusters" Increase Power for Television

A NEW method of combining transmitting tubes in groups or "clusters", which materially increases the power of television stations operating on ultra-high frequencies (300 to 3000 megacycles),

has been developed at RCA Laboratories. The new method makes it possible to handle the normal band of frequencies involved in television transmission with greater signal strength than has heretofore been

attained. G. H. Brown, W. C. Morrison, W. L. Behrend, and J. G. Reddick of the Laboratories staff collaborated in the preparation of a paper describing the system which Mr. Brown read before the Institute of Radio Engineers.

In the RCA method, two transmitter tubes—or two complete transmitters—are teamed through a special network called a duplexer, which permits the combined outputs of the tubes to be fed into the same antenna, thereby doubling the effective power output without narrowing the width of the frequency band transmitted. Since the output of the duplexer with the combined power of two tubes acts as a single unit, it is possible to combine two or more duplexers to multiply the output proportionately. This process can be continued to any extent desired.



OPERATION OF A TELEVISION SET CAN BE CLEARLY EXPLAINED TO SERVICEMEN THROUGH THE USE OF THIS DYNAMIC DEMONSTRATOR, A COMPLETE 30-TUBE RECEIVER COMPRISING STANDARD PARTS ARRANGED FOR QUICK INTERCHANGE AND ADJUSTMENT. JOHN R. MEAGHER, RCA TELEVISION SPECIALIST WHO DEVELOPED THE DEVICE, IS AT THE TUNING CONTROL.



"Madame X" was the code name, during research and development, for an entirely new system of recorded music . . . perfected by RCA.

## *The remarkable background of "Madame X"*

Now the identity of "Madame X," the *unknown* in a long search for tone perfection, has been revealed. From this quest emerges a completely integrated record-playing system—records and automatic player—the first to be entirely free of distortion to the trained musical ear . . .

The research began 11 years ago at RCA Laboratories. First, basic factors were determined—minimum diameters, at different speeds, of the groove spiral in the record—beyond which distortion would occur; size of stylus to be used;

desired length of playing time. From these came the mathematical answer to the record's *speed*—45 turns a minute—and to the record's size, only 6<sup>7</sup>/<sub>8</sub> inches in diameter.

With this speed and size, engineers could guarantee 5½ minutes of distortion-free performance, and the finest quality record in RCA Victor history!

The record itself is non-breakable vinyl plastic, wafer-thin. *Yet it plays as long as a conventional 12-inch record.* The new RCA Victor automatic record changer accommodates up to 10 of the new records—1 hour and 40 minutes of

playing time—and can be attached to almost any radio, phonograph, or television combination.

Not only records are free of surface noise and distortion—the record player eliminates faulty operation, noise, and cumbersome size. Records are changed quickly, quietly . . . RCA Victor will continue to supply 78 rpm instruments and records.

This far-reaching advance is one of hundreds which have grown from RCA research. Such leadership adds *value beyond price* to any product or service of RCA and RCA Victor.



**RADIO CORPORATION of AMERICA**

*World Leader in Radio — First in Television*

It's easy to navigate in Storm, Fog or Starless Night...

## with **RADIOMARINE'S** new **Radio Direction Finder** (Model AR-8711)

Enables you to determine your exact position in relation to:

### RADIO BEACONS



### RADIO BROADCASTING STATIONS



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**Dependable For Navigation In Any Weather.** This Radiomarine Model AR-8711 combination high-grade Radio Direction Finder and Radio Receiver is both useful and entertaining aboard your boat.

It makes navigation easier and safer, regardless of visibility or weather. Enables you to fix accurately your boat's true position. You also can use it as a homing device, steering a true course by radio alone. A movable compass rose and azimuth scale mounted on top of the cabinet give you the direction of the radio beacon signal. Easy to operate.

In addition, you and your guests can listen to radio programs, latest news, weather reports.

Model AR-8711 is designed for mounting on a shelf or table, using either an inside or outside loop. It is sturdy and compact. 28" high, 12" wide, 12" deep. Weight 14 lbs. Operates from 6, 12, 32 or 115 volts power supply.



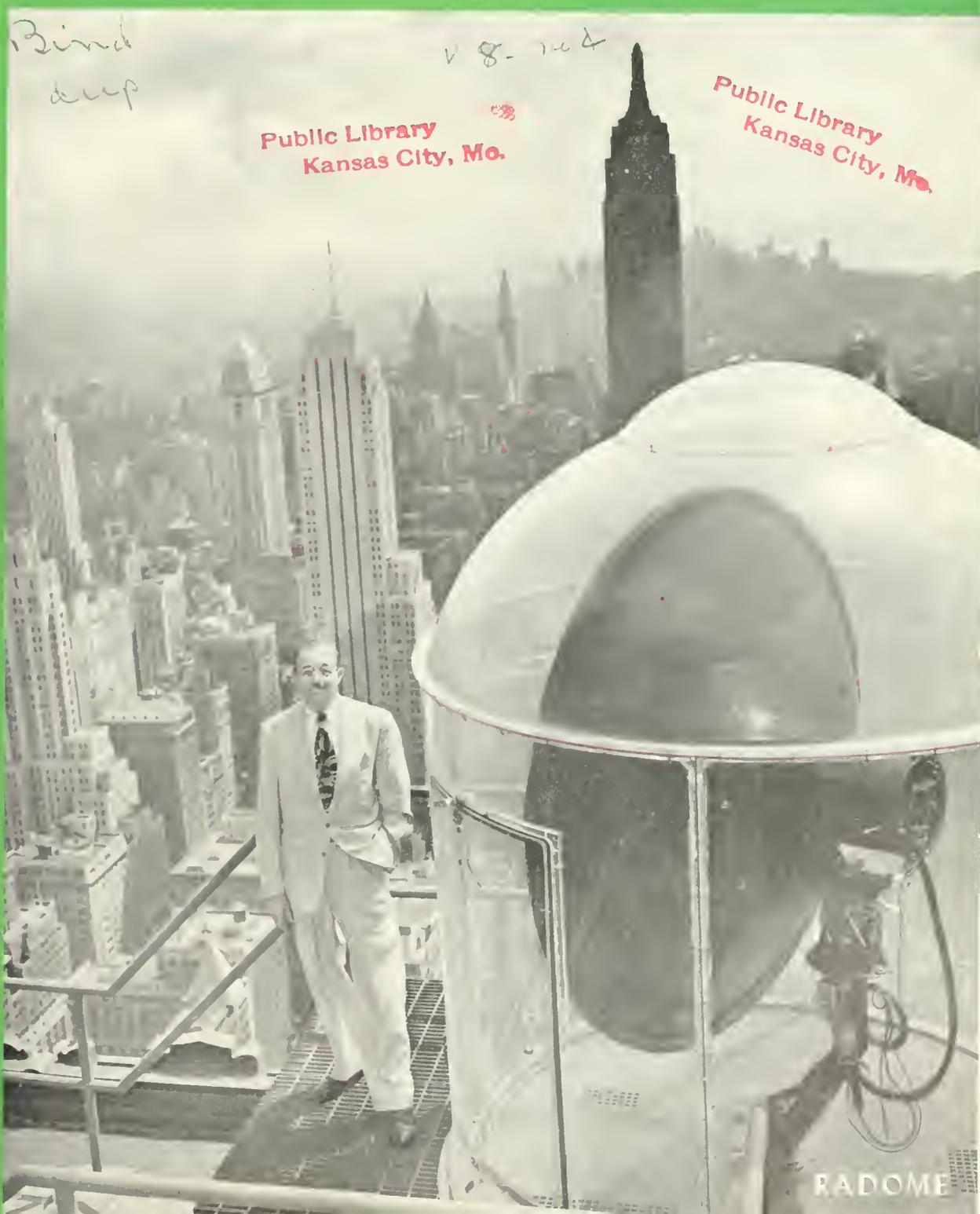
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# RADIO AGE

RESEARCH • MANUFACTURING • COMMUNICATIONS • BROADCASTING • TELEVISION



JULY  
1949

RADOME

"You can store them in your bookcase!"  
 All the new albums and singles are the same convenient size that fits any bookcase shelf . . . 18 albums or nearly 150 singles to the foot!



A complete, automatic phonograph only 10 inches square! Unbelievable—such full tone and volume from an instrument so small! Improved "Silent Sapphire" permanent-point jewel pickup is 3 times lighter—only 1/6 of an ounce pressure on records. Handsome, deep maroon plastic cabinet. It's an RCA Victor 9-FY-3, AC. **\$39<sup>95</sup>\***



Here is television at its clearest, steadiest, best! Pictures are *locked in tune* by RCA Victor's Eye Witness Picture Synchronizer! AM-1-M radio plus both 45 and 78 rpm record changers. It's the most up-to-date console you can buy! RCA Victor 9TW333, AC, only **\$595<sup>†\*</sup>**  
<sup>†</sup>Plus Federal tax and installation

**SEE and HEAR**

# RCA VICTOR'S NEW 45 rpm SYSTEM

A completely new approach to recorded music now brings you the first record and changer ever designed together! With this superb system of record playing you can build a record library that stores in a small space . . . costs little . . . and gives the most perfect music reproduction you've ever heard!

Red Seal records only **95¢\*** All other records only **65¢\***

At these new low prices you can easily afford the record collection you've dreamed of. And the new records, made of non-breakable Vinylite, last up to 10 times longer!

Best of all is "live-talent" quality—a new brilliance and clarity beyond anything you've ever heard. On the new 45 rpm recordings, for the first time in history, *ALL the music grooves are within the distortion-free "quality zone."* And virtually no surface or "needle" noise!

### World's fastest changer!

Acts *silently*, with trigger-action speed! Works vertically, entirely from within the center spindle. You load up to 10 records with one hand, in one swift motion . . . press *one* button *once* to play them all automatically. Costs you less and works easier because of the amazingly simple new design—far fewer moving parts, no posts or clamps to adjust!

Choose the music you want! All the music you want when you want it . . . in the *same* small-size records to *play in any combination you choose*. There's a wealth of all-time favorites and last-minute releases ready for you to enjoy now.

All on "78's" too! If you own a conventional player you can still enjoy a full selection of RCA Victor recordings. *All new releases will also be issued for the conventional 78 rpm system!*

\*All prices are subject to change without notice. Record prices do not include Federal Excise or local taxes. "Victrola"—T.M. Reg. U. S. Pat. Off.

# RCA VICTOR

Division of Radio Corporation of America

World leader in radio • First in recorded music • First in television

# RADIO AGE

RESEARCH • MANUFACTURING • COMMUNICATIONS • BROADCASTING • TELEVISION



OVER

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July 1949

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EFFECTIVE LIGHTING ENHANCED THE DRAMA IN THIS BANQUET SCENE FROM NBC'S ALL-STAR TELECAST OF "MACBETH."

# Man and Science

*General Sarnoff Tells Medical Group "Human Race Remains in Dangerous Ignorance of Itself" — Advocates Coordination of Scientific Specialists in a "Supreme Quest", Utilizing Atomic Energy — He Proposes "Radionetics" as New Branch of Electronic Science Applied to the Human Body*

**I**MMEDIATE use and coordination of every new force in both the physical and social sciences to learn "what makes man tick" and to improve his well-being were urged by Brig. General David Sarnoff, Chairman of the Board of the Radio Corporation of America, in an address before the International Congress on Rheumatic Diseases at The Waldorf-Astoria, on June 1.

General Sarnoff recommended that such a project begin at once with a penetrating study of man himself, using atomic energy and radiations, electronics and all the other scientific tools now available for research and investigation. Used together, he emphasized, these should point the way to improve man's health and his physical, mental and spiritual equipment. He proposed the creation of a new branch of science—"Radionetics"—to deal with the application of electronics to the human body.

In stating his thesis, General Sarnoff based his recommendations on the premise that, despite the great advances of science and technology, the "human race remains in dangerous ignorance of itself". He charged that largely because of this ignorance, a world "that might have peace and plenty and happier and wiser inhabitants is threatened by violence, hunger, and desolation".

## *Scientific Study of Man Needed*

"Only through a concerted, scientific study of man, as well as of machines," he asserted, "can we make full use of our God-given powers to improve man's mental capabilities and his spiritual outlook."

At the outset of his address, General Sarnoff disclaimed any "specialized" knowledge of the fields which he planned to discuss before the medical congress.



BRIG. GENERAL DAVID SARNOFF (RIGHT), WHO MADE THE PRINCIPAL ADDRESS AT THE BANQUET OF THE INTERNATIONAL CONGRESS ON RHEUMATIC DISEASES, CHATS WITH DR. CORNELIUS H. TREAGER, CHAIRMAN OF THE BANQUET COMMITTEE.

"I appear before this notable group of experts on medicine in the role of an amateur," he said, "but I gain some measure of courage from the fact that I also began my career as a wireless amateur. After 43 years in radio, I do not mind confessing that I am still an amateur. Despite many great achievements in the science of radio and electronics, what we know today is far less than what we have still to learn.

"Probably the same may be said of biology and medicine and of many phases of the older physical and social sciences. The opportunities that lie ahead for research and development in all these fields, and especially in the new divisions of science involving atomic energy and radiobiology, would seem to be unlimited."

General Sarnoff said the subject of atomic energy has long fasci-

nated him. He recalled that, in fact, in 1945, before the splitting of the atom created the death-dealing blast at Hiroshima, he had prepared a paper entitled "Science for Life or Death"—the theme of which was atomic energy.

At that time, he said, he thought primarily of the application of atomic power to science, industry and warfare. Since then, his thinking has been directed to the possibilities of atomic energy and electronics, inside of man as well as outside of him.

"It is my belief that controlled atomic energy puts us on the threshold of new opportunities. Coupled with electronics, it offers vast possibilities to look inside of man—and perhaps to discover what makes him function and why he behaves as he does.

"Men have explored and have be-



"THE FISSION OF THE ATOM TURNED THE HARSH DREAMS OF A RUTHLESS EMPIRE INTO BARREN REGRETS."

gun to comprehend the very hearts of atoms. Yet, they largely fail to understand each other. Men may see and hear electrically to the utmost limits of this planet. Yet, their minds fail to cross even the narrow boundaries of their individual and group consciousness. Nor do they understand how their thoughts and emotions are born and by what power they grow to fruition.

"Is this force electricity? Is the human body an electric power house? Does it have a communication system that continually radiates waves of thought and emotion?"

"When we understand each other, is it because we are attuned to each other electrically, or should I say electronically, in much the same way that a distant radio receiver is in tune with a broadcasting station? If this be so, we should learn the electrical characteristics of the human body. We should learn how its communication system functions. That cannot be done alone by social science or psychiatry. It calls for the help of the physical sciences, including the science of the electron and the atom."

General Sarnoff reported that electronics, first associated with radio, is spreading into many fields of activity, including medicine. He told how the electron microscope has revealed new and unknown worlds in the study of bacteria, viruses and the internal structure of the human cell itself.

"We may well hope, therefore," he continued, "that the electron and its atomic companions will lead us to the cure of dread diseases. And it may be that in the further study of man's electrical frequencies and his intercommunication system—in the application of electronics to the human body—we shall develop a new branch of science. Coining a new word to describe it, I would offer the term 'Radionetics'.

"Recently, in this field, eminent physicians have reported the development of electro-acoustic devices, sonic and ultra-sonic, as aids in the detection of kidney-stones and gall-stones, in the location of foreign objects in the body, as well as tumors in the brain. Further, a new technique for detecting cancer of the cervix has been reported, in which a simple electrical test shows when a malignant growth exists in the body.

#### *Atomic Tracers to Fight Disease*

"Cancer is a scourge. We are told that this malignant growth destroys living cells. To fight the disease, we attack the malignant growth and, by so doing, run the danger of destroying healthy tissues and thereby destroying life itself. Scientists have expressed the hope that atomic tracers may be sent through the body to ferret out the spots where malignancy is attacking and killing the living cells. By this new means, the physician may be able

to act early enough to repair and restore the cells under attack.

"If human cells can be destroyed, why should there not be some way to protect and heal them without resorting to surgery? There would seem to be some reason for hope in this idea, for already we have discovered how to split, change and control the atom and its energy. If we can learn how to do the same with the human cell, we may discover how to control the individual cells of man and thus be enabled to improve the functioning of the human body."

General Sarnoff declared that this is but one of the possibilities that emphasizes the urgency of a penetrating study of man himself, as well as of the methods and plans which would secure to all mankind the benefits to which the individual instinctively feels himself entitled.

"The need of such a program cannot be over-emphasized," he asserted. "The impact of new scientific advances on the mind, emotions, and physical makeup of man has been profound and at times bewildering.

#### *Science Affects Human Habits*

"Atomic energy, electrical power, instant communication, winged transportation, radio, television, motor cars, and a host of other dynamic manifestations of life have basically changed the human environment. No wonder so much of humanity finds its surroundings confusing and, therefore, is unable to adjust itself to these rapid changes."

There is grave need for a new type of scientific worker or, to be exact, groups of workers and associates, to conduct as their supreme quest—the study of man, continued General Sarnoff. He stated that these scientists should not only be highly skilled experts capable of carrying out original research in their own fields, but also well-informed and capable of understanding the techniques, methods, and data of allied fields. They should be able to apply the knowledge of their own specialized fields to the other branches of science, he said, and added:

"Until scientists possessing this

'over-all knowledge' can evolve, specialists should be coordinated in carefully associated groups. On the one hand, there will be needed experts in mathematics, physics, chemistry, and engineering, to provide the fundamental methods, physical laws, apparatus and analogues necessary to a research on man himself.

### Skilled Men Must Be Assembled

"But there must likewise be assembled correspondingly skilled men in the fields of biology, psychology, and medicine. The latter will define the problems, analyze them, and use their cumulative knowledge of science towards finding the solutions.

"Fortunately, significant beginnings have been made toward accomplishing these aims. An important instance of such integration of the various branches of science is found in the work of Norbert Wiener, a professor of mathematics at Massachusetts Institute of Technology. He has applied the theory, methods, and equipment used in the fields of communications and electronics to the study of biological processes. He has termed this new study of the behavior of living things, in the broad light of their communications aspects, 'cybernetics', a term derived from a Greek word meaning the 'steersman' — thus indicating the governing function of communications in living bodies.

"Another instance of coordinated attack by physical and biological scientists has been made by the Sloan-Kettering Institute for Cancer Research and the Memorial Hospital in New York. I am happy to say that the Research Labora-

tories of the Radio Corporation of America are cooperating with the Memorial Hospital in this vital work. For this privilege we are indebted to Mrs. Albert D. Lasker, who first suggested the idea to me and arranged a meeting between the scientists of RCA and of the Memorial Hospital which led to this cooperative effort."

General Sarnoff told of the need for a wide variety of ultra-modern tools, including electronic calculators, television-scanning processes, and measuring devices, to conduct the research.

He said there are many lines along which such an intensive study of man might proceed, one of the most promising directions being to select that element in man which is found at the smallest end of the scale—namely, the living cell. He reminded his audience that, considered as a biological specimen, man consists of trillions of such individual cells. Each carries an indication of the nature, personality, and behavior of the individual to whom it belongs. Each cell also carries some mechanism or structure which controls its own functions as well as its part in the life of that particular human being, he said, and recalled how the cellular assembly known as an animal is provided with an amazing inter-communication system, similar in many ways to that known to radio experts.

It is within the realm of possibility, he declared, that investigations may teach us how to improve the functioning of the communication system of man himself, and may also teach us how to repair defects or how to substitute artifi-

cial channels for those that have been worn out or destroyed by accident or disease.

General Sarnoff stressed the importance of working in the world of the infinitesimal, of studying the power of little things in the hitherto unseen, sub-microscopic world.

He said that by dealing with tiny things, man has released atomic energy and "literally clasped hands with Nature".

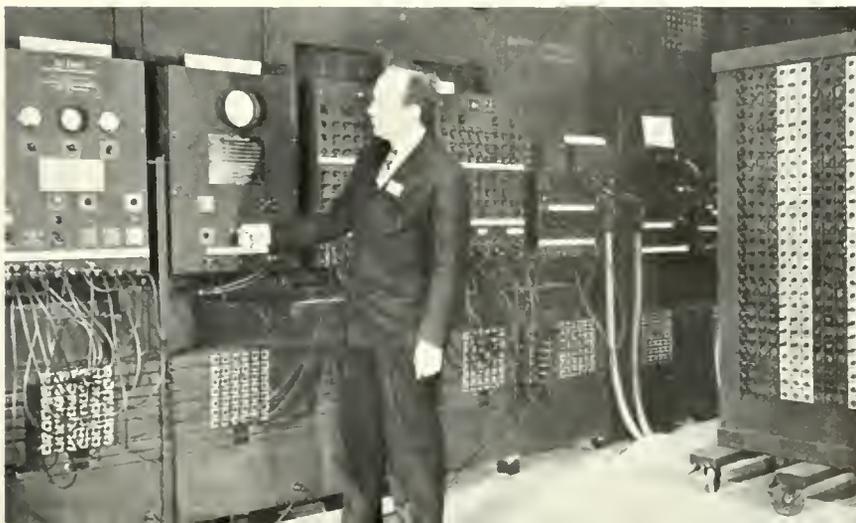
"So we may be watching the birth of a new philosophical concept, based on dependence on the tiniest elements," he confided. "Its human and physical significance may well be incredibly greater than that of the older modes of thought which centered on large bodies or theorized vainly and incorrectly about small ones."

The course of research into the utilization of atomic energy in the human body has already begun and it has progressed to a point where it is rapidly becoming significant, he continued, pointing out that physicists have learned how to make artificial radio-active elements, which release atomic energy in the form of rapidly moving matter of more or less powerful radiation. On an extremely minute scale, they are the original atomic bombs, he said, adding:

"These synthetic radio-active ele-

"THE ELECTRON MICROSCOPE HAS REVEALED NEW AND UNKNOWN WORLDS IN THE STUDY OF BACTERIA, VIRUSES AND THE INTERNAL STRUCTURE OF THE HUMAN CELL ITSELF."

"COMPUTING MACHINES EXIST WHICH CAN PERFORM SOME OF THE FUNCTIONS OF THE HUMAN MIND — BUT FAR MORE SWIFTLY THAN ANY MIND CAN THINK."



ments are now in ample supply. They can be introduced into living beings and their action in the body studied by electrical, photographic, and other means. They open the door to a host of new biological and medical techniques.

"These substances have been aptly termed 'tracers'. In living organisms they act as 'biological detectives' and reveal much that would otherwise be unknown. This is a branch of scientific investigation which is already in rapid evolution. It will facilitate the detailed study of body functions, metabolism and circulation in the living animal . . .

"One may pass into the realm of speculation at this point by assuming that atomic energy will not only serve for the treatment of abnormal conditions of the human body but may be used to repel bacterial invaders and perhaps strengthen and stimulate normal cells and tissues.

"How far such tissues and their cells might be increased in their efficiency and probable life span is so far unknown. Who can say how powerful and long-lived man may become as he learns further how to master these fundamental cosmic forces and to apply them to himself as well as to the outside world?"

Under existing conditions, he said, modern man is subjected, to an increasing and dangerous extent, to the need of living at high speed under continued and sometimes intense strain, and to the necessity for enduring these conditions for prolonged periods. As

a result, many persons suffer severely, particularly in their nervous systems.

Sedatives and similar expedients are poor substitutes for a stronger, more enduring nervous system, he continued, adding:

"Maybe correctly selected and applied forms of atomic energy will feed and strengthen our nervous makeup, thus helping us better to meet the pressures of life.

"Today man is largely ruled by his emotional reactions. Perhaps, even the human brain can be strengthened in its relation to the remainder of the human controlling mechanism. If so, much good would come to mankind."

#### *Discusses Atomic Power*

Discussing the possibility of controlling the atomic power within man himself, General Sarnoff had this to say:

"This at least is certain: if man were capable of releasing and beneficially controlling even a minor portion of the atomic energy within himself, his powers would be tremendously enhanced.

"What is more, there would be placed at his disposal a practically limitless reservoir of energy. Today, men face such questions as: Why does our individual store of energy deteriorate and our physical and mental power progressively weaken until eventually we die?"

"Often old age and its cramped capabilities are inflicted too early in life. Could it be that our stores of energy are atomic in character? Could it be that through lack of our

control of them they gradually decrease and finally fail? . . .

"We have but to reflect that plants feed on sunlight—a form of radiation. If radiation of one sort may bring into the world the beauty of a flower, the growth of a tree and of food for our bodily nourishment, may not energy or radiation of another sort bring strength, order, and endurance into the human frame?"

"It is true that today we have no more idea of just how such a process could be carried out than primitive man had of the action of radio, television, or nuclear fission. But the unknown is not the unknowable. In the case of atomic energy, there is a strong intuitive feeling that this agency will yet lay rich stores of amazing gifts before us, if only we have the determination to overcome the barriers which now guard these gifts."

Describing the cosmic nature of man, with his self-contained aggregation of matter and energy, General Sarnoff pointed out that were we to regard man as an evolving cosmos within himself, there would seem to be many capabilities and potentialities as yet unrealized. Thus the theory of the cosmic nature of man suggests the possibilities for speeding up these evolutionary processes, he said.

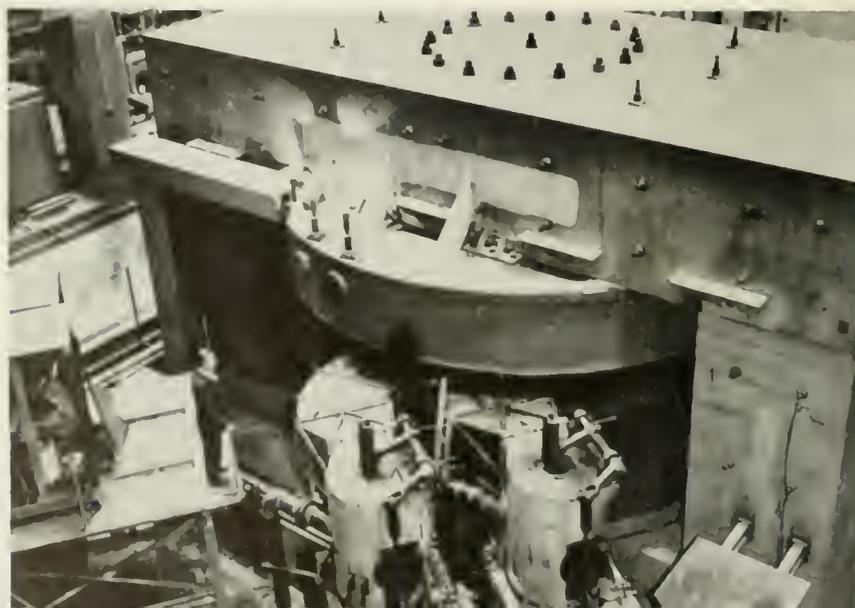
#### *Man Struggles for Survival*

"In the history of mankind, the struggles of men often have been mainly for sheer survival," he recalled. "For his continued existence, man has needed food, shelter, and clothing. The world wars which devastated the earth have sprung primarily from the desire on the part of one or another people to control the limited resources of this planet. Vital resources are not evenly distributed on this earth and this fact has produced dissatisfaction and hatred.

"With the increase in our understanding of the universe and of our mastery of the great forces of atomic energy, the struggle for mere physical survival should disappear. With freedom from this physical struggle, the opportunity for advancing mentally and spiritually will be immeasurably increased.

*(Continued on page 11)*

"ALREADY WE HAVE DISCOVERED HOW TO SPLIT, CHANGE AND CONTROL THE ATOM AND ITS ENERGY."





FRANK M. FOLSOM, RCA PRESIDENT, L. W. TEEGARDEN, VICE PRESIDENT IN CHARGE OF TECHNICAL PRODUCTS, RCA VICTOR DIVISION, AND NILES TRAMMELL, PRESIDENT OF NBC, EXAMINE THE MILLIONTH TELEVISION PICTURE TUBE PRODUCED BY RCA.

## THE MILLIONTH TV TUBE

*Production of "Milestone" Kinescope at Lancaster Plant Observed by Television Viewers on 11-Station Network*

THE millionth television picture tube to be produced by the Radio Corporation of America rolled off one of the production lines at the Company's Lancaster, Penna., plant on June 7, under the eyes of RCA officials and millions of television viewers along the Atlantic Coast and as far west as Chicago. The tube, which climaxed three years of intensified efforts to produce sufficient kinescopes for the mushrooming television industry, was a 16-inch metal-cone tube. Upon its completion and subsequent test, the tube was inserted in an RCA Victor receiver and presented to the Valley Forge Hospital for veterans.

In an address which was part of the activities celebrating this milestone in television progress, Frank M. Folsom, RCA President, recalled the spectacular rise of the video industry since 1946.

"In that period," he said, "we have seen the number of television stations grow from five to 67, so that today this new service is within reach of 70 million people. We foresee continued progress. Technical improvements will be forthcoming from our laboratories and they will be passed along as they are perfected."

During the special 45-minute

[RADIO AGE 7]

television salute, which also signaled the official opening of Lancaster's first television station, WGAL-TV, scenes of activities within the busy tube plant were transmitted over an NBC Television Network of 11 stations. Using facilities provided by coaxial cable and radio relays, viewers in Washington, Philadelphia, Boston, Baltimore, Richmond, Buffalo, Cleveland, Detroit, Chicago, Lancaster and New Haven were given an eye-witness step-by-step visual description of the actual manufacture of the millionth tube. With Commentator Ben Grauer explaining the sequence of scenes as they

were picked up by a battery of NBC image orthicon cameras, TV set owners watched the "milestone tube" from its beginning, as a number of individual parts, to its completion as a high-quality kinescope, checked, inspected and inserted into a receiver.

### *Tube Assembly Revealed*

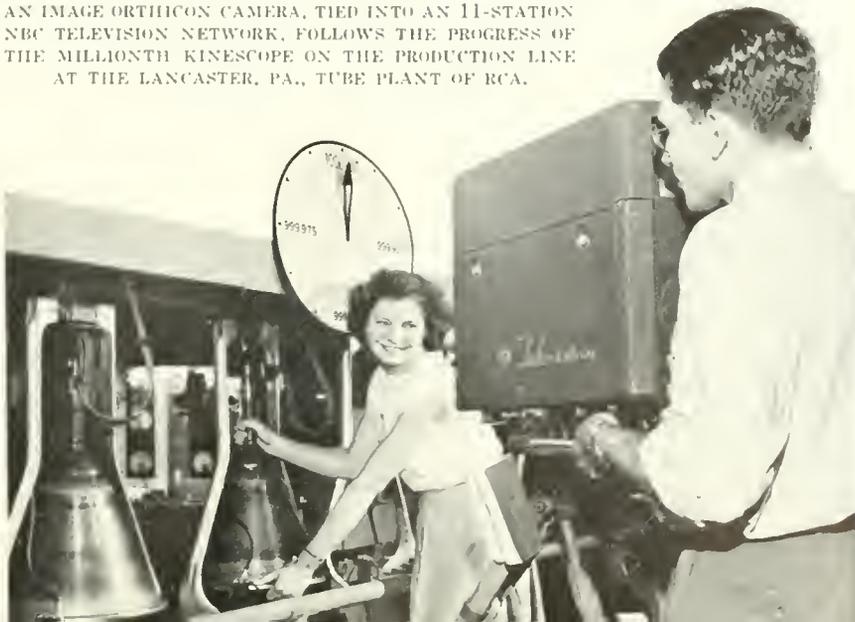
These viewers saw jets of intense flame weld the metal cone to the glass tube forming the neck and to the glass face plate which eventually would be the viewing screen of the kinescope. They witnessed the insertion of the finely-engineered and intricate electron gun into the neck, and then the majority of viewers learned, for the first time, how the fluorescent material which forms the picture screen was poured into the tube as a liquid solution and allowed to settle out into position on the face plate.

During the telecast from Lancaster, NBC shifted the action briefly to its New York studios for the address by Mr. Folsom and a musical selection by Miss Blanche Thebom, Metropolitan Opera star.

Mass-production of the complex and sensitive television picture tube on a conveyor-belt and automatic machinery basis, first achieved at the RCA Lancaster plant in 1946, assured the industry of a large-volume supply of the most vital component in a home television receiver. This was followed by the mass-production and mass-marketing of home television receivers and the opening of today's mass-television era.

Source of about half of the television picture tubes now in use in

AN IMAGE ORTHICON CAMERA, TIED INTO AN 11-STATION NBC TELEVISION NETWORK, FOLLOWS THE PROGRESS OF THE MILLIONTH KINESCOPE ON THE PRODUCTION LINE AT THE LANCASTER, PA., TUBE PLANT OF RCA.





LANCASTER PLANT MANAGER D. Y. SMITH PRESENTS THE MILLIONTH TUBE AND AN RCA TELEVISION RECEIVER TO MAJOR MARJORIE MARTIN REPRESENTING THE VALLEY FORGE HOSPITAL FOR VETERANS.

all home receivers throughout the country, the Lancaster plant was built and operated during the war by RCA as the largest supplier of cathode-ray and power tubes for critical war equipment.

At the end of the war, RCA purchased the plant from the U. S. Navy and expended a million dollars for the development of high-speed automatic machinery specially created for processing metal and glass tubes.

#### *Plant Capacity Doubled*

Since that time, further development of equipment has more than doubled the plant's capacity. And now, in addition, RCA is constructing a new manufacturing center at Marion, Indiana, which will be devoted entirely to production of the company's newly introduced 16-inch direct-view metal-cone picture tube.

In producing a million kinescopes, enormous quantities of material were needed. The glass that went into the formation of the tube envelopes weighed more than 3,000 tons. Fifteen hundred tons of stainless steel; 81 miles of tungsten wire; 15,000 gallons of liquid air, and 800 miles of nickel and copper wire were consumed. The various processes required 22,000,000 kilowatt hours of electricity, and to ship the total output of the plant at one time would have required a train of nearly 1,000 freight cars.

Yet the quantities of these major materials are no more amazing than

the variety of substances which went into the fabrication of the tubes themselves, for of the 92 known basic elements in the earth, Lancaster scientists and engineers found use for more than half of them.

## Radomes Improve NBC Microwave Reception

*(See cover picture)*

Two plastic housings for microwave-relay receiving equipment have been erected by the National Broadcasting Company on the roof of the 69-story RCA Building, Radio City, New York, for the purpose of improving the pickup of television programs originating outside the NBC studios. The plastic huts, called "radomes", provide an all-weather point-of-reception at Radio City for video programs transmitted from temporary field locations within a 30-mile radius.

According to O. B. Hanson, NBC Vice President and Chief Engineer, the receiving equipment in the radomes consists of a six-foot parabola which concentrates the short radio waves—only about 13½ inches in length—toward a waveguide element located at the focal point of the parabola. The latter may be rotated vertically and horizontally for greatest efficiency in picking up the signals. Provisions are included for heating the radomes in winter and ventilating them in summer.

## J. H. McConnell Elected Executive V.P. of RCA

Election of Joseph H. McConnell as Executive Vice President of the Radio Corporation of America was announced by Frank M. Folsom, President, following a meeting of the Board of Directors on July 1.

Mr. McConnell, Vice President in Charge of Finance of RCA since January 7, 1949, has been associated with the Corporation since 1911. In that year, he joined the Legal Department of the RCA Manufacturing Company, now the RCA Victor Division. He became General Counsel of that organization in 1912, and three years later he was elected Vice President and General Attorney of the RCA Victor Division. From April, 1917, to January, 1919, he served the same Division as Vice President in Charge of Law and Finance.

A native of Davidson, N. C., Mr. McConnell was graduated from Davidson College in 1927. In 1931, he received a Law degree from the University of Virginia. He practiced law in West Palm Beach, Fla., and in Charlotte, N. C.

In 1935, Mr. McConnell became an associate in the New York law firm of Cotton, Franklin, Wright & Gordon (now Cahill, Gordon, Zachry & Reindel), where he specialized in legal phases of government regulation of corporate enterprise. He is a member of Phi Beta Kappa and Kappa Alpha fraternities.



JOSEPH H. MCCONNELL

# Television and Human Rights

*Possible Invasion of Privacy by Video Cameras Presents Constant Problem to Producers of Television Programs*



By Robert P. Myers

*Assistant General Attorney  
National Broadcasting Company*

WHEN television attorneys go to bed at night they don't count sheep to fall asleep — they count rights. They count music rights; they count literary rights, motion picture rights, civil rights and defamation, as well as commercial rights and a host of contractual rights. If the video lawyer is still awake, he can try to figure out whether his station's television cameras that day invaded the right of privacy of an African potentate at a football game.

The insomniac barrister is mostly involved these days with the very complicated problem of music rights. The complications involve the working out of a new agreement with the American Society of Composers, Authors and Publishers which will replace the so-called "free" license which has existed for musical performances on television since 1941. As many of you know, the Television Music Committee of the National Association of Broadcasters (NAB) and the television networks have been conducting a series of negotiations with ASCAP on this very problem.

The big problem of working out an ASCAP agreement lies in the scope of the rights which the organization possesses from its members for television. The problem of a general licensing agreement for some of its music and special licensing arrangement for others of

its works, is the one on which broadcasters and ASCAP now are hinging their negotiations. However, all of us feel that an equitable arrangement will be arrived at to permit the further use of ASCAP music on video.

The music problem, which happens momentarily to be in the television legal limelight, is but one of scores of new problems that have arisen with the growth of video.

## *Camera May Invade Privacy*

Another sore point is the possibility that the probing electronic eye will invade a person's right of privacy. As an example, suppose that General Marshall were attending the Army-Navy football game: The cameras, spotting him as he entered the arena, would naturally follow him through the portals, up the aisle, and into his seat. I believe this is a matter of legitimate public concern and interest. What's more, every now and then — say after an Army touchdown — the cameras would have a perfect right to "pan" the crowd and settle on General Marshall in the act of cheering the action. But if the broadcaster were to place a camera on Marshall for the duration of the football game, then this would cease to be a news use and become a feature treatment of Marshall. In this instance, it would be a definite violation of his civil rights and he

could sue the telecaster for invasion of his right of privacy.

This is, obviously, an extreme case but nonetheless it points up the fact that at times there might be a very thin line between the use of television cameras to cover "news" and the making of a "feature" about a personality which could be construed as an invasion of the right of privacy.

As a general rule, it must be remembered that a person cannot be held up to ridicule, that the cameras can cover matters of legitimate public interest but that no individual should be featured except in a true news sense. At public gatherings, such as football games, it is certainly permissible to "pan" crowds. Many court decisions have arisen out of these points as they relate to motion pictures, but as yet there has been no clear-cut test regarding television uses. However, a definite pattern has been evolved as a result of past experiences. It is clear that a camera pointing its eyes to a remote and dark spot in a pickup of a night club could invade the right of privacy of two individuals located in that spot. However, in pickups such as those NBC has been making from the Village Barn, where the individuals are apprised in advance that a television broadcast is being staged, the NBC attorney feels that their antics can be covered without much fear of reprisal.

Where a person is held up to ridicule or embarrassment by the television camera, the broadcaster could find himself in trouble. The telecaster must also avoid misrepresenting a person and his actions or

*(Continued on page 13)*

TELEVISION GATHERINGS SUCH AS SPORTS EVENTS IS NOT ORDINARILY CONSIDERED AN INVASION OF THE RIGHT OF PRIVACY IF THE CAMERA PICKS UP A PANORAMA OF THE CROWD AND DOES NOT CONCENTRATE ON AN INDIVIDUAL.



# Viewers Rate Television Programs

*Studio Audience Notes Reactions with Hand-held Indicators— At Home, Criticism Is Registered by Cues on TV Images*



By Hugh M. Beville, Jr.

*Director of Research  
National Broadcasting Company*

NBC television is pioneering the field of television research with audience reaction tests, working in cooperation with the Horace Schwerin Research Foundation. The Schwerin System of program-testing utilizes electrical recorders that measure not only immediate individual and collective audience reaction to program content, but also study such related factors as size of viewing screen, film versus live presentation, viewer fatigue, and many others.

In setting up the test situations, NBC exhibits kinescope recordings of its top shows in the RCA Johnny Victor Theatre two or three times a week. Audience reaction is taken with the Schwerin "TV Test-Trigger", an instrument which records

the likes and dislikes of up to 80 individuals attending an NBC "Television Review Time" session. Each audience member moves the instrument's knob to indicate "Good," "Fair" or "Poor". Each movement of the instrument is recorded by automatic pen, resulting in an individual and collective "profile" of the video show.

The inauguration of regular qualitative testing of TV shows here at NBC is another indication of the speed with which television is pushing to the fore as a communications medium. It is a further step in NBC's TV research program which now includes such features as regular monthly estimates of TV set ownership by cities and surveys in places and periods not covered by syndicated services.

## Questions Raised By Television

Some of the old and new questions raised by television, according to Horace Schwerin, president of the research organization, are:

What do audiences think of programs now on the air?

How should sequencing of programs be arranged?

Which camera techniques are most acceptable?

How long can scenes be held before liking diminishes?

Are film presentations better liked than live shows, or vice versa, and why?

How long will an audience spend in front of a TV set?

What shows can be effectively broadcast simultaneously on radio and television?

How effective are various types of TV commercials?

Who is available to see daytime programming, and what kinds of programming have greatest appeal for this group?

How can specific programs be slanted toward their primary market audience?

On May 17, NBC and Schwerin Research tested simultaneous home reactions of 13,000 midwest televisioners to "Quiz Kids." Reactions of the huge home sample, largest ever obtained in qualitative television or radio research, were matched with reactions of two different types of studio "control" audiences in New York in the most comprehensive and far-reaching program-testing project ever attempted.

Revolutionary feature of the home-viewer test was Schwerin's application of the "number-cueing" principle, basis for his organization's AM radio testing, to television. Set-owners in the three TV areas viewing "Quiz Kids" also saw small numbers, flashed for 3 seconds each at approximately 40-second intervals, superimposed on the picture which appeared on their screens. As they watched the show, they indicated on ballots, which were mailed to them prior to the

THE POPULAR "QUIZ KIDS" PROGRAM WAS ONE OF THOSE JUDGED BY A SECTION OF THE TELEVISION AUDIENCE USING THE SCHWERIN SYSTEM OF ANALYSIS.





RICHARD PAIGE AND HORACE SCHWERIN DISPLAY THE "TV REACTION RECORDER" WITH ITS 80 TRACING PENS EACH OF WHICH IS CONNECTED TO A "TEST TRIGGER" MANIPULATED BY A MEMBER OF THE STUDIO AUDIENCE.

THE "TEST TRIGGER" (BELOW) IS HELD BY A VIEWER WHO MOVES THE CENTER KNOB TO "POOR", "FAIR" OR "GOOD" ACCORDING TO HIS REACTION TO PORTIONS OF THE PROGRAM.



show's performance, how they judged portions of the program.

Only one of four "sample groups" being utilized in the Schwerin project used the "number-cueing" system. Recapitulation of techniques and size of sample groups being used look like this:

Nine thousand midwest TV families (random sample) voting on live telecasts by the "number-cueing" method.

Four thousand additional midwest TV families, voting simultaneously on the live telecast, using "pictorial question" ballots on which successive elements of the show were listed under pictures of Joe Kelley and the Quiz Kids.

Twelve hundred pre-selected television viewers in New York, voting in four 300-person NBC studio sessions on the kinescope recording of the program, projected on a theatre-size screen, using the "number-cueing" method.

#### *Audience Records Reaction*

More than three hundred additional New Yorkers, viewing the kinescope recording on a closed circuit TV projection set, in groups of 75 each at the RCA Johnny Victor Theatre, used the "TV Test Trigger" and electric pen recording units.

Some of the questions this test will answer, are:

How enjoyable and effective are "panel quiz" shows?

To what extent are visual "gimmicks" necessary?

How do audiences react to the TV version of "Quiz Kids" compared to the AM version?

Which types of questions are most popular?

How should the commercials be handled?

Which groups (by age, sex, income, education) like which portions of the program best, and which least?

Television in 1949 is in its mature period. Of all the refinements and improvements in store for the viewer and user of video in the future, none is more important than the NBC-Schwerin testing project. We are sparing no expense to equip our test studios with multiple receivers, projectors, screens, electrical recorders and many other technological items. Our purpose is to provide reliable data on audience likes and dislikes in television, so that our regular advertisers and those who haven't yet tried television will be able to approach the new medium with confidence and familiarity.

NBC predicts that no video event of 1949 will surpass the Schwerin tests in ultimate importance to both

sponsor and consumer. We have come through the experimental period in television; now we're ready to apply the acid test of audience reaction to our programs and program ideas.

## MAN AND SCIENCE

*(Continued from page 6)*

With greater powers and better functioning of our physical bodies, may we not reasonably hope for a corresponding improvement in our mental capabilities and spiritual outlook?

"In conclusion, I would like to repeat my belief that the new tools, including electronics and atomic energy, which science continues to make available, put us on the threshold of new opportunities. Likewise, they impose upon us great obligations to use them constructively. The hour has come to bring their vast potential benefits to humanity through concerted and systematic research for the development of man himself. Only through such coordinated scientific efforts can man be assured of his survival in this Atomic Age and of the full use of his God-given powers to progress, to live in peace, and to fulfill his destiny."



PILOT BOAT NEW JERSEY, SHOWING THE UNUSUAL "HALO" ANTENNA AMIDSHIPS WHICH PICKS UP TELEVISION SIGNALS FROM NEW YORK AND PHILADELPHIA REGARDLESS OF THE POSITION OF THE SHIP WHEN STATIONED OFF NEW YORK HARBOR.

PILOTS AWAITING THEIR TURN TO GUIDE SHIPS INTO THE HARBOR PASS THEIR TIME WATCHING VIDEO PROGRAMS ON AN RCA 16-INCH RECEIVER IN THE SHIP'S SMOKING LOUNGE.



## Harbor Pilots Boost Television

*Receiver Installed on New Jersey Relieves Mariners of Boredom While on Station off New York Harbor*

IN 1947, the pilots who guide the world's largest ships—and many smaller ones as well—into and out of New York's traffic-laden harbor installed an RCA Victor television receiver aboard the Pilot Boat *New Jersey*, one of their three floating "homes", thereby joining the progress parade of their land-lubber friends. Now, 20 months later, this group of mariners confesses that long-established shipboard routines have been drastically revised by the advent of television.

The transition took place almost overnight. Images on the receiver's 16-inch screen moved in to take precedence over marathon card games, the reading of books and magazines, and other time-killing devices. Those long evenings which the pilots had faced during tours of duty at their station many miles outside the entrance to New York Harbor became merely a memory. Once again, the magic of television had demonstrated its ability to alter prevailing habits of living.

Recently, the Sandy Hook pilots went a step further. They replaced their original receiver with one of RCA's new models equipped with a 16-inch metal-cone picture tube.

This gives larger, clearer pictures and results in less jockeying for the best viewing positions in the smoking lounge.

Television has made inveterate fans of the men, with prizefights rating top priority on their program list. Normally, few seafaring men become boxing fans for the obvious reason that they get little opportunity to attend actual bouts ashore. Now the television screen has brought the squared circle to the harbor pilots, and, to a man, they have developed into ringside "experts".

### *Special Antennas Designed*

Before the original installation was made, Robert Gray, Joseph Shuskus and Joseph Rudolph of the RCA Service Company made several trial runs on the *New Jersey* experimenting with several types of antennas. They finally designed a special "halo" antenna which, because of its circular shape, enables the *New Jersey* to pick up all signals clearly, no matter how the ship turns, sways, or tosses. A rotary converter, installed by the RCA Service Company, solved the problem of changing the ship's di-

rect current to the alternating current required by the RCA set. In addition, the converter isolated the receiver from electric disturbances created by the many motors and generators which otherwise would have affected the picture.

At all times, reception has been excellent, despite the pitch and roll of the ship. The men watch programs from the six television stations in New York and vicinity and, occasionally, are able to pick up the three stations in Philadelphia, over 75 miles away. Frequently, wooden benches must be brought in to accommodate the crowd which sometimes numbers as high as 35 men.

"Selection of programs is quite a problem," one pilot remarked. "Our tastes differ greatly, but the first man to reach the set usually wins out. Boxing seems to be the one subject on which we all can agree."

The pilots also enjoy baseball, wrestling, dramas and variety shows, such as the Milton Berle program. They often sit in the lounge, smoking their pipes, from early evening until the last video program goes off the air. Television, to a great extent, has taken the place of radio, card games and story-telling—the century-old pastimes of seamen.

Life on the *New Jersey* is sometime exciting but more often on the

dull side. When she leaves the pier on Staten Island for duty just outside the harbor, the ship carries about 27 licensed pilots and 25 crew members. For two-week periods, the *New Jersey* drifts off Ambrose Light, sending pilots onto incoming liners and picking up those who have just guided outgoing vessels through the channels and traffic of the Bay. Since the men spend more time aboard ship than they do in their homes, television has shortened considerably the long stretches between dockings.

Taking TV to sea has proved a boon to the seamen and the industry alike. As a result of the excellent reception and variety of entertainment afforded them by the shipboard installation, ninety per cent of the pilots have purchased television sets for their homes.

The fact that the *New Jersey's* pilots had become such confirmed television fans had one drawback. In spite of the excellent reception

and sharp pictures provided by the original RCA installation the 10-inch screen proved inadequate for the many spectators who strained, at times, to catch each movement. The idea of substituting a new RCA set with 126 square inches of picture area was welcomed by all. When the RCA Service Company completed installation of the new receiver, the 10-inch instrument was transferred to the *New York*, sister-ship of the *New Jersey*.

### Three Ships in Pilots' Fleet

The Pilot Associations, which operate independently, maintain three ships, the *New Jersey*, *New York* and *Wanderer*, as well as four motorboats for transporting the men between their headquarters and incoming vessels. When the *New Jersey*, largest and most extensively used of the trio, is in dry-dock, operations are transferred to the *New York*. By popular demand the 10-inch television set also was transferred but the 16-inch receiver has been made a permanent fixture on the *New Jersey*.

"Television's trial run at sea has been most successful," the pilots declared, "and thanks to RCA craftsmanship it has proved both indispensable and seaworthy. Despite the heavy vibrations and strenuous use which the smaller set has undergone, it has remained in excellent condition.

## Television and the Invasion of Human Rights

(Continued from page 9)

misnaming him. These could both result in defamation actions.

There are scores of problems, too, on the subject of literary rights, and especially in dramatic works from which motion pictures have subsequently been made. There are copyrights involved, common law rights, and others. In each case, negotiations have to be made on an individual basis since there are no blanket or general licenses covering dramatic works. Rights in dramatic works may be vested in the author, but in plays which have been sold for motion

pictures these rights may have been sold, too. Each contract for dramatic works has to be checked for both live and kinescope recording. In addition, when motion picture performing rights have been procured there exist subsidiary rights, such as the fact that the movie itself may be copyrighted, that music must be cleared, that rights inhere in talent, producers, directors, etc.

In the event that television broadcasters cannot obtain general licenses covering a substantial majority of the rights which they will utilize — making it necessary for them to negotiate hundreds of individual licenses each month — it may become desirable if not necessary to create a central clearance bureau for rights, with offices in the principal centers where the owners of such rights are located.

## Advanced TV Courses by NBC and Columbia Univ.

Study of television techniques will be incorporated in 25 professional training courses to be offered during the 1949-50 academic year by Columbia University School of General Studies in cooperation with the National Broadcasting Company.

The teaching staff will be recruited largely from NBC network personnel, with the majority of courses to be given under working conditions in the NBC studios in Radio City, New York. Fourteen network executives are listed as instructors.

The curriculum has been designed to give fullest possible coverage of radio and TV. There will be courses in basic radio and TV, dramatic writing, news writing, promotion, publicity, news commentary, speech, announcing, acting, use of equipment, sound effects, audience research, international relations, production and direction, music and the documentary.

More than 400 persons from over 10 states and many foreign countries registered for the radio-TV courses last year.



RCA TECHNICIANS ERECTING THE TELEVISION ANTENNA ABOARD THE PILOT BOAT NEW JERSEY. THE SMALL LOOP BELOW THE LARGE ANTENNA IS FOR STATIONS ON CHANNELS 7 TO 13.



PUPILS OF THE LAWTON SCHOOL, PHILADELPHIA, APPEAR BEFORE THE TELEVISION CAMERA IN A PLAYLET, "A VISIT TO ITALY."

## "OPERATION CLASSROOM"

*Educational Television Introduced to Schools in Philadelphia Area Through Cooperation of RCA Victor with Local Agencies and Institutions*



By Gilbert Chase

*Manager, Educational Division,  
RCA Victor Division.*

**E**ARLY this year the Public Relations Department of RCA Victor, through its Educational Division, mailed to nearly 12,000 educators throughout the country, an eighteen-page illustrated booklet titled "The Modern School Looks at Television". This was intended to answer some basic questions relating to the use of television in schools, and, in the words of Frank M. Folsom, President of RCA, to inspire the interest of educators "in helping to develop what may become the greatest teaching medium known to man". To each brochure was attached a business reply card in which the sender requested fur-

ther information on the development of educational television. To date nearly three thousand replies have been received. Here is conclusive proof that American educators are fully alive to the possibilities of television as a teaching aid.

Meanwhile, exciting events were taking place in television for schools around the Philadelphia area. Theory was being translated into action. Prophecy was being transformed into history. The schools of Philadelphia and Camden were actually and literally "looking at television", not in an abstract and speculative manner, but in terms of concrete reality, as an experience shared by thousands of pupils and teachers. This was accomplished through "Operation Classroom", a cooperative project designed to test the effectiveness of television as a supplement to classroom teaching during school hours.

This pioneer experiment, the first long-range school television project aimed to reach all grade levels, has already attracted nationwide attention, and we are receiving inquiries as to how other communities can start their own "Operation Classroom". There is no standard for-

mula that can be applied everywhere, because much depends on local factors. Nevertheless, the story of what has happened in the Philadelphia area may well serve to stimulate and guide others in the same direction.

Any successful operation begins with cooperation and is carried through by more of the same. In Philadelphia the commercial broadcasting stations had a well-established policy of cooperation with the school system in presenting programs of an educational nature, first on AM radio and more recently on television. There was, however, a serious obstacle in the way of scheduling television programs for in-school viewing, namely, that hardly any schools were equipped with receivers. While this condition prevailed, the stations could scarcely be expected to undertake the expense of preparing special school programs, and the schools had no inducement to acquire sets as long as there no were programs especially designed and scheduled for them. Obviously, it was necessary for a third party to step in and break this deadlock.

### *Works Closely With Schools*

The Educational Division of RCA Victor, for its part, had long been working closely with the schools to encourage and develop every phase of audio-visual education. It was natural, therefore, that we should offer our cooperation in making available a certain number of television receivers, on an experimental loan basis, to schools in Philadelphia, in Camden, and the suburban area. Thirty-one RCA Victor table-model television receivers were made available for this purpose, and the schools in which they were to be installed were selected by school authorities. Two sets were placed in each of the seven public school districts of Philadelphia (one in an elementary school and one in a junior high school), six sets in Camden public schools, eight sets in Catholic parochial schools in Philadelphia and Camden, and the remainder in adjacent townships.

With the installation of sets assured, the planning of a well-rounded program schedule was un-

dertaken by representatives of the school systems in consultation with personnel of the Philadelphia *Bulletin's* television station WCAU-TV, which agreed to enter the project as a public service to the community. Miss Martha A. Gable, of the Philadelphia public schools, and Miss Margaret Kearney, of the Philadelphia diocesan schools, working together with Mrs. Ruth Weir Miller, educational director of Station WCAU, devised a series of four weekly telecasts designed to reach all grade levels from primary to senior high. As a result, early last March, "Operation Classroom" (as the experimental project was called) went into action.

#### *Four Programs Telecast Weekly*

The four weekly school programs were broadcast on the following schedule: Mondays at 3:00 P.M. for primary grades 1 to 3, Wednesdays at the same hour for intermediate elementary grades 4 to 6, Thursdays for junior and senior high schools (1:00 to 1:30 P.M.), Fridays at 1:00 P.M. for junior high school students. The Thursday program was the televised version of a vocational guidance series known as "Career Forum" that had long proved successful on radio.

Programs for primary grades included such topics as "Music Through Rhythm", "We Learn to Read", "Your Books Come to Life" (dramatization of favorite children's books), and "A Visit to Storyland" (China). Youngsters in grades four to six witnessed programs dealing with social studies ("We Visit Italy"), art ("Costumes Round the World"), music ("Let's Make Musical Instruments"), and

science ("What Makes Weather"). Designed for junior high school students were telecasts on such subjects as city planning, transportation, art and architecture, and social studies. Teachers, pupils, and outstanding leaders in various fields took part in the programs.

Detailed evaluation sheets and questionnaires were sent to all schools participating in the project, to be filled in by the teachers who actually used the programs. Of those who replied, ninety-eight percent agreed that television was an effective and valuable teaching aid. In some schools, the pupils were also invited to write down their comments. This typical comment came from a fourth grade youngster: "I think the telecasts were fine. I liked them because they taught me things I wanted to know".

Yes, television not only teaches children the things they want to know, but also teaches them in a way that holds their interest and that causes the knowledge to remain in their minds. In the words of Ruth Weir Miller, "If the objective of teaching is the acquisition of concepts, then television is the most dynamic tool the teacher has ever had at her command." Of course, television cannot take the place of the teacher; its full effectiveness will always depend on how effectively the teacher uses it.

#### *Local TV Stations Cooperate*

On April 22nd, Station WFIL-TV, the Philadelphia *Inquirer's* television outlet, began two series of school telecasts, scheduled in successive periods on Friday afternoons. One of these was a series on civics, titled "Government in

Action", designed for junior high school students and dealing chiefly with municipal administration. The other series, directed to elementary schools, dealt with health and fitness and was called "Fit as a Fiddle".

The third television station in Philadelphia, Station WPTZ, also made a notable contribution to in-school television with a special series of three weekly programs, beginning in March, designed for viewing by high school students in public, parochial and private schools. Thanks to the public-spirited activity of the local stations, as many as nine telecasts were made available in one week to schools in Philadelphia and its suburbs. This undoubtedly constitutes some kind of a record.

Many institutions, agencies, and industries contributed to the success of the programs by making available specialized personnel for interviews and demonstrations and by lending equipment and materials to be placed before the television camera. Among such agencies and institutions were The Franklin Institute, the City Planning Commission, the Philadelphia City Council, the Pennsylvania Railroad, the Philadelphia Zoo, the Police Department, the Department of Sanitation, etc. Once again, this stresses the all-important factor of cooperation, and emphasizes television's ability to bring the outside world into the classroom.

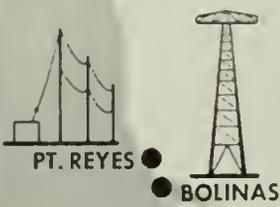
#### *Adults Enjoy Classroom TV*

Telecasts designed for in-school reception are not necessarily limited in their appeal to pupils and teachers. As a little girl in the fourth grade of the Edmunds School wrote, "My Grandmother also looked at 'Operation Classroom'. She liked it too."

RCA Victor dealers and distributors in many television centers throughout the country have shown a keen interest in "Operation Classroom", and undoubtedly will help to stimulate similar activity in other cities. In this area it is planned to expand the project for the next school year, with the cooperation of local RCA Victor dealers and of the Raymond Rosen Company, RCA Victor distributor in Philadelphia.

STUDENTS BECOME ACTORS IN A TELEVISION DRAMA DEPICTING THE CUSTOMS OF A FOREIGN COUNTRY, ONE OF THE EDUCATIONAL PROGRAMS IN "OPERATION CLASSROOM."





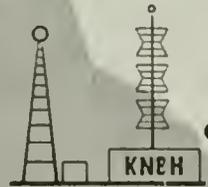
PT. REYES ●

● BOLINAS



● SAN FRANCISCO

KNBC



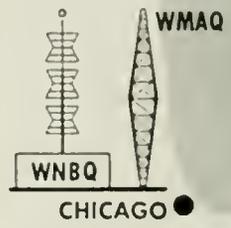
● LOS ANGELES

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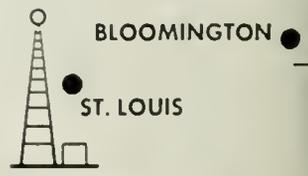
● DENVER



WMAQ

WNBQ

● CHICAGO



● BLOOMINGTON

● ST. LOUIS

MARION

● INDIANAPOLIS

### LEGEND



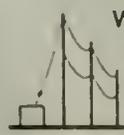
TELEVISION STATION  
(KEY STATION OF  
NBC-TV NETWORK)



BROADCAST STATION  
(KEY STATION OF NBC  
NETWORK OF 170 OUTLETS)



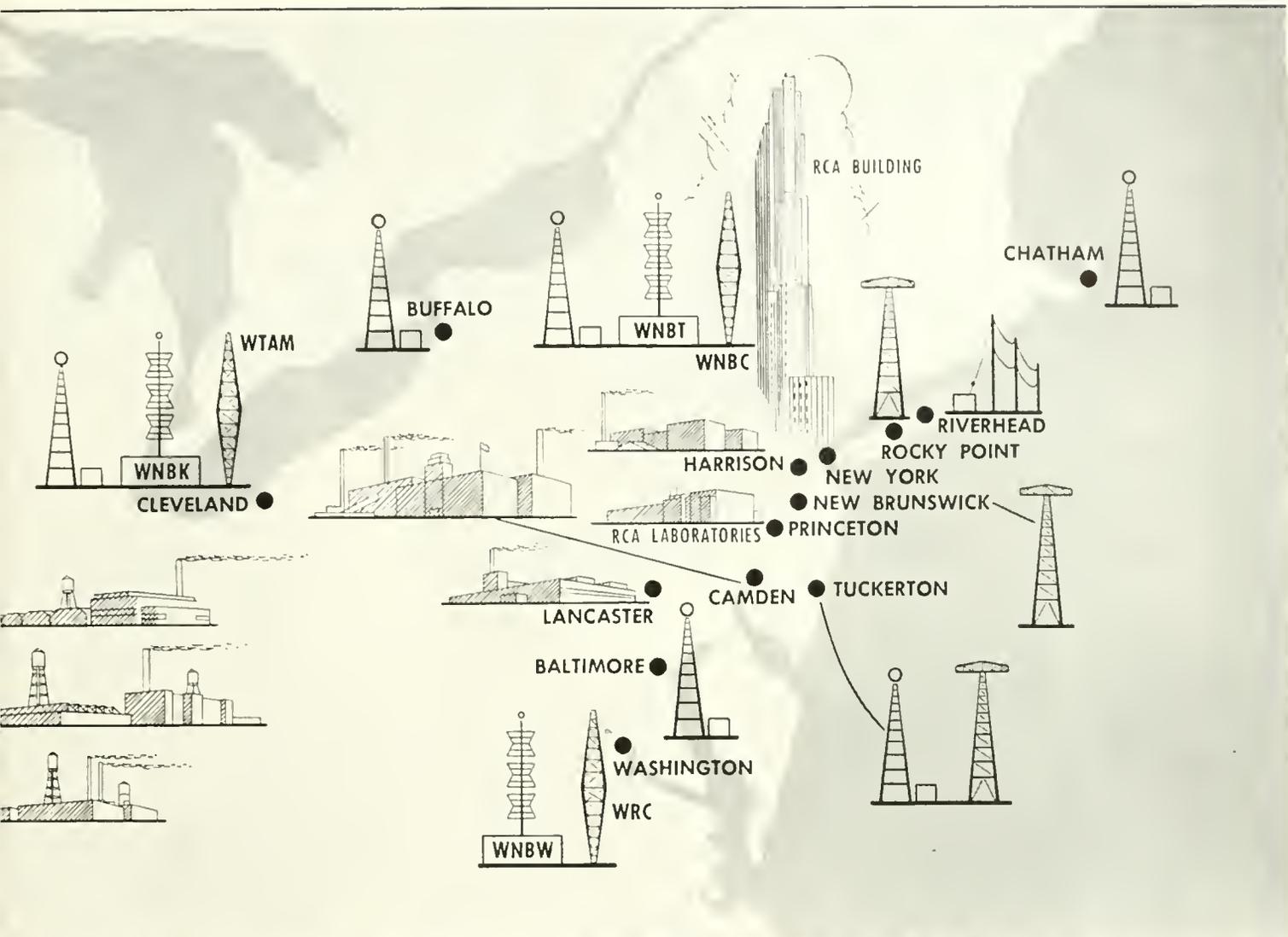
OVERSEAS  
TRANSMITTING  
STATION



WORLD-WIDE  
RECEIVING  
STATION



MARINE  
COASTAL  
STATION



IN SERVICE TO THE NATION

# Trains Employees for Careers

*NBC Conducts Extensive Courses to Develop Personnel for Executive Positions in Radio and Television*



By Ernest de la Ossa

*Director of Personnel  
National Broadcasting Company*

AS the pioneer in broadcast network operations, the National Broadcasting Company, since its formation in 1926, has been the goal of thousands of young people seeking opportunities in a fast-moving industry dedicated to public service.

Actually, radio's appeal to the career seeker is many-sided. The business moves ahead rapidly; it has the glamour of novelty continually renewed, and through deeds, it has acquired a well-deserved position as a medium of service to the masses.

Young applicants for employments are aware of this three-way keynote of newness, accomplishment and service. At the same time, these attributes demand of neophytes a mature outlook at an early business age and a willingness to give unstintedly of their labor.

It is not surprising, therefore, that the question I am asked most frequently is this: "What does NBC look for primarily when interviewing applicants?" The answer involves several basic points. Does the applicant exhibit a sincerity of purpose, a willingness to work hard, and the potential capacity to develop himself in the highly competitive atmosphere of the broadcasting field? Does he possess a tempered imagination and a natural creativeness; does he have a sense of social responsibility? Lest I give the impression that NBC's Personnel Staff has a mystical power of analysis,

let me say here that all of these desirable factors in a prospective employee cannot always be determined in an interview. In fact, some are not developed until the newcomer has been at his assigned task for some time.

That is why NBC has established a system of training and job analysis to observe the progress that young employees make within the Company. This constant but friendly scrutiny is essential if NBC is to build a reservoir of personnel in all branches—administrative, executive and creative—to meet the challenges of an ever-changing business.

The scope of NBC's training activities ranges from orientation programs to those of supervisory training and executive development.

All new employees are given a five-hour orientation course during the first week of their employment to acquaint them with the history of the Company, its overall organization and its operational and personnel policies.

Young men and women employed in such positions as guides, pages, messengers, stenographers, clerks and other junior classifications are selected for a variety of formal training to better prepare them for promotion to higher operating positions. Announcing classes, information lectures and discussions with Management representatives and

Department Heads on Company operations and job opportunities, and on-the-job assignments in operating departments are provided for those employees who possess the necessary qualifications for advancement to positions of higher responsibility.

## *Qualified Employees Trained*

A group of top qualified young college graduates is engaged for assignment to the NBC Executive Training Squad. These young men are assigned to specific on-the-job training for a period of 12 to 18 months based on a pre-planned program assigning them to all phases of operations related to one of the following four Company activities: 1) Sound Program; 2) Finance and Services; 3) Sales; 4) Television. At the end of the formal training period, trainees are assigned to key junior administrative positions.

Technical training plays an important part in NBC's training program. Young men from technical schools and colleges are engaged for training in Television and Sound Engineering operations. The training consists of both classroom and on-the-job instructions enabling the trainee to gain practical knowledge of the technical plant and all phases of engineering operations. Refresher courses for senior engineers are also conducted to assist these employees in keeping up with technical advances and changes in Company technical operating procedures.

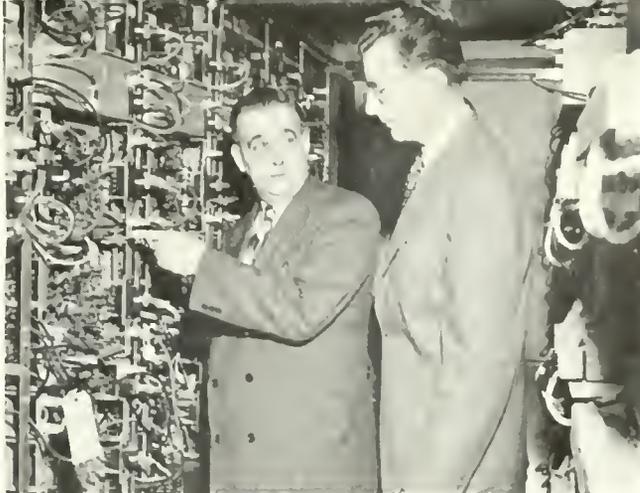
So that employees at all levels of operations may have the opportunity to keep up-to-date on Company operations and organization, a

NBC PERSONNEL MANAGER TED THOMPSON CONDUCTS A SESSION OF THE NETWORK'S JUNIOR EXECUTIVE TRAINING GROUP.





WHITNEY BASTON, DIRECTOR OF ENGINEERING TRAINING, EXPLAINS THE OPERATION OF A CONTROL BOARD TO NBC TRAINEES.



SUPERVISOR GEORGE GRAHAM OF TELEVISION ENGINEERING TRAINING POINTS OUT THE DETAILS OF A VIDEO CIRCUIT TO A STUDENT TECHNICIAN.

series of all-employee information meetings and panel discussions is scheduled periodically throughout the year. Department Directors and Managers discuss their organization and operations and point out the part that their functions play in the overall operations and objectives of the Company. The most recent series of this type, running for a period of eight weeks, was devoted to discussions of all phases of NBC's television operations.

Supervisory training is an integral part of NBC's training activities. Supervisors in all departments meet regularly each month to discuss supervisory problems relating to job instruction, job relations and human engineering.

At the Management and staff level a program of executive development is carried on continually. At this level training is offered for the most part on an individual basis. Training timetables are established for key personnel to insure that the employee will be afforded every opportunity to develop his ability and qualifications to assume higher executive assignments.

#### *Many Opportunities in Radio*

In discussing the advantages of employment in any industry there can be no better proof of the opportunities existing than a mention of individuals who have made notable successes of their chosen vocations. During the past 23 years, thousands of young men and women have been employed by NBC as pages and guides. Their duty is to meet and greet the millions of NBC guests and escort them through broadcasting and television opera-

tions. Today, the roll of nearly every department of the National Broadcasting Company reveals numerous executive or creative specialists who have risen from the ranks after putting in a period of training and indoctrination as pages. Paul Rittenhouse, manager of the Guest Relations Department; Theodore Thompson, personnel manager; Tom McFadden, manager of stations WNBC, WNBC-FM and WNBT, and William Garden, now a television program producer, launched their careers in this manner. John Tiedeman, budget officer of the Company, and George Wallace, manager of Network Sales Promotion, also once wore the uniform of NBC guides. Numerous others have advanced to responsible positions outside the Company; many have even developed into noted artists of the networks.

It should be understood, however, that not all jobs in broadcasting are bathed in glamour. NBC also has a large staff working behind the scenes but equally essential to the smooth-operating team that has created the nation's Number One Network. Included are messengers, operators of duplicating and mimeograph machines, typists, clerks, and a wide variety of other people whose occupations are indispensable in the conduct of any large corporation.

#### *Television Opened New Doors*

The advent of modern television in late 1946 opened many new opportunities for those with the special qualifications inherent to the video field. Television, like radio, must depend heavily upon young people, but the problems and chal-

lenges of the new medium demand workers with imagination and a readiness to accept responsibilities.

Not long ago, Mr. Niles Trammell, NBC President, who started his Company career as a member of its sales staff, summarized the radio employment situation in this succinct paragraph:

"We want enthusiasm and zest in our business, but the basic essential is the type of dependable skill and judgment that is characteristic of the professional in any line of endeavor. The 'pro' may not be brilliant but his day-in, day-out performance is absolutely reliable. The key jobs in broadcasting go to the people who have professional competence and reliability."

## "KUKLA" NAMED BEST TELEVISION PROGRAM

"Kukla, Fran and Ollie" recently was honored by the Chicago Federated Advertising Clubs as "the best television program of any kind produced in Chicago". Burr Tillstrom, creator and impresario of the program which is sponsored on 32 stations of the NBC Television Network by RCA Victor Division, accepted the award.

This is the second successive year that "Kukla, Fran and Ollie", has received this tribute, the third won by the show in recent months. Previously, it was given the citation of merit of the Illinois Federation of Women's Clubs, and an award at the 19th Institute for Education by Radio at Ohio State University.

# Television Outlook is Bright

*In Address to Stockholders at 30th Annual Meeting of Corporation, General Sarnoff Says Television is Safeguard Against a Serious Economic Recession — Chairman of Board Reveals 1948 as Most Successful Year in RCA History*

TELEVISION, continually growing in popularity as a new service and industry, is becoming a vital factor in the Nation's economy. Brigadier General David Sarnoff, Chairman of the Board of the Radio Corporation of America, reported at the 30th Annual Meeting of RCA stockholders held May 3 in a studio of the National Broadcasting Company at Radio City. He said that television is "one of the safeguards against a serious economic recession".

Pointing out that the impact of war and the subsequent reconversion period created an unusual situation, General Sarnoff said: "In the return to more normal business conditions, where the law of supply and demand again is in operation, and to a buyer's market in which competition is keener—it is clear that 1949 will be a more difficult year than 1948."

Net profit, after taxes, of RCA for the first quarter of 1949, he reported, was \$5,932,083, an increase of \$167,585, compared with the same period in 1948. Profit for the first quarter of 1949—before Federal Income Taxes—amounted to \$9,804,083, compared with \$9,631,498 in 1948.

Earnings per common share for the first quarter of this year amounted to 37.1 cents, as compared with 35.8 cents per common share for the first quarter in 1948.

Consolidated gross income of RCA during the first quarter of 1949 amounted to \$92,327,827, compared with \$88,053,297 for the same period last year. This represents an increase of \$4,274,530 over the 1948 figure.

General Sarnoff reported that during the past ten years RCA has paid more than \$65,000,000 or 53 per cent of net profits, in dividends to its stockholders. Of this amount, \$31,820,000 was paid to holders of preferred stock and \$33,251,000 was paid on the common stock. He said that during the same ten-year period the net worth of the Corporation was increased by \$60,000,000, and now exceeds \$127,000,000.

## *Most Successful Year of RCA*

The year 1948, he recalled, was the most successful in the history of the Corporation—either during peace or war. Volume of business was higher, profits earned were larger, and dividends paid to stockholders were greater than any other year since RCA was founded in 1919.

On May 1 of this year, RCA personnel numbered more than 41,000, he said, praising the loyalty and spirit of cooperation given to the Corporation by employees.

"It is gratifying to report that there were no strikes in RCA during the past year," declared General Sarnoff. "Labor problems that arose

from time to time were solved through collective bargaining with the forty-three unions representing our workers."

Reviewing current operations of RCA, which include research, engineering, manufacturing, broadcasting and world-wide communications, General Sarnoff discussed some of the problems for which RCA is seeking solutions.

"First," he said, "let us consider television. Here is a new art and industry, which must be developed within the framework of governmental regulation as to technical standards, number of stations that can be owned by any one company, and other matters. The growth of television today and tomorrow is not dependent merely upon manufacturing and selling transmitters and receivers. Many regulations control its advance and, while directed chiefly at the transmitting end, they also affect the receiving end.

"In recent months, you doubtless have read some of the dire predictions about quick obsolescence of television receivers. Many facts have been omitted. No one need hesitate to buy a present-day type of television receiver, for there is no indication that receivers of 1949 design will be obsolete in the near future. It is interesting to note that RCA Victor television receivers, first introduced to the public

PRODUCTION LINES OF METAL-CONE AND ALL-GLASS TELEVISION PICTURE TUBES AT RCA'S LANCASTER, PA., PLANT.





"SCIENTIFIC RESEARCH IS AS VITAL A FUNCTION IN THE RCA AS IS MANUFACTURING OR BROADCASTING."



OPERA STAR GLADYS SWARTHOUT COMPARES THE 12-INCH, 78-RPM RECORD WITH THE NEW 7-INCH, 45-RPM DISC.

in 1939, are still in use and giving satisfaction, although more than ten years have passed.

"Television is too powerful a force for the public good to be stopped by misleading propaganda. No one can retard its advance any more than the carriage maker could stop the automobile, the cable, the wireless, or the silent picture the talkies. Television is something the public has long desired and is eager to have. It is here to stay, because the people like television and want it."

#### *Audience Cooperation Needed*

General Sarnoff urged patience on the part of the public while showmen and performers develop improved techniques, declaring that only through the cooperation of the audience will the showmen know what to provide in entertainment, news and education.

"Ultimately the success of television will rest primarily on programming," he declared. "Television is a new force in communications, and it is also a remarkable new art form. As such it is fraught with problems and requires experimentation, both scientific and artistic, to determine the direction of progress that will satisfy the public.

"We in RCA—now, as in the past—gladly abide by the public's decision, for we have found public opinion to be essential in charting the future of an invention, an industry, or an art. This is in keeping with the character of a country

that enjoys freedom to invent, freedom to compete, freedom to think, and freedom to criticize. . . .

"The outlook for television in 1949 is bright. It is continually gaining in popularity with the public, and as a new industry, it is one of the safeguards against a serious economic recession for it promises to be a vital factor in the Nation's economy.

"The radio industry is particularly fortunate in being closely allied with science and invention. This alliance always holds the promise of new products and new services. Scientific research is as vital a function in the RCA as is manufacturing or broadcasting. Radio has been, and will continue to be, a broad field for new developments and expansion. Even in this day of television, we believe that we are only on the threshold, for radio is still a fertile field for invention, discovery and progress.

"We have seen radio broadcasting, talkies, television, radar, Ultra-fax and the new field of electronics evolve from the small beginnings of the early wireless."

Recalling RCA Victor's pioneering and world leadership in recorded music, General Sarnoff praised the development of the new 45-rpm phonograph system which RCA Victor recently introduced to the public. He said that the new system solved problems as old as the industry itself and presented new standards of value and performance, unmatched by any other rec-

ord or record player available to the public.

General Sarnoff declared that broadcasting had been immensely widened in scope by the addition of television, and that expansion of operations in this field is going forward under the auspices of the National Broadcasting Company, a service of RCA.

#### *Sound Operations Essential*

"How well and how soundly such operations are conducted are of interest not only to our stockholders, but also to the public, to the affiliated stations and to advertising sponsors," he stated. "Doubtless you have been reading of recent 'talent raids' on NBC. We could have matched the millions involved in such skyrocket bidding had we been indifferent to the interests of our stockholders, artists and clients.

"We believe time will show there is no profit to the network, the sponsor or the artist in the purchase of over-priced talent packages. Commercial program costs must be measured by what radio is able to deliver to advertising sponsors. According to recent trade reports, some of the so-called 'assets' purchased in these talent raids already are dwindling.

"Leadership built over the years on a foundation of solid service cannot be snatched over-night by buying a few high-priced comedians. Leadership is not a laughing matter.

"Broadcasting faces no easy task during this conversion period for each new step presents an economic problem of its own. The policy of the National Broadcasting Company has been and continues to be to provide the highest variety of entertainment and the best informational, cultural and educational programs.

"At the same time, we seek to maintain program costs at an economic level that will pay off to the advertiser, the affiliated station and the network. This means the constant production and addition of new, high quality, dynamic programs, the encouragement of new talent, new program ideas, and new personalities. In all these respects your Company intends to lead, not to trail, competition."

#### *Future Rests on World Scale*

In looking ahead, General Sarnoff said that the future should be weighed on more than a domestic scale since the world had been made much smaller and more compact by science and because all people, regardless of boundaries and man-made "curtains," live closer together than ever before.

"I have recently been in Europe," he asserted, "and I can assure you that any serious setback in American economy would have grave re-

percussions overseas. While I do not foresee any major economic depression in the United States, I believe that we should expect some adjustment in business conditions.

"The pace of the past ten years, under the impact of war and the conversion to postwar industrial activities, has been swift. We must now take up the slack and readjust our sights in planning for the future.

"The unusual conditions that prevailed in the postwar years, including 1948, brought many new problems to business and their solutions opened new opportunities. We have made every effort to embrace these opportunities to strengthen the Corporation and to apply them in charting the future. With civilian production curtailed during the war, it was natural that there was a large backlog of consumer demand. Our efforts to fill these needs are reflected in our high volume of business and profits in 1948."

General Sarnoff said the strength of RCA is found in its scientific research and diversification and reported to stockholders that although from time to time one unit or another of the RCA organization has been up or down, according to the exigencies of the times, the consolidated picture has consistently shown earnings commensurate with progress.

He said that from time to time voices had been raised against ownership of broadcasting stations and manufacturing plants by the same organization, but declared

that practical proof of the value of this ownership to the nation, to the public and to the industry, now is being witnessed.

#### *Enterprise Hastened Television*

"For instance," he said, "if the National Broadcasting Company had not gone on the air with television stations and programs before manufacturing of television sets got under way on a mass production basis, television might never have been started.

"Certainly the growth of television would have been retarded and the pleasures derived by the public from television would have been delayed. As the broadcasting business is being readjusted to conform with new patterns dictated by the addition of sight to sound, it is quite clear for all to see that diversification is a sinew of industrial strength."

In conclusion, General Sarnoff declared that the Directors and management of RCA are fully aware of the new and complex problems that lie ahead, and added:

"These problems are inherent in the establishment of a new industry. And television is not just something added to broadcasting. It is a new industry calling for development of a new art form and for new conceptions in entertainment as well as in equipment. While these problems present great challenges, they also present great opportunities for progress. Therefore, we look forward to the future with confidence."



JOSÉ FERRER, STAGE STAR, PORTRAYS THE TITLE ROLE IN TELEVISION VERSION OF "CYRANO DE BERGERAC."



TELEVISION HAS DEVELOPED ITS OWN TECHNIQUE FOR THE DISSEMINATION OF NEWS FROM AROUND THE WORLD.



INFORMATIONAL AND EDUCATIONAL FEATURES COMPRISE AN IMPORTANT SEGMENT OF VIDEO PROGRAMMING.

# RCA Institutes Holds Graduation

*Class of 163 Students Hears General Sarnoff Outline Opportunities in Electronics Field*

**R**ADIO, television and electronics provide a vast field of opportunity for young Americans alert to clues that lead to discoveries and inventions. Brig. General David Sarnoff, Chairman of the Board of the Radio Corporation of America, told members of the graduating class of RCA Institutes at commencement exercises held May 26, in an NBC studio at Radio City.

Graduates of the Institutes, which is the oldest radio technical training center in the United States, numbered 163 at this year's commencement. They included young men having completed courses in radio servicing, operating and broadcasting, and advanced technology covering maintenance, operation and development of circuits and equipment in both radio and television. A welcoming address was given by Maj. General George L. Van Deusen; the invocation was by the Rev. Dr. Ralph Thorn, of the Willis Avenue Methodist Church, the Bronx.

"The science of electronics serves the people and industry in many ways," declared General Sarnoff. "The full extent of its usefulness has yet to be measured. We think of electronics first and foremost as the heart of modern communications. Through its magic, we can transmit messages and music around the earth — and eventually television also will encircle the globe.

"Already news as it happens and history as it is made are seen by many millions of Americans. There are 1,300,000 homes in the United States equipped with television. In comparison, 39 million homes have radio sets, and in the years ahead most if not all of these radio-equipped homes will have television.

"Therefore, as television spreads across the Nation, opportunities in manufacturing, installation and servicing will expand. Industrial and theatre television are big fields that are beginning to open. These, broadly stated, are the most obvious services of this great science with

which you, through your education, have formed a professional alliance."

General Sarnoff told the graduates that in addition to radio and television, the science of electronics provides many other opportunities.

"We live in an era of high-speed transportation and communication," he continued. "Only recently, we have developed tremendous and potentially dangerous sources of power. It is electronics, which has duplicated and even surpassed human performance in many ways, that gives us that precise degree of control so necessary to these technological advances. Indeed, we may well think of this as a century not only of great speed and great power, but also one of master controls."

He said that in the industrial field great mills, which can turn out a mile of cold-rolled steel in a minute, have their rollers synchronized perfectly by electronics, as do many other plants owing their production capabilities to electronic regulators, heating devices and other electronic apparatus.

Electronics have helped to smash numerous industrial bottlenecks, he reported, recalling that electronic power computers made possible a seven-fold increase in aluminum production in World War II.

## *Electronics Speeded Tools of War*

"Electronic devices have sharpened all five human senses," asserted General Sarnoff. "With one, we can hear a fly walking. And there is a phototube so sensitive it distinguishes more shades of color than the eye. Another device feels variations of one ten-thousandth of an inch in thickness of a copper wire; still another will taste a drop of vinegar in a vat of water; and one electronic instrument can smell the smoke of a match inside a giant warehouse.

"We can watch an electronic circuit measure the speed of bullets whizzing from a gun. Other instruments probe electronic fingers deep into the earth and unerringly locate



BRIG. GENERAL DAVID SARNOFF PRESENTS A DIPLOMA TO ONE OF THE GRADUATES OF RCA INSTITUTES AT EXERCISES HELD IN AN NBC STUDIO ON MAY 26.

hidden oil and ore deposits. Similarly, they can detect impurities in sealed packages and bottles."

He reported the development of electronic computers having the ability to "out-speed the human brain," working out in a fraction of a second problems that would take mathematicians hours or even days to solve. He told of a tube called the Selectron which, he said, can remember 256 items of information and can release any part of it to supply an answer to a problem in less than a millionth of a second.

"Because of their inherent capabilities and versatility," said General Sarnoff, "radio and electronics deserve our utmost attention in finding or devising new tasks for them. For a number of years, we have been working to reduce the size of personal radios, and with some success. As a result there are instruments about the size of a jewel box that operate very satisfactorily.

## *Envisages Tiny Television Set*

"But why stop there? How about a radio the size of a wrist watch? About a year ago, a Swiss firm introduced a wrist watch containing a buzzer alarm. If the Swiss can devise an alarm clock to wear on the wrist, I believe that Americans

*(Continued on page 31)*

# Honorary Degrees to Folsom and Engstrom



FRANK M. FOLSOM

**F**RANK M. FOLSOM, President of the Radio Corporation of America, received honorary degrees of Doctor of Laws from Fordham University and Manhattan College, New York, during Commencement Exercises held at the two institutions on June 9 and 11 respectively.

The citation accompanying Mr. Folsom's degree at Fordham read as follows:

**FRANK MARION FOLSOM** — The distinguished president of the Radio Corporation of America, awarded the Presidential Medal in recognition of his continued and outstanding services to our country in administering a multiplicity of high offices throughout the war years, recipient of the Distinguished Civilian Award, the Navy's coveted honor. His American ancestry dates to the early seventeenth-century waves of colonists to our shores. The record of his name in the rolls of our country's patriots entitles him to membership in the Sons of the Revolution. For two decades he has executed top-level posts not only in the largest business of the world—our Govern-

ment—but also in half a dozen leading corporations. He simultaneously holds directorships in numerous companies and he is a regent or councilor or trustee in many institutions of higher learning throughout the United States. For his work and his achievements in favor of the church he holds the papal honor of Roman Knight in the Sovereign Military Order of Malta. In celebration of his great personal accomplishments and to add our tribute to his other honors, he is presented for our most glorious decoration, the honorary degree of Doctor of Laws.

At Manhattan College, the following tribute preceded the award of the degree to Mr. Folsom:

The family name borne by this distinguished gentleman, Frank Marion Folsom, has been a bright and honored light, from the very beginning, in the history of New England. In the business world of management and production that honorable name rings as a synonym for hard work, for untiring perseverance, for absolute honesty linked with high gifts of mind and heart. Today this distinguished gentleman holds the lofty position of President of the Radio Corporation of America. He has been besides, the recipient of the highest honors of Church and State in recognition of notable services rendered to both.

Elmer W. Engstrom, vice president of the Radio Corporation of America in charge of research at RCA Laboratories, was awarded the honorary degree of Doctor of Laws at the Commencement Exercises of New York University on June 15.

Brig. General David Sarnoff, Chairman of the Board of RCA and a member of the University's Governing Board, escorted Mr. Engstrom to the speaker's platform where Chancellor Harry Woodburn Chase conferred the degree with this citation:



ELMER W. ENGSTROM

**ELMER WILLIAM ENGSTROM**—A native of Minnesota and an engineering graduate of the University of that state, his personal contributions as a research engineer to radio and electronic development, and notably to the incredible progress of television, command the forthright respect of his scientific peers. Vice president in charge of research of the Radio Corporation of America, he is one of that exclusive group of latter-day Prometheans who not only illumines with his own brilliance, but who yokes the genius of fellow Titans unrenowned for tractability into corporate resourcefulness and fecundity. President of the Industrial Research Institute, he is concerned moreover with the constant improvement of research activity throughout American industry as a buttress to our common wealth. In his residential community at the grass roots level he has no less proved himself the good citizen in various roles of civic leadership. For all of which, with unbecomable gusto, we would envelop him with the bondage of our honorary doctorate of Science.

# DESIGNING EXPORT RADIOS

*Purchasers of Receivers Abroad Demand Quality, Durability and Attractive Appearance in the Products They Buy*



By John Vassos

*Industrial Designer  
Consultant to  
RCA International Division*

**I**F we could learn to apply to our own lives the simplicity and truth which we have learned to incorporate in our export radios, we would be much happier—and have fewer nervous breakdowns.

My export assignment for RCA calls for pure designing—absolute truth. The export market demands complete honesty of line, and lasting simplicity.

In Europe, in Latin America, and in the other countries abroad, the purchase of a radio is a serious business. The prospective buyer wants the full value of his dollar. He wants a quality set, as it may have to last him as much as ten years. And therefore he wants a design which will be harmonious with the furnishings of his house during that time. A radio is an important part of his living-room, but it must not be pretentious.

With these needs in view, in 1936 I designed for RCA a radio whose pattern has been followed ever since in the Company's models. The top-heavy, "tombstone" style which had been used up to that time was discarded, in favor of a longer, lower chassis to blend with the room.

I felt that we should keep only the two basic areas of interest—aural, the mechanism which produces sound; and visual, the knobs, dial and cabinet which allow the sound to come out. These two elements dictated the form of the instrument. It was to be a simple

statement expressing the medium. All extraneous features which were in contrast to this statement, such as the legs and over-ornamentation, were rejected.

We adapted the American principle of streamlining to radio design. The Americans, I believe, have always had the greatest feeling for simplicity of line. We have been the first to apply it in our design of airplanes and in our architecture. It has been one of the factors in bringing American standards to the top. Yet the appreciation of this simple styling in radios is found to a much greater extent abroad.

The mechanical features of an export radio require much special attention. The value of a set is determined largely by the number of bands it covers, for in many export markets, short-wave stations are of prime importance. Moreover, we must provide the best in sensitivity and selectivity.

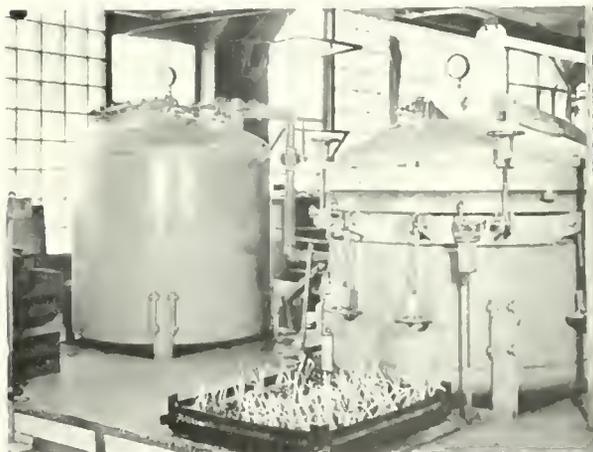
The materials used must be extremely durable to stand up under the rigors of rough handling in shipment, and of extremes of climate: cloth that won't sag, glue that won't melt, wood so dry that it will not absorb moisture. These are "musts" for every radio.

Another contributing factor in export radio design are the import regulations of various countries. Duties are imposed in proportion to weight and size as well as on an ad valorem basis. This consideration particularly affects the radio-phonograph combinations.

Fortunately, in all our problems of design we have the whole knowledge and experience of the many RCA branches to draw on—the RCA Laboratories, the RCA Victor Division, RCA Communications, Radiomarine Corporation of America, and the National Broadcasting Company. At the other end is the worldwide organization of distributors and dealers of the RCA International Division to put these quality receivers in the customers' homes.



IN THIS CONTROL LABORATORY GLUES AND LACQUERS ARE CHECKED FOR THEIR RESISTANCE TO TROPICAL CONDITIONS.



PARTS FOR EXPORT RECEIVERS ARE IMPREGNATED WITH LIQUIDS IN THESE VACUUM TANKS TO PREVENT DETERIORATION IN HUMID CLIMATES.



REMOVING AN RCA EXPORT RADIO SET FROM A "TORTURE CHAMBER" WHERE IT HAS BEEN SUBMITTED TO CONDITIONS MORE SEVERE THAN WOULD BE ENCOUNTERED IN THE TROPICS.

# THE RCA EXHIBITION HALL

*Radio, Television, and Electronic Displays Attract 2,500,000 Persons in Two Years — Hall's Facilities, Including Theatre, Used by 1,000 Outside Organizations*

TO a majority of the two and a half million people who have visited the RCA Exhibition Hall, in New York, since its opening in May, 1947, it is a wonderland of radio, television and electronic progress. There, in Radio City, behind windows 200-feet long and two stories high, RCA products are colorfully displayed and its services portrayed by animated exhibits. On the concourse level, below the street, a theatre seating 75 people, a guest lounge, several reception rooms, offices and a completely-equipped engineering shop make up an important part of the Hall which the average tourist does not see.

One of New York's leading tourist attractions, the Hall is a fascinating spot where the visitor may see himself televised, name his favorite record and hear it played back, operate the latest model RCA Victor radios, phonographs and television receivers, or investigate the marvels of radar, loran, the direction-finder, and radiotelephone units — all of which play an important part in maintaining safety at sea.

By merely pushing the button of his choice, the gadget enthusiast sees the NBC station nearest his home town light up on a huge glass map, hears the current network broadcast or sees the latest telecast. Another button brings into view several tiny, rotating wood carvings which depict the highlights of NBC history. A large global relief map, on which the routes of RCA radiograms may be traced by neon-lit paths, is among the most popular attractions, and few visitors leave without taking with them souvenir messages from the radio-teletype machines.

This combination of education and entertainment never fails to intrigue guests in every age group. Youngsters are delighted with the self-operation gadgets; students of radio and electronics probe the mechanical side of the instruments; while the older folk never cease to

marvel at the display of scientific progress.

Though not included in every visitor's tour, the Johnny Victor Theatre and private meeting rooms on the concourse level also play an important part in Exhibition Hall functions. Here, beyond the view of the casual spectator, conferences are held, films screened, cocktail parties given, demonstrations staged, and classes conducted. Television and radio programs also originate from the Exhibition Hall.

## *Outside Organizations Use Hall*

Although it operates primarily to serve the Radio Corporation of America, the Hall's facilities have been made available to more than one thousand outside organizations. It has become a favorite meeting place for philanthropic organizations, business, scientific and educational groups, and other associations having a public service to perform. The popularity of the theatre and lounges is evidenced by the fact that bookings frequently must be made two months in advance.

The Johnny Victor Theatre is a modern, compact, comfortable studio, constructed with finest acoustics

for musical concerts, a glass-enclosed control room, and an up-to-date projection room for screening films. Large-screen television demonstrations on a 6- by 8-foot screen have been staged here frequently, and the broadcast programs, "Author Meets the Critic" and "Much Ado About Music" originate on the theatre's stage. On several occasions video programs have been telecast from this spot, using the full line of TV equipment which is part of the theatre's permanent facilities.

Television monitoring and control equipment, panel boards, and turntables for disc-playback to the upper level are found in the control room. Adjacent to the theatre a record library of over 10,000 selections is maintained.

Adjoining the Johnny Victor Theatre, the attractive and spacious Public Lounge is in constant demand both by RCA Divisions and outside groups. This room and the smaller, Executive Lounge, are the scenes of a wide variety of public relations activities, while the "Salle Petite" is used exclusively for private interviews.

In these attractive surroundings, RCA introduces its new products and developments to the public and the press. For example, the 45-rpm records and record players, and the new RCA Victor television receivers equipped with 16-inch metal-cone kinescopes were first revealed and extensively demonstrated here.

THE JOHNNY VICTOR THEATRE OF THE EXHIBITION HALL IS USED FREQUENTLY FOR THE PRODUCTION OF NETWORK BROADCASTS.





FEATURES OF THE EXHIBITION HALL HAVE BEEN WITNESSED BY TELEVISION VIEWERS AS FAR WEST AS CHICAGO AND ST. LOUIS.

Two or three days a week NBC, in cooperation with the Schwerin Research Corporation, conducts television audience reaction tests in the theatre. NBC also utilizes the theatre to show kinescope recordings of programs, such as the Chesterfield Supper Club, to members of the cast. At times, RCA Victor auditions its recording artists here.

RCA Victor dealers, distributors and Service Company branch managers meet regularly in the Executive Lounge which also serves as the setting for photographs of RCA home instruments.

One day a month has been set aside in the Hall's engagement book as "Electron Microscope Day". On this occasion slides, a film and demonstration of the electron microscope are presented to as many college, scientific and professional groups as can be accommodated. Students, especially, are attracted by the variety of electronic wonders which the Hall has to offer. School classes numbering upwards of 30,000 pupils have been taken on tours and have watched motion pictures in the Johnny Victor Theatre.

RCA hospitality has been extended through the Exhibition Hall to gatherings representative of nearly every phase of American industry and institution. A typical weekly schedule includes the names of organizations such as Eastern Air

Lines, United States Rubber Co., Twentieth-Century Fox, March of Time, American Tuberculosis Assoc., Museum of Modern Art, Citizens Committee for Displaced Persons, Boy Scouts Organization, Institute of Radio Engineers, and Juilliard School of Music. Programs in which these groups participate usually consist of film previews, rehearsals, classes or demonstrations for the press.

A casual visitor to the Hall's concourse level might find Jane Pickens rehearsing a concert before 70 guests, Arturo Toscanini entertaining foreign visitors, or encounter a meeting of the Television Writers' Guild.

#### *Special Events Given Attention*

Special events call for special attention by the Exhibition Hall staff. On election night the Hall remained open until 5 a.m., attracting capacity crowds. Returns were televised on a 6- by 8-foot screen in the Johnny Victor Theatre and on the many receivers installed on the main floor. This same procedure was followed for the championship prizefights and World Series telecasts at which time special tickets had to be issued to regulate attendance.

More people have been introduced to television in the Exhibition Hall than at any other place. Questions

ENGINEERING ASSISTANT ROSE ANN LONGNECKER CHECKS THE OPERATION OF A TELEVISION SET IN THE MAINTENANCE SHOP OF THE EXHIBITION HALL.



of every nature concerning the new art are answered by a competent staff of eight public relations representatives. These young men are thoroughly instructed in every phase of RCA operations so that they may transmit this information intelligently to interested guests.

Each piece of equipment in the Hall must be kept in perfect condition, since it is used for demonstration as well as display. Twelve television receivers and approximately fifteen radios and radio-phonograph combinations are available for inspection by an average of 3,000 persons each day. Duplicate sets are held in reserve for replacements when models on display require extensive servicing or overhauling. An engineering staff works steadily on routine check-up and repairs, particularly those made necessary by visitors who are souvenir hunters.

Behind the scenes, 23 persons work diligently to keep RCA's Radio City showplace mechanically perfect and to plan, coordinate and supervise its numerous activities.

The fact that it has attracted a multitude of visitors from every state in the Union and more than a hundred thousand overseas guests indicates that the Exhibition Hall is recognized by the public as a symbol of RCA preeminence in radio, television and electronics.

# "Macbeth" Sets Video Record

*Top Names of Stage, Lavish Scenery and Costumes Feature History-Making Television Production by NBC*

**T**HE biggest, most lavish and, if paid for and sponsored, the most expensive production on television was The Players' Club presentation of Shakespeare's "Macbeth" on the NBC Television Network, Sunday, May 1. To pay the cast alone, top names of Hollywood and Broadway, would have cost around \$25,000. The rehearsal, air and studio time, plus the cost of the sets and costumes, would have run the total cost well over \$1,000,000.

An analysis of the time and work expended on the three interior and three exterior sets in Studio 8G and the two sets made for the portions of the play produced on film shows that to run, setup and strike the sets required ten men working a total of 107 hours.

To build and paint the sets required 203 hours, 16 men and 20 gallons of paint. Some of the painting was done after the sets were erected in the studio. Five property men were needed for the production. A hauling crew of three men was required to bring the props, sets and costumes into the studio and a secretary to keep track of the crew and their various pickup points.

The costumes — approximately three changes for each of the 35 members of the cast—were obtained from the two largest theatrical costume houses in the city. Ten tailors, working eight hours a day for three days were used to get the clothes ready, and it required the services of six dressers at the dress rehearsal and while the program was telecast to aid the actors and actresses in their changes.

Seven makeup experts were used to make up the cast and five property men were required to keep track of the various props used during the show.

There were four cameramen and five light men used on the production.

## *Adapted Drama for Telecast*

Henry Fisk Carlton adapted the drama to fit the hour telecast. Since members of The Players' Club were doing the play as their annual observance of the Bard's birthday, two sets of producers and directors were used. Harold McGee and Anthony Brown were the producer and director respectively for The Players and the late Owen Davis, Jr., and Garry Simpson held down the same spots for NBC. Walter Wag-

ner of The Players was the only stage manager.

The top names of The Players' Club roster — who are also top names of the Broadway stage — played in the production. Walter Hampden, president of the club, played the role of Macbeth and the three highest-paid Witches ever to essay the roles were Bobby Clark, David Wayne and Edgar Stehli.

Others in the star-studded cast were Joyce Redman as Lady Macbeth, Walter Abel as Macduff, Paul McGrath as Banquo, Leo G. Carroll as Duncan, Sidney Blackmer as Ross, Alexander Clark as Lennox, Philip Truex as Malcolm, John Drew Devereux as Donalbain, Ben Lackland as Seyton, Ralph Bellamy as Porter, John Carradine and Charles Brokaw as the first and second murderers, Frank Wilcox as Caithness, Ernest Rowan as Men-teith, Maurice Wells as Angus, Douglas A. Clark-Smith as the doctor and John Craven as the manservant.

Even the "spear-carriers," in the production rated among the first names of the legitimate theatre Ladies-in-Waiting were Viola Keats and Margaret Garland. Gentlewomen were Elizabeth Dewing, Virginia Downing, Monica Lang, Abby Lewis, Sonia Sorel and Margot Stevenson. Soldiers were Jack Benwell, Richard Ellington, Carl Frank, Storrs Haynes, Don Moore and Nelson Way.



JOYCE REDMAN AS "LADY MACBETH" IN NBC'S EPOCHAL TELEVISION PRODUCTION OF THE SHAKESPEAREAN TRAGEDY.

WALTER HAMPDEN, NOTED STAGE ACTOR, PLAYED THE TITLE ROLE IN "MACBETH", SUPPORTED BY AN IMPRESSIVE CAST OF BROADWAY AND HOLLYWOOD STARS.



# Zworykin Receives Lamme Medal

*American Institute of Electrical Engineers Honors RCA Laboratories' Vice President for Contributions to Television*

DR. Vladimir K. Zworykin, Vice President and Technical Consultant of the RCA Laboratories Division, received the Lamme Medal, an outstanding award for scientific and technical achievement, from the American Institute of Electrical Engineers at its annual meeting in Swampscott, Massachusetts, on June 22.

Dr. Zworykin was awarded the medal "for his outstanding contribution to the concept and design of electronic apparatus basic to modern television." The award, established in 1928 through a bequest of Benjamin Garver Lamme, chief engineer of the Westinghouse Electric & Manufacturing Company, was presented by Everett S. Lee, Institute President.

Brig. General David Sarnoff, Chairman of the Board of RCA, in presenting Dr. Zworykin, hailed him as the "scientist extraordinary of this age" and recalled highlights of the host of scientific contributions achieved by the medalist since his arrival in this country 30 years ago.

"His great love was television," General Sarnoff said, "and he worked tirelessly toward the goal of an all-electronic system that would some day prove to be the world's greatest means of mass communication, education and entertainment. His first achievement was development of the basic principles of the now famous iconoscope tube. Then he began working on an over-all system incorporating this new electronic 'eye.' To achieve this he also developed the kinescope, or television picture tube, for the receiver."

With the development of these tubes, the television tide turned from the mechanical to the electronic system. General Sarnoff pointed out, "... In 1929 he demonstrated all-electronic television publicly for the first time, proving that it was far superior to the old mechanical system with its motor and revolving disc. Scanning was

done electronically and the picture was reproduced electronically."

General Sarnoff cited other developments to which Dr. Zworykin has lent his great talents: secondary emission multipliers, image tubes, the electron microscope, and a universal electronic computer, which may open the door to weather prediction and control beyond anything yet achieved.

"It is recorded that during World War II, Dr. Zworykin performed outstanding service as a member of the Scientific Advisory Board to the Commanding General of the United States Army Air Force, the Ordnance Advisory Committee on Guided Missiles, and three important sub-committees of the National Defense Research Committee," General Sarnoff said.

## *Received Presidential Certificate*

"In the course of his war work, he directed research resulting in the development of fire control, television guided missiles, infrared image tubes for Sniperscopes and Snooperscopes, and storage tubes. He received the Presidential Certificate of Merit in recognition of his distinguished achievements during the war."

In accepting the medal, Dr. Zworykin said that the rise of the scientist in public esteem presented an opportunity for the reexamination of the engineer, not only as a contributor to our standard of living but to the progress of science itself.

"The man in the street becomes conscious of scientific advances only as the engineer translates them into an instrument, a manufacturing process, or a machine," Dr. Zworykin stated. "The strategic importance of the engineer in making products of scientific discovery available to the public becomes evident when, for prolonged periods, a scientific discovery remains dormant because engineering talent is not applied to its utilization."

Pointing out that we ordinarily



DR. V. K. ZWORYKIN

think of engineering development following scientific discovery, Dr. Zworykin declared that, "At the moment we are more interested in the fact that engineering progress uniformly promotes scientific discovery by giving the scientist tools of increasing effectiveness.

"The present development of nuclear science appears inconceivable without the assistance received from the electronic industry in the form of high-power oscillator tubes and control equipment of all kinds. The same applies to the study of cosmic rays, the research into the nature of the electron through the study of atomic resonances, and almost every other problem in the forefront of present-day scientific interest."

Reviewing the development of television, the scientist said that its growth appears to be limited only by the space in the frequency spectrum, adding:

"There are, however, many applications of television which are not so limited. If the transmission is by cable or along sharply defined radio beams, the problem of interference, and hence of frequency allocation, vanishes. As a matter of convenience, it has become customary to refer to television applications satisfying this condition as 'industrial television.' Special compact cameras and receiving units

*(Continued on page 32)*



DR. IRVING WOLFF, DIRECTOR OF THE RADIO TUBE RESEARCH LABORATORY, RCA LABORATORIES, RECEIVES THE DISTINGUISHED PUBLIC SERVICE AWARD FROM REAR ADMIRAL C. D. WHEELOCK, FOR HIS WORK IN ELECTRONICS AND RADAR.

## Navy Honors Dr. Wolff

*Director of Radio Tube Research Laboratories at Princeton Receives Distinguished Public Service Award for Achievements in Electronics and Radar*

**I**N CEREMONIES at Princeton, N. J., on May 24, Dr. Irving Wolff, director of the Radio Tube Research Laboratory of RCA Laboratories, received the "Distinguished Public Service Award" of the Navy Department, in recognition of his achievements in electronics and radar.

The award, which included a certificate signed by Secretary of the Navy, John L. Sullivan, was presented by Rear Admiral C. D. Wheelock, U.S.N., Deputy Chief of the Bureau of Ships. It is the highest honor bestowed on a civilian by the Navy.

Such recognition is given only to individual citizens, not in Navy employ, who "have contributed measurably in scientific or manufacturing fields to the success of the Navy's policies and programs," the Secretary's office stated. In ad-

dition, the recipient must have rendered outstanding service over and above that normally expected of him and not required by his job or the terms of his contract.

### *Aided Navy's Effectiveness*

"Dr. Wolff contributed immeasurably to the effectiveness of the operation of the Navy during the late war, and the interim period since then," the Navy spokesman declared. "His achievements and accomplishments covered the field of electronics in general, but more particularly that of radar.

"In 1932, while in the employ of the Radio Corporation of America, he conducted research in microwave transmission and reception. Using equipment developed as a result of this research, he demonstrated the ability to detect radar signals reflected from gas tanks

and small ships about a half-mile distant. Shortly thereafter, he developed a means of timing these signals, whereby distance to the reflecting object could be measured. This was one of the fundamental contributions to modern day radar."

Later Dr. Wolff and his associates developed airborne radar equipment to prevent collisions and high-altitude precision radar for altitude determination, it was pointed out. The radio altimeters used by the United States and her Allies were developed by Dr. Wolff's group.

"Had he been content to do only what was expected of him," the Navy statement said, "the Navy and other Armed Services would have been deprived of equipment that proved invaluable in the successful prosecution of the war and increasing the safety of air and sea navigation since the cessation of hostilities."

Dr. Wolff received the B. S. degree in physics from Dartmouth College in 1916 and a Ph.D. degree in the same subject from Cornell University in 1923. He was an instructor in physics at Iowa State College in 1919 and at Cornell from 1920 to 1923, where he was a Heckscher Research Fellow in 1924.

He joined RCA in 1924 as a member of the Technical and Test Department and from 1930 to 1941 was with the Research Division of the RCA Manufacturing Company, Camden, N. J. In the latter year, he joined the staff of RCA Laboratories. He has specialized in problems in microwaves, sonar, radar and aviation.

Dr. Wolff is a fellow of the Acoustical Society of America, the Institute of Radio Engineers and the American Association for the Advancement of Science; and a member of the Physical Society and Sigma Xi.

# RCA TO OPEN NEW TV PLANT

**E**XTENSION of television receiver production to a third plant of the RCA Victor Division was begun early last month with the installation of new equipment and conversion of other facilities at the Division's Bloomington, Indiana, factory.

To help meet increasing demand for RCA Victor's television receivers, approximately one-third of the 226,000 square feet of manufacturing space in the modern one-story Bloomington plant will be initially devoted to TV set production. This extension supplements present operations in Camden and Indianapolis, with provisions for later expansion of the Bloomington space as required.

Production lines are scheduled to start in August, and are expected

to reach full output by September. The entire operation will be automatic, with conveyors used to facilitate materials handling. Use of a special arrangement for adjusting the height of conveyor lines will permit interchangeable production of table-model, console, and console instruments.

"This extension of television production, involving facilities valued at more than half a million dollars," said H. G. Baker, general manager of the Home Instrument Department, "is a reaffirmation of RCA Victor's faith in the continuing growth and stability of the television industry."

In addition to television receivers, the Bloomington factory will manufacture all of the intricate television tuners or station-selector

switches required for both its own production and that of its companion plant at Indianapolis. It will also continue to produce the company's full line of table-model, portable, and personal radios, as well as all RCA Victor radio chassis for radio-television combinations.

Inauguration of television operations at Bloomington will raise to four the number of RCA Victor plants assigned to various phases of television production in Indiana. The others are the Company's largest television receiver factory, at Indianapolis; a cabinet factory at Monticello, and the new television picture tube factory now under construction at Marion.

The Bloomington plant will remain under the management of T. S. Weeks, who will supervise television production in addition to continuing his supervision of radio production.

## RCA Institutes Graduation

*(Continued from page 23)*

can perfect a wrist-watch radio, and eventually a miniature television set!"

As some other examples of outstanding developments in electronics undreamed of only a few years ago, General Sarnoff mentioned the RCA Ultrafax system which is capable of transmitting a million words a minute; Teleran, a combination of television and radar, of vast importance in air navigation and traffic control; radio-controlled planes and electronic maritime navigation aids; and the electron microscope which can peer deeply into submicroscopic realms.

"A serious error that must be avoided when considering the heights of achievement reached in electronics," declared General Sarnoff, "is to think that everything has been done. The radio-electronic developments I have mentioned here are but an index to the opportunities that exist.

"Progress calls for not only research scientists and experimenters, development and design engineers, but also for operators and technical repairmen, mechanics and testers. Each field offers chances for ad-

vancement, and it is encouraging to realize that from each branch of radio-electronics new trails will be blazed. Therefore, it behooves you to select that field which appeals most to you and to follow it with all the talent, initiative, eagerness, and hard work that you can muster.

"Let me repeat: The most important factor to keep in mind is to continue your education. Science and industry will reward you for your talents and energy. Out of your efforts may come inventions, new products, processes and services. Through your achievement, I hope that you will find success and happiness—enhanced by the knowledge that you are contributing to progress for the benefit of this Nation and its people. There is everything good yet to be accomplished in our lives and in our work. What man has done, man can do better. May each one of you be that man."

### Canadian Doctors Watch Surgery by Television

Television as a medium of medical and surgery instruction was demonstrated for the first time in Canada by RCA Victor during the

national convention of the Canadian Medical Association, held in Saskatoon on June 13-15.

Television equipment worth \$100,000, including two cameras, control apparatus and a transmitter were installed at the Saskatoon General Hospital where the surgical operations were televised. The programs, broadcast for an hour each day, were sent 1 1/4 miles by microwave radio relay from the hospital to convention headquarters where they were viewed on twelve 10-inch and 16-inch RCA Victor television receivers. In addition, 6- x 8-foot pictures of the operations were shown on an RCA television projection unit installed at the hotel.

Arrangements for the demonstration were made in cooperation with the E. R. Squibb & Sons International Corporation.

### NBC Extends TV Net

Five television stations have been added to NBC's rapidly expanding TV network, bringing the chain's total television outlets to 45. The new stations are WKY-TV, Oklahoma City; WBRC-TV, Birmingham; WBTV, Charlotte; WOW-TV, Omaha, and WMBR-TV, Jacksonville.

# TELEVISION IN INDUSTRY

## *Use of Video Equipment in Commercial Fields May Exceed Scope of TV in Homes, Watts Tells Milwaukee Engineers*

USE of television in industry may develop into a service broader in scope than that of video programming for the public, greater even than those that might be encompassed by the widest sweeps of imagination conjured up by science fiction writers. This prospect was outlined recently by W. W. Watts, vice president in charge of the RCA Engineering Products Department, in an address to the Engineers Society of Milwaukee.

Speaking on the subject, "Television's New Directions", Mr. Watts described some of the applications of television to industry which are now being explored. He mentioned particularly the use of fixed-focus cameras in laboratories and at critical points in production lines to facilitate inspection of materials and observation of processes and gauges in locations where explosive materials, dangerous gases, extreme temperatures, or difficult access make it impracticable to station a human observer. Other uses he envisaged included the probable uses of television in traffic safety, the guarding the asylum and prison corridors, retailing, teaching, graphic communication, and the theatre.

Outlining a system to detect fouls in horse racing, he described how six television cameras mounted around the track could provide stewards with a head-on view of the entire race on television screens, especially those portions of the course that are difficult to see from the judges' stand.

In the field of education, he added that television has proved to be a particularly brilliant and useful servant of society. He told of the numerous applications of television to medical and surgical teaching which have been found, and of the explorations conducted in schools through the cooperation of stations, school officials and manufacturers. He explained how television can look down the eye-piece of microscopes and throw the images on large screens before class-

rooms; how manufacturing methods in fields ranging from heavy engineering to watchmaking can be taught to large groups quickly, and how the best of facilities and faculties can be made available simultaneously to all students in an area by broadcast or direct-wire television service.

New applications of television, he said, are "an inviting frontier for creative engineering, and a source of prestige, fortunes, and opportunities to render service to the world."

## Zworykin Receives Medal For Work in Television

*(Continued from page 29)*

are being built for such purposes."

Potential applications of "industrial television" cited by Dr. Zworykin included: observation of machines or gauges in inaccessible places; monitoring of dangerous operations from a distance; telecasting of important meetings for press coverage or overflow audience; presentation of fashions or other merchandise on television receivers in stores, and in hospitals for observation of operations, surveillance of patients and entertainment of patients.

"The greatest benefits can only be achieved through the intimate interplay of fundamental science and engineering," Dr. Zworykin concluded. "As long as both fields of endeavor are adequately staffed and exchange information freely, we need not fear for the material progress of our civilization."

The Lamme Medal is the latest in a long series of awards and honors bestowed on Dr. Zworykin. These include: The Morris Liebmann Memorial Prize of the Institute of Radio Engineers, the Benjamin Count Rumford Medal of the Boston Academy of Arts and Sciences, the Howard N. Potts Medal

of The Franklin Institute, the Rumford Medal of the American Academy of Arts and Sciences, the Gold Medal of the Poor Richard Club, the annual award of the Television Broadcasters Association and the Cross of the Chevalier of the French Legion of Honor.

A graduate of the Institute of Technology, St. Petersburg, he received the Doctor of Philosophy degree from the University of Pittsburgh in 1926. Brooklyn Polytechnic Institute has conferred upon him the honorary degree of Doctor of Science.

In addition to being a Fellow of the A. I. E. E., Dr. Zworykin is a member of the Institute of Radio Engineers, the American Physical Society, the American Association for the Advancement of Science, The Franklin Institute, Electron Microscope Society of America, Sigma Xi, the National Academy of Sciences, the American Academy of Arts and Sciences, and the French Academy of Science.

## NBC Grants 5 Fellowships To Summer Radio Institutes

Nine ministers, directors of religious education, and laymen in religious radio have been granted fellowships to the NBC Summer Radio Institutes by the National Broadcasting Company and the Protestant Radio Commission, it was announced recently by Sterling W. Fisher, manager of NBC's Public Affairs and Education Department.

The awards were made to those who are currently planning and providing radio programs on sustaining time for state and city federations of churches, and ministerial associations of other interdenominational agencies. Each fellowship carries a stipend of \$150, which will cover tuition and a portion of the recipient's traveling expenses.

The Summer Radio Institutes are conducted by NBC in cooperation with Northwestern University, University of California at Los Angeles and Stanford University.

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# RADIO AGE

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OCTOBER

1949

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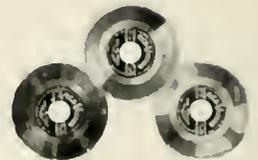
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RESEARCH • MANUFACTURING • COMMUNICATIONS • BROADCASTING • TELEVISION



OVER

irect-view picture re-  
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electronic completely  
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October 1949

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(A complete index of articles which have appeared in Radio Age from Volume 1 through Volume 8 is included with this issue.)

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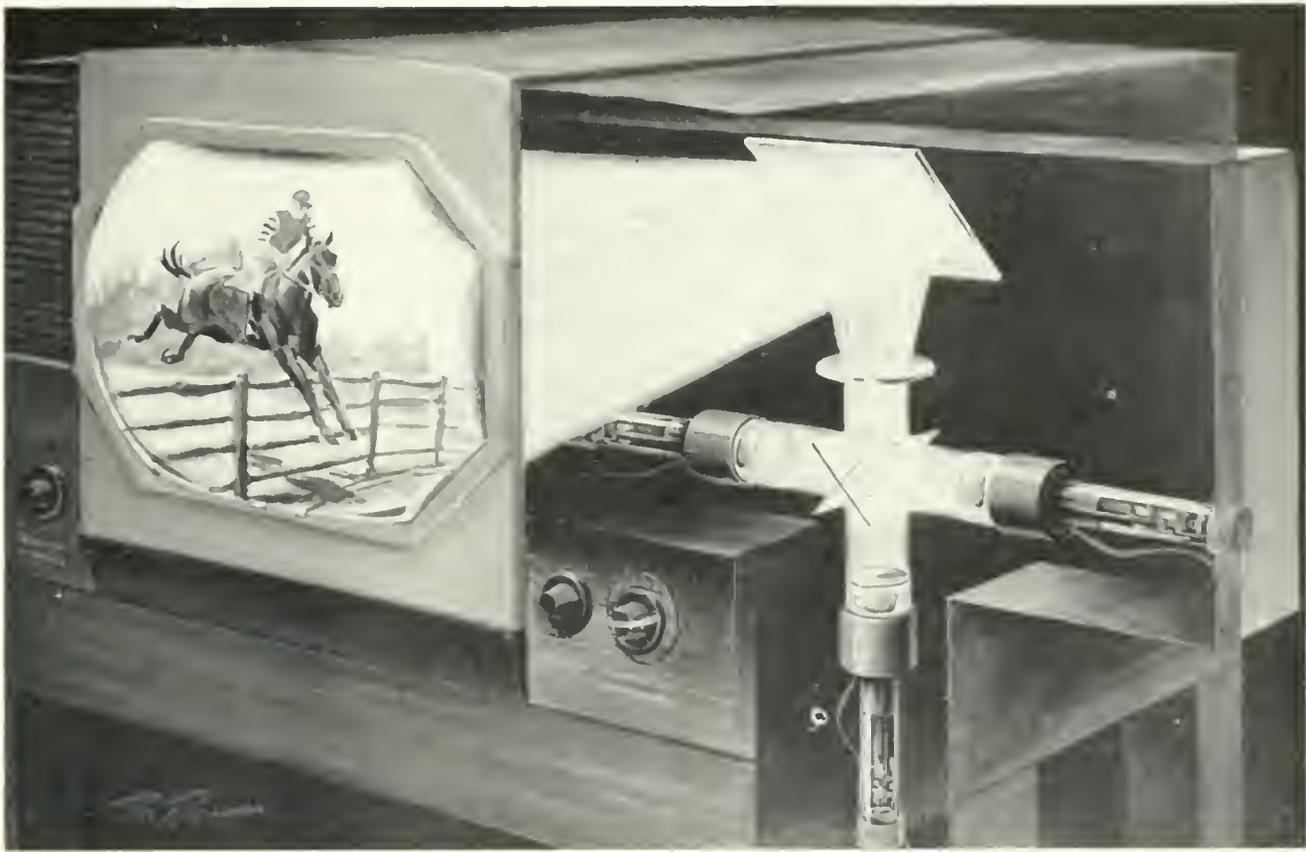
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COLOR CONVERTER USING SMALL PROJECTION KINESCOPIES AND REFRACTIVE OPTICS.

# New RCA Color Television System

*First Public Demonstration of Field Test Broadcast in Washington, D.C., Shows All-Electronic, High-Definition and Completely Compatible Color System Which Can Supplement Black-and-White Service Without Disturbing Present Sets.*

THE first scheduled program of color television broadcasts—a part of the Radio Corporation of America's field tests—was presented by RCA in Washington, D.C., on October 10 to demonstrate to the Federal Communications Commission and to the public the new RCA all-electronic, high-definition and completely compatible color television system.

The initial demonstration was presented for the official record of the FCC in its current hearings relating to the adoption of technical standards for color television service. This demonstration and sub-

sequent color transmissions, originating at the National Broadcasting Company's WNBW studios at the Wardman Park Hotel, provided an opportunity for representatives of the Government, the press, science, industry and the public to observe the color system which RCA believes to be the best foundation for satisfactory standards.

Continuing demonstrations are planned to show how this system can be the basis for the establishment of a color television service without obsoleting present black-and-white sets.

The demonstration program fea-

tured variety artists, radio and television stars, color motion pictures and color slides, all scanned by color cameras to demonstrate the effectiveness of the new RCA system in transmitting and receiving scenes and action in natural colors for the added enjoyment of the public.

A special entertainment program presented some of America's favorite entertainers, seen for the first time in color television. NBC television favorites Kukla, Fran and Ollie of television's top puppet show introduced other stars including Gladys Swarthout of the Metro-



LEFT: RCA COLOR CAMERAS OPERATING IN STUDIO OF WNBW, WASHINGTON, D.C. BELOW: NEW COLOR TELEVISION CAMERA WITH COVER REMOVED SHOWING DICHOIC MIRRORS (IN FRONT) AND SOME OF THE CAMERA'S ELECTRONIC CONTROLS.



politan Opera who sang the "Habanera" from Carmen, juggler Rudy Cardenas and the dance team of Fred and Susan Barry, Dickinson Eastham, understudy to the "South Pacific" star Ezio Pinza sang "Some Enchanted Evening" with Miss Swarthout. The commercial possibilities of color television were demonstrated by Sid Stone, the popular "pitch man" of Milton Berle's Texaco Star Theatre. A 19-piece NBC orchestra under Norman Cloutier provided accompaniment for the talented stars as they appeared in brightly colored costumes characteristic of their roles.

#### *Objective of RCA*

Speaking for the record, Dr. Elmer W. Engstrom, Vice President in Charge of Research, RCA Laboratories, declared: "RCA has believed from the beginning that television should progress from black-and-white to color just as soon as this was practical. Believing this, RCA has aggressively worked upon all promising systems of color

television and has earnestly directed its efforts to this end.

"RCA has believed that color television, when established, should be based upon a lasting foundation of proper standards, excellent performance, and should be developed in an orderly manner with regard to the black-and-white television service.

"RCA is pleased that its experimental work and engineering analysis provide the basis, and this we may now state with conviction, for high-definition color television with in six-megacycle VHF and UHF channels and compatible with the present black-and-white service.

"This system for the first time enables color television in 6-mc to proceed upon a lasting foundation of proper standards, excellent performance and complete compatibility with existing receivers."

#### *Importance of Compatibility*

Dr. Engstrom pointed out that the RCA color television system is a compatible system. This means, he explained, that present television

receivers can receive color programs in black-and-white without any modification. Also, when a broadcaster shifts from black-and-white transmission to color transmission, the viewer of an existing black-and-white receiver is unaware of the shift. On the other hand, a viewer of a new color set, receiving programs in color, will, when the broadcaster changes from color to black-and-white transmission, see black-and-white pictures without making any changes in his receiver.

"The question of compatibility is of great importance not only to the present owner of a black-and-white receiver, but may very well be fundamental to the economics of a color television broadcasting service," said Dr. Engstrom. "In considering the public interest, it is necessary to take into account these economic factors, because the public cannot be served unless the broadcasters are able to render a commercial service.

"With a compatible system a broadcaster first starting color

schedules is automatically assured that he will retain his full potential audience on all the receivers in his service area, both black-and-white receivers and new color receivers. The economics of the television broadcasting industry appear to be such that regular color broadcasting service might be seriously delayed if the broadcaster must sacrifice circulation, and therefore revenue, in order to provide color transmissions.

"With a fully compatible system, however, the broadcaster can change at will, either from color to black-and-white or the reverse, without disturbing the viewers of either the existing receivers or color receivers, and without requiring adjustments to either type of receiver. This means no loss of audience at the start or later, which will no doubt be an important factor for some time, because it is probable that many programs will be transmitted in black-and-white even when color becomes an established service."

With appropriate production design, Dr. Engstrom declared, RCA believes that new color receivers of reasonable cost, practical to install, and simple to operate can be made available by the radio industry. He pointed out that economies and price reductions have been achieved in black-and-white sets and similarly it may be expected that economies and price reductions will be experienced in color receivers as demand and quantity production develop.

#### *Adapting Sets to Receive Color*

Existing black-and-white television receivers may be converted to receive color pictures by various methods in the RCA color system, Dr. Engstrom said. He described these methods as follows:

1. By using a separate converter unit containing appropriate electronic gear and picture tube viewing arrangement of a ten-inch diameter size.
2. By substituting a new projection unit for the cathode ray tube in the black-and-white set.
3. By adding one tube to the cathode ray tube in the black-and-white set and changing the three-color signal to a two-color signal

to be viewed on the two-cathode-ray-tube combination.

#### *Scope for Future Improvement*

"In a medium of such tremendous social and economic impact as color television," continued Dr. Engstrom, "RCA believes that it is vitally important that the system adopted be based upon such principles that its future improvement is unhampered. The RCA color television system provides this scope and flexibility.

"It is the belief of RCA that this new system provides for the first time a sound basis for bringing color television service to the public, as well as full scope for the continuing development of color as the art progresses, without involving obsolescence of present-day black-and-white receivers. RCA color is a complete departure from mechanical color and the rotating color discs and moving parts which have characterized all the mechanical color systems invented since 1925."

#### *Equipment Used in Demonstrations*

Dr. Engstrom said that the RCA color television equipment used in the demonstrations before the FCC and others was developed at RCA

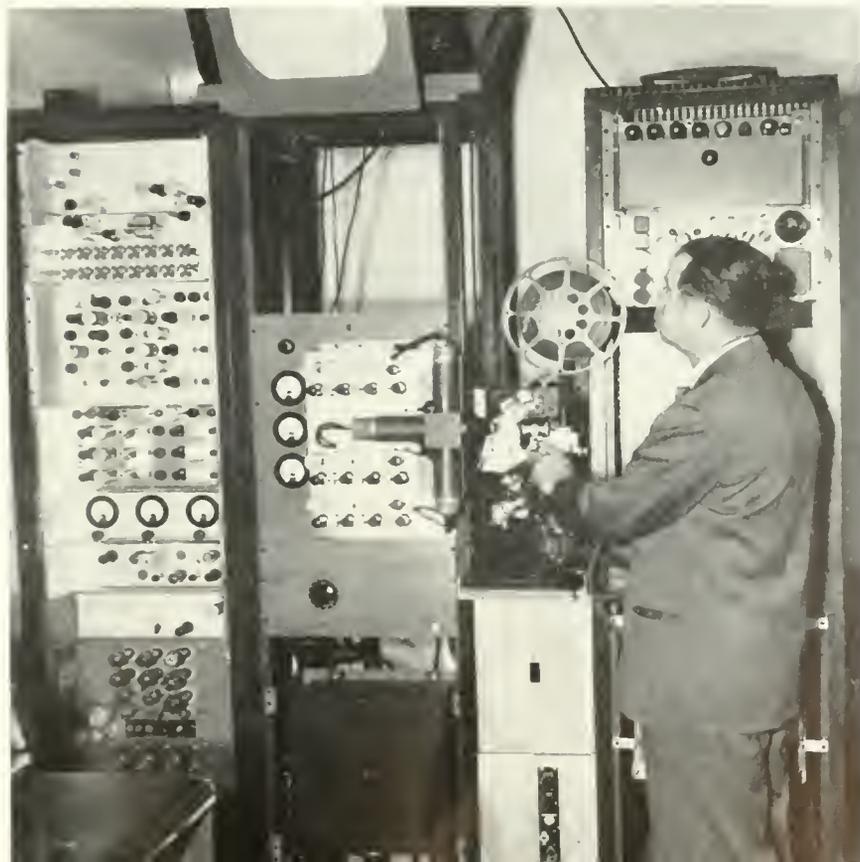
Laboratories, Princeton, New Jersey. It consisted of two cameras for live subjects in the studio, one camera for color motion picture film, and one camera for color slides. There were two color monitors and a control-room console. Color pick-ups also were viewed in the studio on a specially-built receiving unit, designed with 16-inch tubes.

This studio equipment not only provides ample flexibility for current operations, but has the necessary elements for conducting the continuing color broadcasts planned by RCA.

The WNBW transmitter used in the demonstrations operated on Channel 4 of the assigned standard black-and-white television band.

Color receivers and black-and-white receivers for the demonstrations were installed at the Washington Hotel, two miles from the transmitter. Since the RCA color system is compatible, RCA engineers pointed out that the transmissions in color did not interfere in any way with the regular black-and-white service of WNBW. In fact, any owner of a standard television receiver in Washington and surrounding areas was able to view

THE 16-MM. COLOR MOTION PICTURE PROJECTOR WHICH IS ONE OF THE UNITS OF THE RCA COLOR TELEVISION SYSTEM AND, AT LEFT, THE ELECTRON SAMPLER WHICH TAKES 3,800,000 SAMPLES OF EACH COLOR A SECOND.





STUDIO CONTROL UNITS OF NEW RCA ALL-ELECTRONIC, HIGH-DEFINITION COMPATIBLE COLOR TELEVISION SYSTEM AS INSTALLED AT NBC STATION WNBW IN WASHINGTON. RAY D. KELL, HEAD OF THE TELEVISION SECTION, RCA LABORATORIES, IS OPERATING THE MONOCHROME MONITOR.

the demonstrations in black-and-white with full detail.

#### *New Field-Type Color Camera*

An increasing number of color receivers is to be made available by RCA for field testing to obtain technical data, service experience and user comment and reaction, Dr. Engstrom reported. He also reported that RCA has started development of a field type color camera and associated apparatus. This is expected to be ready next spring and will then be added to the field test set-up. This field camera will use a new camera tube which will greatly reduce the size of the camera itself. A mock-up of this camera and an operating sample of the camera tube were displayed during the demonstration.

#### *How the RCA Color System Works*

Briefly, as Dr. Engstrom explained, this is what happens when

the RCA color television system goes into action:

The color camera in the studio is equipped with three separate tubes. Each of these pick-up tubes, equipped with an appropriate color filter, receives one—and only one—of the primary colors, which in television are *red*, *blue* and *green*. In transmitting a color picture, these colors are electronically “sampled” in rapid sequence and combined. The combination is then transmitted as a unit over a standard television transmitter.

At the receiving end, the single television signal is fed to an electronic arrangement which is the inverse of the sampler at the pick-up. The combination is separated and a signal representing each color goes to a tube in the receiver which reproduces a picture in that particular color. The three separate colors are then viewed simul-

taneously as a single, complete color picture.

One of the fundamental characteristics of the RCA system is the application of “time multiplex transmission,” which has been adopted and applied to television from the art of radio telegraphy. Other innovations are the “electronic sampler” and “picture dot interlacing.”

The electronic sampler, which is described as a new and outstanding engineering development, functions with microsecond precision in sampling the colors. From the sampler the signals, representing the three primary colors, are fed to an electronic combining device. Standard synchronizing signals from the synchronizing generator are also applied at this point, and the principle of “mixed high frequencies” is also utilized.

Each color is sampled 3,800,000 times a second—for the three colors

a total of 11,400,000 samples a second. The green signal is sampled and less than 9 hundred-millionths of a second later the red is sampled, and then the blue. This means that the signals of each color are transmitted at an approximate rate of one every four millionths of a second. When viewed on the screen of a receiver the recurrence of the signal is so rapid that the color appears to be constant—giving a high quality picture without flicker or color breakup.

The three color signals from the camera are combined in an "electronic adder" and then are passed through a band-pass filter. The output of this filter contains frequencies between 2 and 4 megacycles, with contributions from each of the three color channels. The signal at the output of the band-pass filter is known as "the mixed-highs signals." These mixed-high frequencies are fed to an "adder", which is already receiving signals from the sampler and from the synchronizing generator. The composite signal which comes out of a smoothing filter is applied to the modulator of the transmitter.

"We have demonstrated," continued Dr. Engstrom, "that the

mixed-highs procedure is successful and satisfactory in a wideband simultaneous system. In the RCA color television system the sampling process by itself is sufficient to carry high frequency components of each color signal so that when combined the resulting band width is below 4 megacycles (the sampling frequency determines the highest frequency which will be passed). However, the choice has been made to sample for the lower half of the video band (up to 2 megacycles) and to use the mixed-highs principle for the upper half of the video band, because this has technical advantages.

"The radio-frequency circuits, the picture intermediate-frequency amplifiers, the second detector, the sound intermediate-frequency amplifiers, the discriminator, and the audio circuits are identical with those of a conventional black-and-white receiver. The composite video and synchronizing signals from the second detector enter an electronic device called the 'sync separator,' which removes the video and sends the synchronizing pulses to the deflection circuits and to the sampling pulse generator. The sampling pulse generator utilizes the trailing edge of the horizontal synchronizing

pulse to actuate the receiver sampler in synchronism with the transmitter sampler.

"The signal from the second detector also enters the sampler. It is a composite signal. An electronic commutator samples the composite signal every 0.0877 microsecond, producing short pulses. The amplitude of each of these pulses is determined by the amplitude of the composite wave at that particular instant.

"The commutator feeds these pulses into three separate video amplifiers which in turn control three cathode-ray tubes or kinescopes having appropriate color-producing phosphors. This method for portraying the single color picture with three kinescopes in a projection system is similar to that which RCA has previously demonstrated to the Commission."

Dr. Engstrom summed up the characteristics of the new RCA color system as follows: (1) 6 megacycle channel; (2) Fully compatible; (3) 525 lines; (4) 60 fields per second; (5) Field interlaced; (6) Picture dot interlaced; (7) 15 color pictures per second; (8) Time multiplex transmission; (9) All-electronic.

STUDIO CONTROL CONSOLE OF THE RCA COLOR TELEVISION SYSTEM.



LEFT: TWO CONES CLAMPED TOGETHER AT THEIR OUTER EDGES FORM ONE SILENCING UNIT. BELOW: INSTALLATION OF "CONES OF SILENCE" IN THIS CARPENTER SHOP REDUCED NOISE BY SIXTY PERCENT.



## Cones of Silence

*Inexpensive Sound-Absorbers, Developed at RCA Laboratories,  
Prove Effective in Solving Extremely Difficult  
Acoustical Problems*

**N**OISE, the arch-enemy of man's well-being and efficiency, can be converted into heat and dissipated by an ingenious functional sound absorber developed at RCA Laboratories, Princeton, N. J.

These units, sometimes called "cones of silence", were developed by Dr. Harry F. Olson, director of the Acoustical Laboratory, to solve special noise problems in the Laboratories. More recently they have been made available to industry by a leading manufacturer of building materials.

Each absorbing unit consists of two 14-inch cones, made of pressed wood pulp. The cones are fastened together base-to-base by a light steel band, and suspended from wires strung over the area to be sound-proofed.

Whereas most materials used for sound absorption represent a compromise, in that they serve that purpose and also act as a wall or

ceiling covering, the sole objective of the "cones" is to soak up clatter. Since the cones are not designed to do two things at once, their absorption efficiency is twice that of conventional materials.

### *Noise Level Greatly Reduced*

Originally, the Olson devices were developed specifically to alleviate very bad noise conditions in the cabinet shop and drafting room of the Laboratories. In the former, the din created by circular saws, hand saws, hammers, and planers was excessive; in the latter, echoes and reverberations made concentration by personnel difficult. Both rooms have truss roofs, with skylighting and roof ventilation. Acoustical ceilings not only would have been extremely costly, but would have impaired the lighting and ventilation.

Installation of the absorbers reduced the noise level more than

sixty per cent in each room, with a cone suspended at a height of ten feet for every five square feet of space.

In many instances it is not advisable or possible to install sound absorbing materials on ceilings or walls because of cranes, pipes, wiring, and other necessary facilities, etc. The great flexibility of the absorbers permits their use in many such situations and at a reasonable cost. The absorbers are inexpensive and easy to install. In one instance three men, without previous experience, equipped a room having 1,500 square feet of floor space in less than two days.

The absorbers operate on a principle of acoustic resistance, in which the acoustical energy—or noise—is converted into heat energy. This conversion takes place when air is forced through very narrow passages, such as are found in the fuzzy surface of the "cones".

It is believed that functional sound absorbers may undergo considerable improvement, where as conventional materials, under development for 20 years, appear to have reached a point where actual results approach their theoretically possible values.

# Sales of 45 RPM Records Soar

*Folsom Reports 260% Increase in Sales Within Past 90 Days — Three Shifts Work Overtime to Meet Demand for New High-Quality Disks.*

**S**ALES of 45-rpm phonograph records have increased 260 percent since the middle of July and RCA Victor plants are presently unable to keep up with the public demand, Frank M. Folsom, President of the Radio Corporation of America, announced on October 20.

"We are more than delighted with the progress made by the '45' phonograph system since its introduction to the public last April," he added. "I predict with utmost confidence that it is destined to lead the phonograph field both in record players and records. We have included the '45' system which has the simplest and quickest record changer in the world in all of our radio-phonograph consoles.

"In response to the rapidly mounting demand in all sections of the country, RCA Victor has increased its record production facilities, which now are being worked

three shifts daily, with overtime. Demand for the new '45' record players is so great that our deliveries to distributors are running a minimum of two weeks behind orders. The upward trend is certain to continue as more and more music-lovers become acquainted with the quality, as well as the simplicity and economy of the new '45' system.

"Since June, every new RCA Victor recording has been produced on 45 rpm as well as conventional 78 rpm disks. Our catalog of '45' records now numbers more than 1,000 selections and is being expanded as rapidly as possible. It encompasses a full range of recorded music, including symphonic, semi-classical, popular, children's selections, and folk tunes.

"I vigorously declare," said Mr. Folsom, "that the '45' as a system of recorded music is here to stay, and let there be no doubt about it."



YOUTHFUL MUSIC LOVERS FIND THE RCA 45 RPM PHONOGRAPH AN IDEAL ADDITION TO THEIR PLAYROOM. PARENTS ARE IMPRESSED BY THE AUTOMATIC CHANGER AND THE UNBREAKABLE RECORDS.

## NEW SHORT 16-INCH PICTURE TUBE

**A** new 16-inch metal television picture tube, five and a half inches shorter than present kinescopes for 16-inch television sets, has been announced by the Tube Department of the Radio Corporation of America.

The new kinescope, which, for the first time, will utilize an RCA "Filterglass" face plate for greater picture contrast, is expected to make possible more compact chassis and more flexible cabinet design in television receivers that will be available next year.

The new picture tube, designated the RCA-16GP1, will be supplied in very limited quantities to makers of television receivers in December. Appreciable quantities will be available early in 1950, company officials revealed.

Design engineers and television receiver manufacturers were told

of the new tube last May. Later, engineering samples were supplied to television set manufacturers who are RCA Tube Department customers, so that new receiver designs and circuits could be worked out for utilization of the new tube.

Like the first 16-inch metal kinescope, the new television receiver tube has a funnel-shaped metal cone, with a glass face plate sealed to the large end and a tubular glass neck containing the electron gun fused to the smaller end. The new tube, however, is but 17 $\frac{1}{8}$  inches long, which compares to 22 $\frac{1}{2}$  inches for the present 16-inch tube, and 18-inches for the widely used 10-inch television picture tube.

The new kinescope utilizes a wider deflection angle, 70 degrees as compared to about 55 degrees for the present tube, to make pos-

sible its shorter length. Performance characteristics remain essentially the same.

The new RCA "Filterglass" face plate has a special material incorporated in the glass, which greatly increases picture contrast. Lightening of black areas in the television picture by reflected room light is greatly reduced. Contrast is further improved by reduction of reflections within the face plate itself.

As in the present 16-inch kinescope, another outstanding feature of the new tube is the large-area vacuum-tight seal running completely around the front circumference of the tube between the face plate and the metal cone. The metal to-glass sealing technique is also used to bond the neck section of the tube to the metal cone.



THEATRE TELEVISION FIRST CAME INTO PROMINENCE EARLY IN 1949 AT THIS BROOKLYN MOTION PICTURE HOUSE.

## Theatre TV—A New Industry

*Contract Signed by Fabian Theatres Expected to Bring RCA Television to More Than 50 Movie Houses; Pact Regarded as Forerunner of Nationwide Enterprise; Milestones in Video's New Service Recalled.*



By W. W. Watts  
*Vice President in Charge of  
Engineering Products Department,  
RCA Victor Division.*

**T**HEATRE television, a potentially tremendous new industry and a potentially powerful mass medium of entertainment, education, cultural development, and news, was born as a commercial entity this past summer with the signing of a contract between Fabian Theatres and the Radio Corporation of America for the first permanent, commercial installation of instantaneous, theatre-size TV projection equipment.

This installation, for which the first unit of commercial design is

now in production in the RCA plant at Camden, will be made in Fabian's Brooklyn Fox Theatre early in 1950. Termed by S. H. Fabian the "proving ground" of theatre television for his circuit of more than 50 theatres, the pioneer Brooklyn installation is also envisaged by leaders in the television and motion picture industries as the forerunner of a nationwide theatre-television service.

Spyros Skouras, president of the 20th Century-Fox Film Corporation has disclosed plans for the installation of instantaneous TV equipment in more than 20 West Coast theatres. He predicts that theatre television will be established on a national basis within seven years. It is recalled in this connection that it took the "talkies" only five years to displace 22,000 "silent" motion picture houses in favor of 15,000 theatres wired for sound. Computing the investment, profit, and employment opportunities in initial equipment requirements alone—on the basis of the nation's approximately 20,000 theatres and the present equipment price of \$25,000 per theatre — the immense economic

significance of the 500 million dollar development is self-evident.

Further indication of the imminence and immensity of the projected new service of theatre television is found in the statement of minimum requirements for frequency channels filed August 30 with the Federal Communications Commission by the Society of Motion Picture Engineers. The SMPE recommended that the FCC set aside approximately 60 channels in the higher part of the spectrum, where they would not interfere with the 54 channels now earmarked for home television service. This number of channels, said the SMPE, is needed to provide for a nationwide competitive system in which a large number of program-originators can operate.

### *Broadway in Every Town*

The prospect of a "Broadway in every town" is seen in such a system. Its entertainment possibilities include the telecasting of motion picture or other productions from a central theatre to subscribing suburban theatres throughout a given community or area, the use of inter-

city relays for simultaneous showings of a Hollywood premiere in all parts of the country, or, similarly, the simultaneous TV presentation of a Broadway stage hit in theatres in many metropolitan centers.

"Theatre television," it was asserted in the SMPE statement, "will endeavor to offer material paralleling in a general fashion that presented by the legitimate theatre, radio, and motion pictures, but adding the important element of immediacy."

Social values of the proposed system were also cited by the motion picture engineers. "In times of emergency," the statement pointed out, "the motion picture industry . . . has been exploited for purposes of public morale and governmental information essential to our national welfare and economy. A nationwide theatre television system will be able to render a similar service of even greater effectiveness because of its instantaneous nature.

"Theatre television . . . presents numerous educational as well as entertainment possibilities. Events of outstanding historical importance or of great social significance may be viewed in schools, public auditoriums, and theatres at the moment they occur.

"It will afford marked industrial aid to the country by providing employment and personal opportunity to many people."

Conceived during RCA research which began in 1928, theatre television made its first appearance in an experimental form in January, 1930, when the Company presented 60-line images on a 7 $\frac{1}{2}$ - by 10-foot screen at the RKO-58th Street Theatre, in New York City. The low-definition pictures were crude compared to those produced by present-day equipment, but they indicated the possibility of annihilating time in bringing important events to the motion picture screen as they happened.

#### *Substantial Progress Made*

Substantial progress was made in the next decade, and in 1940, RCA achieved 441-line screen images measuring 15 by 20 feet in demonstrations in the New Yorker Theatre, in New York.

Although World War II interrupted commercial development in that same year, RCA's research and engineering on military applications of television led to findings which facilitated speedy improvement of the theatre system when commercial work was resumed.

Much of the intensive development of the past two years was carried out by RCA under separate joint research contracts signed with 20th Century-Fox and Warner Brothers Pictures, Inc., in the summer of 1947. Pursuant to these pacts, the RCA Theatre Equipment Department, under Barton Kreuzer, developed and delivered to each of the two film producing organizations a set of three equipments, all meeting the present 525-line standard of definition. The first was an instantaneous projection system capable of presenting 6- by 8-foot screen images. Next came a similar system projecting images up to 15 by 20 feet in size, with a maximum projection throw of 40 feet. The third was an intermediate film or film storage system, providing for the filming of images from the face of the TV picture tube and subsequent projection of the film images by conventional methods.

#### *Demonstrated at Conventions*

The smaller direct-projection system was successfully demonstrated, with the cooperation of participating film companies, at conventions of the National Association of Broadcasters, in Atlantic City; the Society of Motion Picture Engineers, in New York; and the Theatre Equipment and Supply Manufacturers Association, in Washington. Enthusiastic interest in the possibilities of the project was displayed by industry leaders at each of these demonstrations.

One of the larger instantaneous systems was used by 20th Century-Fox at the Fox Theatre in Philadelphia on June 25, 1948, to present the first inter-city telecast to be viewed by a regular admission-paying theatre audience. On that date, a capacity audience in the theatre watched the Joe Louis-Joe Walcott heavyweight championship bout on a 15- by 20-foot screen as it was taking place in New York's Yankee Stadium, 90 miles away.

When the initial postwar units had been completed, tested, and delivered, RCA proceeded with its research, looking toward the engineering of a much smaller and more flexible unit — one with physical dimensions and design that would be entirely practical for theatre use. This was finally achieved less than a year ago as the outgrowth of an advance in picture tube design.

It requires 80 kilovolts to power the projection-type kinescope used to achieve theatre-size images. Up to a year ago, the smallest tube capable of operating at this high voltage was one with a 12-inch diameter face.

#### *Smaller Tube Developed*

The development of a 7-inch, 80-kilovolt kinescope by the RCA Tube Department in 1948 gave Camden engineers what they needed. Though the reduction in face diameter was only five inches, it permitted the use of a 20-inch spherical mirror and a 15 $\frac{1}{2}$ -inch correcting lens in the optical barrel of the system, in contrast to the 42-inch mirror and 20-inch lens used theretofore. Moreover, the smaller lens, it was found, could be moulded from plastic, instead of being ground slowly and expensively from glass. This in addition to savings in size and cost, achieved a dramatic reduction in the combined weight of these major optical elements from 500 pounds to only 50 pounds.

THEATRE-SIZE TELEVISION IMAGES, 15 BY 20 FEET, CAN BE PROJECTED BY THIS TYPE OF EQUIPMENT.





MOTION PICTURE ENGINEERS WATCH A DEMONSTRATION OF A TEST MODEL OF RCA'S LARGE-SCREEN TELEVISION PROJECTOR.

The smaller, lighter, and less costly system which evolved swiftly from these advances, and which also represented an improvement in image quality, was first seen outside the laboratory by an intent crowd of about 1000 exhibitors, theatre equipment manufacturers, and dealers at the St. Louis convention of the Theatre Equipment and Supply Manufacturers Association in September, 1948.

Half a year later, on April 4, 1949, members of the SMPE and leaders in the theatre and television industries, who were guests of the engineers at a special session of the society's convention in New York's Hotel Statler, saw the impressive outcome of RCA's last major step in the development of a television system for the theatre. They saw bright, steady, well-defined theatre-size images projected from an optical barrel only 30 inches in diameter and 36 inches long, with all auxiliary equipment such as power supplies, amplifiers, and controls housed in separate, relatively small cabinets which could be placed in the projection booth or any suitable remote location in the theatre.

Following this demonstration, the television committees of the SMPE and the Theatre Owners of America held their first joint meeting to consider inter-related problems of the showman and the engineer in this new field and exchange opinions and ideas. Both the TOA and the SMPE, as well as

the Motion Picture Association of America, have since given full support to the advancement of theatre television service.

June 22, 1949, brought the first public demonstration of the final experimental model—the one seen by the engineers at their New York convention—which had now been installed in Fabian's Brooklyn Fox Theatre for the Walcott-Charles championship fight. One result was a cheering audience of regular admission-paying movie-goers and boxing fans that jammed every seat and all allowable standing room an hour before the fight went on the air. Another was the decision of Fabian Theatres to place its order for the pioneer installation.

#### *First Demonstrations in West*

The past month has seen the first West Coast and Midwest demonstrations of the final experimental model, presented by RCA at the conventions of the Theatre Owners of America, in Hollywood, and the Theatre Equipment and Supply Manufacturers, in Chicago.

The remainder of the history of theatre television is as yet unwritten, but the rapid growth of this phase of the video industry seems assured and its general course fairly well defined. It possesses virtually unlimited opportunity for development as a great and unique service to the American public, with equally great potentialities for economic benefits.

## New TV Transmitting Antenna Designed

A NEW super-gain transmitting antenna, developed to meet television requirements for higher power, greater power gain, and directional effects, has been announced by the RCA Engineering Products Department. The initial equipment has been delivered to Station WBNT, Columbus, Ohio, and other units are being built for TV stations in the Midwest, South, and on the West Coast.

The new WBNT antenna consists of a combination of dipoles and screens, each unit measuring 30 by 48 inches and weighing 100 pounds.

The antenna achieves a new flexibility and other performance characteristics through the many possible arrangements of the individual units in the tower-mounted array. Each unit is capable of serving an area extending from the tower in the form of a quarter-circle. By mounting one, two, three, or four dipole and screen combinations on as many sides of the tower, the broadcaster may obtain signal coverage in any direction, or in all directions. To achieve higher power gain, the dipole-screen combinations are stacked above each other on the side of the tower facing in the desired direction. Conversely, units may be omitted or reduced in number on any side of the tower where signal interference with another station might result.

The new units can be tuned for use in both the high and low frequency portions of the VHF television channels. They are also expected to find wide utility as standby television antennas for emergency use, as well as auxiliary units for broadcast stations which wish to increase power gain or eliminate interference with other stations by greater directional control of the signal.

## 46 Stations in TV Network

NBC's television network will number 46 affiliates with the addition of WSAZ-TV, Huntington, W. Va., which begins commercial operations on November 15.



Model 9T270 has a 16-inch picture tube and a large loudspeaker which is mounted under the cabinet top.



The "Anniversary Model" provides a 10-inch picture tube in a cabinet of simulated wood grain and maroon side panels.



Console Model 9TC272 with 16-inch kinescope and inclined front panel for comfortable viewing of television picture.



Doors in Model 9TC275 may be closed to conceal 16-inch tube, controls and loudspeaker.



Console Model 9TC240 is equipped with a 10-inch picture tube and is available in mahogany, walnut and bland finishes

## 1950 Models of RCA Victor Television Receivers



12½-inch Kinescope tube features Model 9T247 which also includes the high-quality "Golden Throat" sound system.



This Chippendale-styled console has a 16-inch picture tube and facilities for AM, FM and short wave reception plus automatic changers for 78 and 45-RPM records.



Smart, modern cabinet design provides an attractive setting for the 12½-inch picture screen of the 9TC245 console.



ANTENNA ERECTED ON THE STERN OF THE "SOUTHERN SEAS" CAN BE ROTATED TO ITS BEST RECEIVING POSITION FROM A MOTOR CONTROL BOX ATOP THE TELEVISION RECEIVER IN THE CABIN.

## Television Afloat

*Servicemen Overcome Obstacles in Installation on Private Yacht and Provide Images Equal to Best on Home Receivers*

AFTER installing almost two million television receivers in American homes, servicemen are convinced that they have encountered about every conceivable obstacle, most of which they have successfully overcome, but three technicians from RCA's service branch at Franklin Square on Long Island, New York learned recently that a TV installation on a ship presents problems never faced ashore. Yet by drawing on their ingenuity and skill they carried out the difficult assignment to the complete satisfaction of the customer.

As a result of their efforts, a 16-inch RCA Victor receiver aboard the 135-foot yacht *Southern Seas* now cruising somewhere on the coastal waters of the United States, is providing owner Clifford J. Mooers and his guests with tele-

vision programs whenever they are broadcast from cities near the yacht's route.

To the uninitiated it might seem that setting up television on a ship would present few unusual difficulties, but the three technicians—Bert Schroeder, Edward Beck and Geoffrey O'Connell—have a different opinion which they formed the hard way, by experience.

Although the receiver aboard the *Southern Seas* is standard in all respects, practically everything else in the seagoing installation had to be custom-tailored to meet the special conditions.

### *Erected New Mast for Antenna*

The most important item, next to the receiver itself, was the erection of a suitable antenna. Since it was not feasible to place the antenna in

the most obvious place—atop one of the ship's masts—the technicians decided to "step" a new mast to support the signal collector. Accordingly, a 24-foot length of aluminum pipe was fixed in position just inside the stern rail of the *Southern Seas*. Six guy-wires leading from the peak of the mast and from its midpoint to deck cleats hold the pipe rigid.

But a ship's course is changed frequently, a fact that would make the ordinary fixed antenna ineffective at times. To overcome this drawback, the Schroeder-Beck-O'Connell combination attached a motor to the antenna and placed the motor control box on top of the receiver. This permits the user of the set to rotate the antenna into its most advantageous positions while he is tuning the receiver.

### *Protected Against Moisture*

To connect the antenna to the receiver in the main salon a coaxial cable was "snaked" down through the pipe mast, into a conduit under the deck and through the steel bulkhead of the cabin. The two wires for the antenna motor followed the same course. Extreme care was exercised at all points in the run of the wiring to protect the cable and wires against spray and rain. This was done by thoroughly caulking all openings in deck and bulkhead through which the conductors passed.

Normally, this operation would have completed the installation except for plugging the socket of the receiver into a handy power outlet. But this was impossible aboard the yacht. The *Southern Seas* is equipped with a 110-volt direct-current lighting system, while the receiver was designed for alternating current of 117 volts. This meant that some means had to be devised to convert the d.c. into a.c. and increase the available voltage to 117. RCA's technicians specified the method for accomplishing this change but soon discovered that the necessary equipment was in short supply in the electrical market.

Eventually, however, they secured a device called an "inverter" which did the trick.

The inverter was placed in a cabinet directly beneath the receiver and wired into the circuit so that the movement of a single switch turned both receiver and inverter "on" and "off".

When tested on Long Island Sound near Port Washington, the installation drew the approval of television experts. Reception of the six metropolitan stations was uniformly excellent. The picture was steady and completely free from the types of interference that might be created by the craft's electrical devices. As a consequence, the yacht's owner and guests are able to obtain program quality seldom surpassed on standard installations ashore.



SERVICE TECHNICIAN BERT SCHROEDER EXPLAINS OPERATION OF 16-INCH RCA RECEIVER TO CAPTAIN HENDRICKSON OF THE "SOUTHERN SEAS".

## NBC Co-Sponsors UN Project

*Series of Six Network Programs Broadcast to Illustrate Purpose and Importance of United Nations*

SIX weekly documentary programs prepared by outstanding radio personnel from the United States, Great Britain and Canada have featured the fourth annual countrywide United Nations Project, co-sponsored by the National Broadcasting Company and the American Association for the United Nations. Norman Corwin, head of special projects for the UN, supervised the series which was designed to point up world reliance upon the United Nations for peace, welfare and security in the post-war era.

The opening program on September 11, titled "Could Be", was written, directed and produced by Corwin. This full-hour presentation marked the tenth anniversary of the Poland blitz that touched off World War II. The program, a fantasy, depicted the world of the future based on the premise that all nations had combined to blitz the problems of peace.

This offering was followed a week later by "Sometime before Morning", written and directed by Mildard Lampell, writer of many highly acclaimed programs. W. Gibson-

Parker, formerly of the British Broadcasting Corporation and now chief of productions for UN Radio, produced the show. "Sometime before Morning", demonstrated the function of the United Nations in the paramount objective of keeping peace in the world, and interpreted the history of mediation.

The third presentation, "The Biggest Show on Earth", took the radio listener on a whirlwind tour behind little-known scenes of UN activities at Lake Success. It was written, produced and directed by Jerome Lawrence and Robert E. Lee.

On October 2, NBC offered "Junction in Europe", written by Gibson-Parker and directed by Corwin. This program illustrated the accomplishments of the Economic Commission for Europe, one of the least publicized and most important of the many UN agencies.

The fifth program in the series, "Nightmare at Noon", told the story of one man's fight to persuade all nations to outlaw mass killings, starvation and the consequent depletion of entire peoples. The broadcast originated at Toronto, Ont., and was written by Len Peterson and

directed by Andrew Allen, members of the Canadian Broadcasting Corporation staff.

To conclude the project, NBC broadcast "11 Memory Street" on October 16. This half-hour program was written by Allen Sloane and produced by Gerald Kean. It outlined the work of the International Refugee Organization and embodied material recorded on the scene in Europe and broadcast here for the first time.

## NEW RELAY TUBE

A new miniature electron tube which automatically will turn an electrical current on and off an average of 45 million times during its effective life has been announced by the RCA Tube Department.

Uses of the new tube include control of the flashing of animated electrical signs and the intricate light systems of stock market quotation boards. Because the tube, which is a cold cathode, glow discharge type, consumes no standby electrical power and requires no warm-up period, it is especially suited for use in burglar alarms, remote-control devices, and complex automatic business machines. Because of its low cost, small size, and unusual features, it opens up new design possibilities for ingenious electronic toys.

Behind the scenes  
of  
NBC Television  
Programs



**1** Bob Wade (left) and Elwell of NBC's television production staff inspect model sets for a scheduled production.

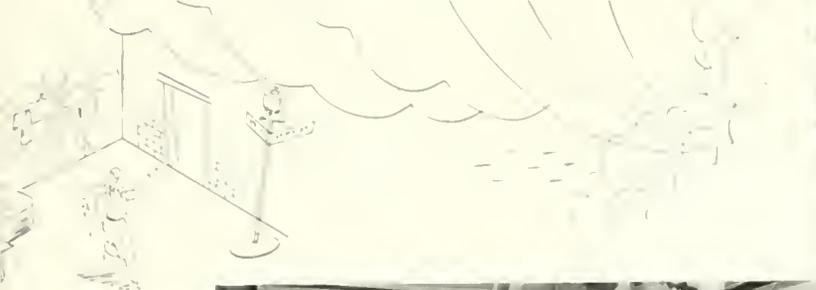


**2** Workmen assemble and point scenery units according to details of the miniature stage settings.



**3** Production tests

**4** Cost members



6 Costume plays often require minute attention to the preparation of wigs and false features to effect facial changes.

5 Experts are always available to assist performers in applying make-up for roles they assume before the camera.

Actors prepare to don costumes for a dress rehearsal.



7 Stage illumination is controlled by a network of cables operated from this lofty gallery above the studio.



Facilities manager Wade operating "moving title" machine.



8 Giving players their cues is one of stage manager's most exciting duties.





COURTYARD OF THE MODERN RCA MANUFACTURING PLANT RECENTLY OPENED NEAR MEXICO CITY.

# Mexican Operations Extended

*Modern Production Lines in RCA's Mexico City Plant Turn Out Ten Types of Export Radios and Many Phonograph Records. Manufacture of New 45-rpm Discs and Players to Begin Soon at Factory in Colonia Cloveria.*

ON the outskirts of Mexico City, RCA's block-long ultra-modern radio and record plant typifies the streamlining of industry which is taking place under the progressive program of the Mexican government. On production lines of the new plant, opened in May, 1948, ten different types of RCA export receivers are being assembled for distribution to cities and hamlets throughout the country. Records of both popular and classical North American melodies are pressed here, and an up-to-the-minute recording studio is available for local artists.

The country's program of industrial modernization has raised the living standards and greatly changed the daily routine of its people. The sombrero-shaded peon, enjoying a leisurely siesta, is no longer the symbol of Mexico. Today, that same Mexican is much more

likely to be seen, very wide-awake, hanging on for dear life as he speeds to work in a modern bus as jam-packed as any New York subway during rush hour. He works a five and a half day week in a plant whose construction and facilities are likely to be as up-to-date as any in the United States.

### *Attractive Working Conditions*

RCA Victor Mexicana, S.A., RCA's associated company south of the border, opened its new two-story structure in Colonia Cloveria, growing industrial center on the northwestern edge of Mexico City. Surrounded by carefully landscaped grounds, the light, airy building which houses general offices, recording studios, factory and warehouse provides the best of working conditions for its 245 employees, 60 of

whom are women. Factory employees work daily from eight to four, and on Saturday from eight to twelve. Office hours are from nine to five on week days and from nine to one on Saturday. Lunch is provided in a cafeteria in the building.

For many years the Company observed the popular siesta custom by closing for two hours during the middle of the day. However, this custom was prohibited in all factories by Government order during the war, and has not been revived. Generally speaking, it is only the professional men of the country who continue the custom and cease work for two and sometimes three hours in the early afternoon.

There is little to distinguish the Mexican industrial worker from his North American counterpart. He works in a fluorescent-lighted office or on a gleaming assembly line.

Only the "reboso", or shawl, worn by some of the girls adds a touch of local color.

The home life of the RCA factory employee reflects a similar blend of North and Latin American influences. Many of the houses are built in typical Spanish style. They stand close against the street, and only when the door is open can one glimpse the attractive, flower-filled patio onto which all rooms open and which is the real center of the home. However, the newer residences have discarded the patio style and seem to vie with each other in having the greatest number of flowers in yards around the houses.

The Mexicans work hard and play hard, too. They are great sports enthusiasts. Bull-fighting is the main attraction, but they are also fond of baseball, jai alai, horse racing, golf, tennis and soccer.

Music has always been an important part of Mexican life. The old custom of giving "gallos" (serenading) to a pretty señorita is still widely practiced. After work hours, the "cantinas" and "pulquerias" are favorite gathering places for refreshment and entertainment.

Music is supplied, sometimes by a jukebox, but more often by a "mariachi". The mariachi, delight of both Mexicans and tourists, is an informal instrumental group consisting of as many as eight pieces — trumpet, bass, accordion and several guitars. Such groups may even be found singing and playing on many of the buses in and around Mexico City.

#### *Home Instruments Are Popular*

Radios and phonographs are widely used to bring both Mexican and North American music into the home. Although Mexico has a population of 24,000,000 people, only one-third of this number falls within the economically active class with earnings of a dollar a day or more. But of this segment, 70 per cent own radios or radiophonograph combinations.

Recordings by such native stars as Pedro Vargas, Jorge Negrete, Maria Luisa Landin, Luis Alaeraz, Fernando Fernandez, Avelina Landin, the Trio Calaveras, and many others, are made in the new "floating" studio of RCA Victor Mexicana, S.A., where special vibration-

free construction and the latest recording equipment combine to give facilities equal to the finest studios in Hollywood and New York. A great many of these recordings are released in the United States and in other Latin American countries. Master recordings of classical and popular music are sent from the United States to Mexicana for local pressing. In fact, American music has become so popular in Latin America that RCA Victor Mexicana recently obtained rights to record Hit Parade tunes as soon as they are announced.

To keep pace with its Northern neighbors the RCA associate company plans to make the new 45-rpm records and phonographs available to the Mexican people. Machinery for pressing and recording discs and manufacturing the record players is on its way to the Mexican capital.

#### *Plant Makes Some Components*

A recent government decree requires assemblers to manufacture at least twenty-five per cent of all parts for radios built in Mexico. As a consequence, RCA Victor Mexicana, which formerly concentrated its operations on the assembly of radio receivers, is now manufacturing some components to comply with the law.

Television eventually will be introduced in Mexico. Due to the high peso exchange rate its development south of the Rio Grande has been delayed, but there is no doubt that when video reaches Mexico it will enjoy the same popularity it now is experiencing in the United States.



SKILLED NATIVE WORKERS ASSEMBLE COMPONENTS OF RADIO RECEIVERS ON A PRODUCTION LINE IN THE MEXICO PLANT OF RCA.



AIR VIEW OF MODERN FACTORY OF RCA VICTOR MEXICANA ON THE OUTSKIRTS OF MEXICO CITY.



NILES TRAMMELL  
*Chairman of the Board of NBC*



JOSEPH H. MCCONNELL  
*President of NBC*

## Changes in NBC Executive Staff

At its regular meeting held on October 7, the Board of Directors of the National Broadcasting Company elected Niles Trammell Chairman of the Board of the National Broadcasting Company, and upon the recommendation of Mr. Trammell elected Joseph H. McConnell President of NBC.

In recommending the change, Mr. Trammell stated: "For some time it has been evident that with the rapid development of television and the changes in radio broadcasting technique, I could better serve the interests of the National Broadcasting Company by being relieved of administrative duties and be able to devote more of my time to client, talent and station relations in both radio and television. In selecting Mr. McConnell to be President of the National Broadcasting Company, I am confident he will contribute materially to the continued success of our operations in the changing era ahead. Mr. McConnell, who is forty-three years of age, has been associated with the operations of RCA for the past twelve years. He has had successful experience in finance, law and business administration. Prior to his election today as President of the National Broadcasting Company, Mr. McConnell was Executive Vice President of RCA and worked closely with NBC in dealing with its expanding business

problems. Mr. McConnell is thoroughly familiar with our operations and personnel and his election, I know, will be enthusiastically applauded within and outside the Company."

General David Sarnoff, in vacating the Chairmanship of NBC in favor of Mr. Trammell, stated: "The step was taken because we agreed with Mr. Trammell's view that expansion of the broadcasting business which the growth of television makes possible, and changing conditions in the industry, required him to be freed from administrative duties so that he can give more of his time to talent, client and station relations and to the major developments of the Company. My interest in NBC continues as heretofore and I remain a member of its Board of Directors."

Niles Trammell has been President of NBC since July, 1940, and has held important executive positions in NBC and RCA for more than twenty-six years. Mr. Trammell joined RCA in San Francisco in April, 1923, and transferred to the National Broadcasting Company in March, 1928, as a Salesman. In May, 1928, he was made Manager and Vice President of the Central Division with Headquarters in Chicago. In December, 1938, he was made Executive Vice President of the Company in New York.

## "Armed Forces" Theme of New NBC TV Programs

THE story of unification of the nation's armed forces, told from the level of the Secretary of Defense down to the lowest-ranking serviceman, will be unfolded in a weekly television series presented by the Department of Defense exclusively over NBC facilities, beginning October 30, at 5:30 p.m., EST. The programs will be titled the "Armed Forces Hour" and will be comparable to the "Army Hour" which NBC broadcast during the war years.

In commenting on the series, Secretary of Defense Louis Johnson said: "As our program for unification of the armed forces proceeds, it is important that the people of the United States understand the increased efficiency and financial economy resulting from this action. Each taxpayer should know that under unification wasteful duplication will be eliminated and he will receive full value for his defense dollar. It is therefore gratifying to me and to all of us in the Department of Defense that the National Broadcasting Company will soon present on television a series of programs called the 'Armed Forces Hour.' By means of these programs, many millions of citizens will be able to see how their defense dollars are being spent. Subjects will range from food and guns and planes to how a small businessman can sell his products to the armed forces.

"Equally important, citizens will be able to see some of our key people in the military establishment at work in their offices or in the field. Information and a sense of personal acquaintance with our defense leaders will be two important benefits. There will be others which will become apparent as unification proceeds toward the creation of a defense team which will assure our country's safety and guarantee a lasting peace.

"I commend the National Broadcasting Company for undertaking to reflect these developments which are so important to our national security."

KANSAS CITY DEALERS CROWD AN AUDITORIUM TO INSPECT LATEST TELEVISION MODELS ON "D-DAY".



## Bringing TV To New Markets

*Extensive Surveys, Planning and Industry Cooperation Important Factors in Staging Successful "T-Day" Operations*



By Henry G. Baker

*General Manager,  
Home Instrument Department,  
RCA Victor Division.*

**T**O folks living in any new television town, television's arrival seems something sudden. Overnight stores seem to blossom out with streamers and banners and electric signs proclaiming that you can now buy RCA Victor television. Articles about television crop up in newspapers. A new type of truck, with ladders and television masts on top, and carrying hundreds of pounds of cable, test equipment and

parts, becomes a familiar street sight. Rooftops sprout television antennas, first a few here and there, then, seemingly in no time at all, some regions fairly bristle with them. Television becomes an increasing part of everyone's conversation as people compare reception and program favorites. Something new has swept over a city spontaneously and captured it by storm.

Yet behind television's advent into each new television market lies many months of planning and the sort of cooperation between dealer, station, distributor, service organization and manufacturer that makes them jointly invincible and inevitably successful.

Before television can make its contribution to the home life of a community, there must be long hours of training in how to display, demonstrate and sell this new service. Before there can be crowds on the sidewalk watching a set in operation in a store window, there must be crews of men plotting the size, nature and time schedule of a market.

Through having participated in the introduction of television into 18 new market areas by mid-summer of this year, the RCA Victor Home Instrument Department has brought the introduction of television into a community to as exact a science as a constantly growing and changing new industry allows.

Surveys of a prospective television market region begin almost as soon as a station application is filed. Transmitter sales organizations, our Sales and Market Research Departments, field salesmen, station managements, our distributors, FCC reports and the trade press are constantly checked and their findings compared. In this way we learn when new stations will go on the air, when commercial broadcasting will begin, and what plans there are for programs in each region. Close and frequent contact is maintained with each station to assure accuracy in these records.

### *Every Market Surveyed*

Every market is carefully surveyed to determine the buying power and preferences of the people there, the area likely to be covered by the television signal, and other factors which will affect its television receiver requirements. Experience in earlier, somewhat comparable markets is invaluable here, frequently revealing facts which might not be known otherwise.

Not the least important of the contributions made to the success of television in a new region is in the supplying of merchandise according to the territory's desire for traditional or modern styling. Buying power, of course, varies with the potential of each locality. Some communities consist predominantly of individual homes, while others have an important percentage of their families living in apartments — situations influencing receiver size requirements. In addition to the standards of quality which are now generally accepted, knowledge

of requirements in finishes, prices, and cabinet and picture sizes is important in giving the manufacturer the competitive advantage necessary to win a given share of the market in each community.

One of RCA's first allies in establishing a fresh market area is the RCA Service Company. Even before the station goes on the air, the Service Company may survey the market, select a location for a branch office and shop, and prepare preliminary estimated contour maps of the region for use in advance planning of service zones and operations. By the time a meeting is held with the dealers of the region to acquaint them with the RCA Victor television receivers, a service branch is invariably installed, staffed with a nucleus of factory-trained technicians and some personnel from the region, equipped with the latest of installation, test and service equipment, and backed by a fleet of distinctively marked service trucks, fully equipped for professional operation.

#### *Distributor is Key Factor*

In conformance with well-established Home Instrument Department policy, the distributor is the key factor in television receiver distribution in each region. Principal efforts of the factory are to counsel and assist him in obtaining the most desirable results in his territory.

Timing of the entrance into a new television market is of primary importance. While an early start may sometimes be forced for competitive reasons, we try to defer the first meeting with dealers until shortly before the station goes on the air. Premature activity allows too much time for enthusiasm to dwindle and serves only to hamper the sale of such other services as radio.

Approximately three months before the station begins to broadcast its test pattern, field sales representatives of the Home Instrument Department meet with the distributor and Service Company representatives to map out plans for the forthcoming all-important introductory meeting. At that time, dealers will be shown the RCA Victor tele-

vision receiver line and given effective sales procedures.

The first meeting of distributors, dealers and manufacturers' representatives in a new market is called Dealer Day or "D" Day, a policy established at the very beginning of postwar television. Later, when the new station has its official opening, RCA Victor advertising in the region begins and sales efforts go into high gear. This is called Television Day or "T" Day.

#### *Sales Machinery is Complex*

The sales machinery set in motion by distributors on "T" Day is as complex as a television chassis. Advance mailing pieces, ranging from "teasers" which awaken interest to tickets of admission for the opening are printed, and mailing lists are compiled. The local distributor prepares large maps showing where he should issue RCA Victor television franchises to get adequate dealer coverage. A spacious room, usually a ballroom in one of the city's principal hotels or clubs, is reserved for the initial receiver presentation. Arrangements are made with a local store to create room settings appropriate to the various television receiver models being displayed and demonstrated.

RCA Victor distributors, in most cases, already have secured the cooperation of the local television station or the RCA Victor Promotion Department to present an actual television program, either broadcast or by direct line, with which to demonstrate the receivers.

When the machinery has been put in readiness, the dealers begin to receive attention-getting mailing

pieces. At first they merely hint that something important to their television futures will soon take place. Subsequent mailings fill in details about the date and location of the meeting, topics to be covered, demonstrations that may be given, and how to secure tickets. By the time the "last-call" invitation is issued, all key dealers of the region have been reached and attendance of their salesmen at the meeting is fairly well assured.

Merchandisers, however, are not the only ones in the community concerned with television, able to benefit from it and to contribute to its success. Many other important elements are invited to attend this first meeting and participate in television's introduction.

State and local political leaders are invited and many an introductory television meeting has been honored by the presence of the governor and the mayor. Other participants may include local bankers, whose organizations may later handle financial papers for dealers; utility executives, whose cooperation can prove invaluable; newspaper publishers and reporters, important to advertising and publicity programs; television station representatives, whose programs help create demand and who benefit from expanded audiences; radio broadcasters, trade paper representatives, and other influential people.

The introductory meeting is a fast-paced, staccato event, with speeches kept short and meaty. Here, the enthusiasm that will carry television to sweeping success is given its start.

*(Continued on page 32)*

ARTISTS COMBINE THEIR TALENTS WITH ENGINEERS TO STAGE A "LIVE" TELEVISION DEMONSTRATION IN A NEW MARKET AREA.



# Training Announcers for Roles in Radio and Television

*Emphasis in Both Media is Now Placed on Showmanship Rather than on Diction and Glibness*



By Patrick J. Kelly

*Manager, Announcing Department  
National Broadcasting Company*

**T**HE qualifications which make a good announcer, namely, voice plus the ability to use it; background; clear thinking; and a combination of personality and showmanship, are as necessary today as they were twenty years ago. When radio was in its infancy, the announcer stood apart, primarily as a model of perfect diction, but as broadcasting formats changed and television appeared on the scene, he gradually stepped down from his pedestal and became an intimate part of the program. Today, his principal qualification is showmanship.

As is true in every profession, time and mechanical advancements have greatly lessened the duties of the "man at the mike". When I joined the NBC announcing staff, in 1929, fifteen men — among them Graham McNamee, Tiny Ruffner, Alwyn Bach, Curt Peterson and Milton Cross — ran two networks. At the time the Red and Blue networks were separated this number had increased to thirty-nine. Today, NBC alone has a staff of twenty-four announcers.

On one occasion, Ed Herlihy and I had to run both the Red and Blue networks single-handed. Five of us were scheduled for duty, but two

of the men were in auto accidents enroute to the studio. A third, Jack Costello, was almost electrocuted by touching a live studio mike with one hand and a short-circuited lamp with the other. Ed and I took Jack to the first aid room, then handled shows on both networks for an hour and a half, until we could procure replacements for the missing men.

### *When Versatility Was Essential*

I can remember the days when we had to write our own copy for sustaining shows, act as producers, and quite frequently improvise when breakdowns occurred. We were delighted if a pickup came through from London or San Francisco, even though we had to listen intently and carry on when the signal "cracked-up" in the middle of the broadcast. Now, of course, each program has its own producer, copy is written by the script department, and mechanical difficulties rarely arise.

Most good announcers have been either actors, singers, or both, before they entered the radio field. My own experience as a singer

and actor proved to be an invaluable microphone asset over the years. In fact, my knowledge of opera and music in general came to my aid the first day I set foot in the NBC offices. Tiny Ruffner, who did the interviewing, asked me to read some news reports and several pages of extremely difficult opera announcements, which I managed to rattle off with the greatest of ease — much to his surprise.

Back in the early days, the announcer had many opportunities to call upon his ability to think quickly and take command of an emergency situation. It wasn't unusual for him to be assigned to introduce a singer on a fifteen-minute broadcast and find that the artist had failed to show up. In that case the announcer usually took out his own music and sang the entire show.

Another example of quick-thinking was illustrated by Ford Bond when he interviewed Lou Gehrig many years ago on the Huskies show. Ford plied the question to Lou: "I expect you to eat a good healthy cereal every morning to keep yourself in tip-top shape?", expecting the star to reply: "Yes, I always eat Huskies." Instead, Lou blurted out: "Yes, I eat a bowl of *Wheaties* every morning." Ford turned pale, but without a pause he ad-libbed: "Yes, Lou, I know you always did, but now I understand you're eating another cereal." Lou caught on and replied once more: "Oh, yes, I made the change be-

THE AUTHOR INSTRUCTS A MEMBER OF NBC'S ANNOUNCERS' CLASS IN THE APPROVED TECHNIQUE OF ADDRESSING A MICROPHONE.





IN THE EARLY DAYS OF RADIO, AN ANNOUNCER WAS FORCED TO USE AN UNWIELDY STUDIO MICROPHONE WHEN ASSIGNED TO REMOTE BROADCASTS.

cause I felt that Huskies were the best in the world!"

Today's announcer must be as great a master of the "ad-lib" as he ever was, but not for the same reasons. In the days when planes taking off for Europe and the docking of big liners made headlines, the special-events announcer was a busy man. On-the-spot coverage was made of happenings which today would rate only a couple of newspaper lines.

At the launching ceremonies of the *S. S. America*, George Putnam, star NBC newscaster-announcer, more than justified his title. A moment after Putnam opened the half-hour broadcast a gust of wind swept his script, containing all statistics on the event, into the river. Undaunted, Putnam, subtly extracted facts, figures and "color" concerning the giant ship from attending notables. Microphone interviews completed, and the ship safely down the ways, he then treated his coast-to-coast audience to a polished ten-minute summary of the proceedings.

Perhaps the longest ad-lib job in NBC announcing history was ex-

ecuted by Charley O'Connor, who was sent out in an airplane to cover the arrival from England of the Mollison plane. When the Mollisons failed to show up O'Connor circled Long Island Sound in the dark for forty-five minutes, telling his audience anything and everything he could think of.

While incidents like these seldom, if ever, occur in the present-day pattern of perfectly-timed and well-prepared broadcasts, our announcers must have clear, level heads and be always on their toes. They never know when the unexpected will happen.

#### *Good Voice Only One Requirement*

A good voice is but one of the many prerequisites which the man who would stand behind the mike must have. His ability to use that voice, give feeling to words, and project his personality into the printed word is what really counts. This ability does not just exist in a man; it is the result of a combination of many factors. The would-be announcer must be alert and versatile; he must have initiative and, most important of all, background. This means poise, an easy, dignified

approach, knowledge of music and languages, familiarity with foreign names, places, titles, blended on a generally broad cultural base.

How background is acquired matters little. The career records of many of our most noted announcers make a colorful list, representative of nearly all walks of life. Graham McNamee was a salesman and concert baritone; Jimmy Wallington, who once aspired to be a minister, studied medicine, geology, literature, and finally sang with the Rochester American Opera Company; Ed Thorgersen tried his hand as a seaman, cowboy, journalist and organist; Alwyn Bach, concert baritone and choral conductor, spent some time in the printing business; Ford Bond, who directed choral groups, was also a newspaper reporter, and George Hicks served as a deckhand, lumberjack and member of the U. S. Diplomatic Service before he entered radio.

Most unusual of all, perhaps, is the career of Kelvin Keech who once taught the Prince of Wales to strum a ukelele. Keech studied voice, graduated as a chemical engineer, entered vaudeville, served in the Signal Corps during World War I, and later led a jazz band around the capitals of Europe. A mingled marine, engineering and stage career preceded my own entrance into broadcasting.

#### *Experience is a Requisite*

When enthusiastic young men come into my office, convinced that they are qualified to be announcers, I try to impress on them the importance of experience and background. In order to give an intelligent performance on any subject, a man must have a liberal arts education in music, art and current events, or equivalent experience. It is also difficult to convince some aspirants that many voices which are pleasing to the ear may sound entirely different coming out of a loudspeaker, since amplification affects both the pitch and timbre of a voice. Although we have had about six different women announcers over the years, their careers were short-lived for the reason that most radio listeners prefer a low speaking voice — even in men.

In my nineteen years as Chief Announcer I have auditioned thousands of men both within and outside the NBC organization. Unfortunately, vacancies in this field do not occur frequently enough to take care of all who qualify, but a substantial number of men have reached their goal on the network. Ben Grauer, Ed Herlihy, Howard Petrie, Jack Costello, Charles F. McCarthy and Peter Roberts are some of the more well-known "mike men" whom I have placed on NBC's staff. Frequently NBC affiliates as well as independent stations call on us to supply them with announcers, and many young men have started their careers in this way.

### *Annual Auditions for Employees*

We try to hear all applicants, and certainly those with a good background of announcing experience. In the fall of every year we conduct auditions for young men in the Company who express interest in announcing as a career. Each group, which numbers about sixty, includes guides, pages, mail boys and others who are willing to begin at the bottom of the ladder. Usually fifteen or sixteen of these men are picked to train through the winter in our announcing class. Students showing the most talent are recommended for positions. Some are placed with smaller stations to gain experience and others are engaged as junior announcers here in New York. Many graduates of NBC's training plan, such as Dave Garroway, Hugh James, George Ansbros and Don Gardner, are successful free-lance announcers or staff men on other networks.

In 1932, when I first started training members of the NBC staff, the announcer was expected to be a gem of English speech—a very precise type of gentleman who always wore a tuxedo after six p.m., and whose speech matched his suit. The American Academy of Arts and Letters awarded an annual diction medal to the announcer who possessed the most beautiful vocal tone and who, throughout the year, never tripped on his consonants or tightened his vowels. Showmanship was a secondary matter.

Fortunately, this period didn't

last too long. As changes took place and new shows were built, the announcer gradually was brought down to earth. He was taken from his proud pedestal of artificial articulation and absorbed into the program where he belonged. His function has remained the same—to announce the program—but now he must do this as a part of the show and not as an individual apart from all others. The announcer must work in the mood of the program, and if he does this in a pleasing natural manner, making his presence felt without being too obvious about it, he is a good announcer.

Aside from the fact that it has made advertising far more friendly and effective, this transition has given the announcer greater opportunities to make use of his acting talents and to prepare for television.

### *Television Presents New Problems*

To a large degree, television has revolutionized announcing, as it has the entire entertainment field. It requires announcers to sing, act and perform as a part of the program—feats which they accomplished in the past only in emergency situations. Since video is an extension of radio, experience gained in one field is invaluable in the other.

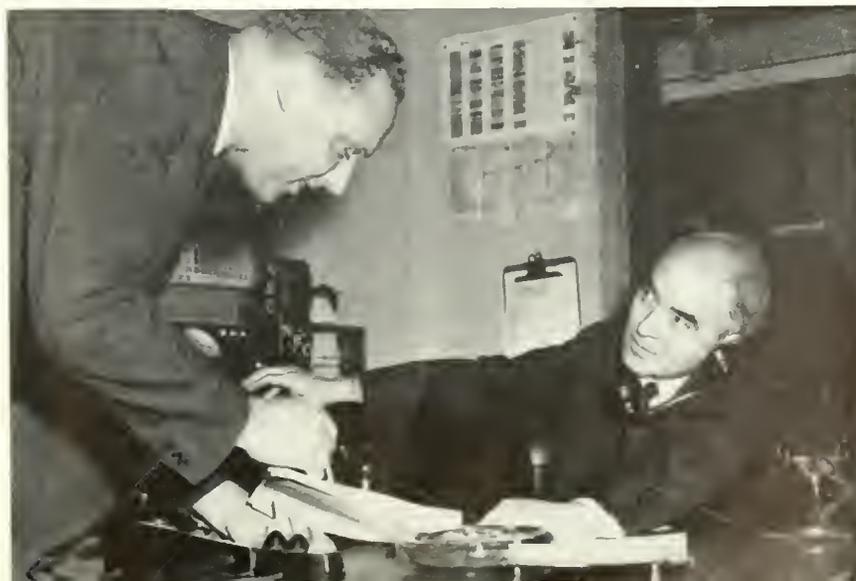
A good radio announcer, who has played large studio audiences, should be perfectly equipped to step into television. Although not all TV announcers are seen on the

screen, those who are will have to be as concerned about personal appearance as are the stars of the program. This factor undoubtedly will carry much weight with casting directors.

Whether for radio or television, we must be able to furnish the right man for the right job at the right time, in a business where seconds count. We must know where each man is and when he will report back to the Announcing Division. In shuffling the announcers' names on schedules, I sometimes feel like an intelligence officer plotting a commando raid. I never know when I may be called, on short notice, to place a man aboard a plane, an ocean liner, or even a submarine, to help carry an NBC program to the nation.

In addition to training announcers, we try to develop young men for future responsible positions throughout the Company. Promotion within the ranks is our constant aim. One young man, who came into the Announcers' Office as Night Secretary, was promoted to an Assistant Supervisor; later he was placed in complete charge of night operations, and he is now Manager of Audience Promotion. His successor became Program Manager of a Philadelphia station; and a third young man moved up the ladder to take charge of our central booking office. Such incidents confirm the value of our training, whether or not the trainees remain with NBC after the conclusion of their educational period.

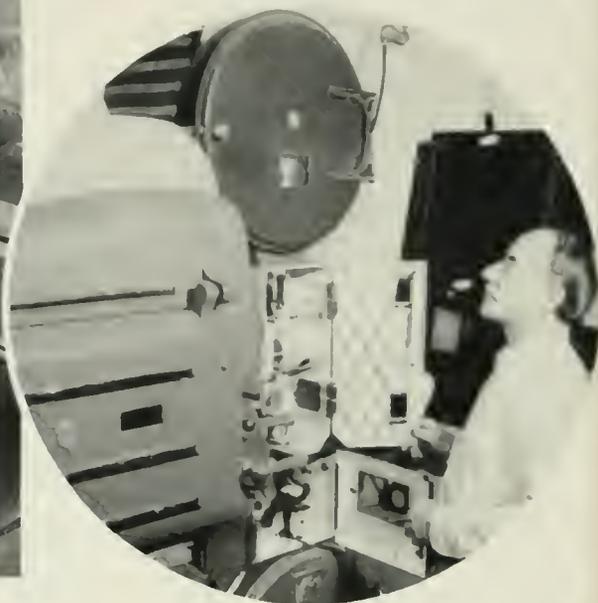
DOING SEVERAL THINGS AT ONCE IS MERE ROUTINE IN THE BUSINESS DAY OF A MANAGER OF NETWORK ANNOUNCERS.





LOUDSPEAKERS SUSPENDED ON PEDESTALS BETWEEN ROWS OF CARS ARE DRAWN THROUGH A WINDOW AND ATTACHED AT THE MOST CONVENIENT PLACE FOR THE OCCUPANTS.

RCA EQUIPMENT WAS SELECTED FOR THE PROJECTION ROOM OF WHITESTONE BRIDGE DRIVE-IN.



## Drive-in Theatres Increase

*Outdoor Screens, a Pre-war Rarity, Now Number More Than 1300 as Public Flocks to Informal Movies.*



By M. F. Bennett

*Theatre Equipment Section  
RCA Victor Division*

SOON after sundown, in more than a thousand American communities, automobiles move out into the highways and head for movieland's newest innovation in entertainment, the Drive-in Theatre. This idea of viewing the latest films from the informal comfort of your own car is, in reality, nearly twenty years old, but its greatest growth has taken place since the end of the last war. To-

day, these al fresco auditoriums are multiplying rapidly all over the country, particularly in sections where the climate is mild during most of the year.

The first drive-in theatre was built near Camden, N. J., in 1933. For nearly a decade thereafter, such ventures were considered in the novelty class. By the end of World War II, the number of outdoor screens scarcely exceeded 50. Then the tide turned and what had started as an experiment, soon became one of the wonders of the film industry.

The fundamental reason for the increased popularity of the drive-in was the development of specialized equipment for the purpose, particularly film projectors, carbon-arc lamp houses, and sound systems. One of the first firms to sense the importance of this newcomer to the film exhibition field was the Radio Corporation of America. As a result of its pioneering, the Company has installed equipment in more than 800 of the 1300 theatres now in operation.

A drive-in theatre consists essentially of a large viewing screen, a precision-built film projector, a powerful light source, a method of distributing the sound to the car-borne patrons, and a series of semi-circular ramps or ridges onto which the automobiles are driven. The average outdoor theatre accommodates 400 to 500 cars, but many larger ones are in operation in the principal cities of our country.

Patrons of a drive-in theatre reach their vantage point with a minimum of confusion and delay. They drive their cars to a ticket booth, pay their admission and are then directed to a vacant space on one of the ramps. Each ramp, being raised slightly in the direction of the screen, elevates the front end of the car so that its occupants are able to view the screen over the tops of cars parked on the forward ramps. With his car in position, the driver reaches out of the window and lifts a special weather-proof loudspeaker from a handy pedestal and attaches it to any convenient spot within the car. The speaker is connected to its pedestal by a sturdy extensible cord. If the weather is bad or the temperature uncomfortably low, the car window may be closed on the cord without damaging it.

One of the most appealing features of the drive-in theatre is its informality. If time is short, father does not have to change from his work-clothes into his party suit. If there are small children in the family, the baby-sitter ceases to be a problem. Youngsters can go along with the grown ups and get their rest in the rear seat while the parents are concentrating on the silver screen.

Owners of drive-ins are capitalizing on the county-fair atmosphere of their properties. Recalling how gas stations have attracted additional business by offering and performing extra services for their patrons, outdoor film exhibitors are following a similar pattern. Windshield wiping, car towing, tire changing, a galaxy of vending machines, playground equipment, and sometimes a nurse-in-attendance, ready with equipment for mixing formulas and heating bottles, are among the added attractions offered patrons. At one drive-in, during hot and humid weather, an attendant with an insect repellent can be hired for a small fee to keep coupes and sedans free of bothersome insects. It has been estimated that the returns from concessions now account for nearly a fourth of the gross income of outdoor theatres.

#### *Drive-ins Seek Wider Audience*

Although these theatres generally are operated only for the "carriage" trade, there are exceptions. Several which provide locations for planes, are called "Fly-in Drive-ins." At least one, adjacent to a stream, has made arrangements for canoeists to tie up at the bank and watch the show. From all this, it is evident that promoters of drive-ins do not intend to stint in adding services that will attract a broader cross-section of the amusement-seeking public.

As contributors to the progress of drive-ins, Hollywood supplied the films, exhibitors planned and constructed their theatres, but to engineers fell the task of developing suitable equipment for the installations.

Adequate screen illumination was, perhaps, the number one problem. Close behind was the demand for a sound system that would pro-

vide the film's accompanying sound to the occupants of 200 or more cars at a volume level and with the tonal quality that moviegoers expect.

To flood the outdoor theatre screen with sufficient light to ensure a bright film image to viewers on the outermost ramp, engineers were forced to develop arc lamps far more powerful than those required in indoor auditoriums. While an inside screen 30 feet wide is considered a giant, today there are many outdoor screens twice as wide. To deliver this greatly increased quantity of light demands an arc lamp and optical system operating at maximum efficiency under the special conditions imposed by outdoor usage.

#### *Sound Annoyed Nearby Homes*

In the same way and to an even greater degree, the production and distribution of sound for an outdoor auditorium kept engineers busy for many years. The first drive-ins relied upon one or more powerful loudspeakers, usually perched atop the screens. But it was impossible to keep the sound within the limits of the theatre property, and adjacent householders objected. Moreover, automobile windows had to be open throughout the film program to allow the sound to be heard at all.

After intensive experimentation, RCA scientists developed the rugged weatherproof speakers and sound distribution system which have been generally adopted. Because of their construction, these speakers can remain on their pedestals for months at a time without being affected by the elements.

As proof of the resistant qualities of the speakers, RCA engineers call attention to a drive-in theatre in upper New York State which was under flood waters for three days. When the theatre was reopened, only three of the hundreds of loudspeakers showed effects of their immersion.

To insure that these reproducing units will withstand extremes in weather conditions, the speakers are subjected at the factory to a series of "killing" tests. They are forced to undergo a salt spray for 200 continuous hours; they are submerged in water for two hours and then heated in an oven at 140 degrees for an equal period. This latter procedure is repeated four times before the units are considered acceptable.

Such precautions in manufacturing equipment have done much to popularize the drive-in theatres and to make an economic success of the business ventures. But there is still room for progress. For one thing, exhibitors would like to extend their operating time first into the early hours of dusk and eventually into daytime. Obviously, the longer hours would add materially to income, particularly in the summer months when daylight-saving means shorter programming hours.

Much attention also is being given to the possibility of in-car heating which if accomplished would make it practicable to operate drive-ins twelve months a year.

Solutions to these and other problems, authorities are convinced, would give added stimulus to an industry which already promises to become a major factor in the field of film exhibition.

CARS MOVE UP TO TICKET BOOTH OF NEW WHITESTONE BRIDGE DRIVE-IN, NEW YORK'S LATEST OUTDOOR THEATRE. SIDE OF HUGE SCREEN SHOWS IN BACKGROUND.



# Standardization of RCA Products

*Painstaking Research, Exhaustive Tests and Coordination of Data on Finishes, Materials and Components Are Among Functions of Specialized Group Set Up to Increase Production Efficiency and Assure Dependable Performance of Products.*



By D. F. Schmit  
Vice President in Charge of  
Engineering,  
RCA Victor Division.

**T**HE proudest claim of the RCA Victor Division is the dependable performance of its products in the use for which they are intended — whether a camera-size portable radio, a home television set, or huge installations of broadcast, scientific or industrial electronic equipment.

A scientific equipment may go to sub-zero Arctic cold; another RCA equipment, for military or commercial use, may go to the tropics, meeting conditions of excessive heat and humidity. Television antennas and masts, from the relatively simple ones perched atop homes to the complex installations on tall towers for broadcast transmitters, are exposed to cyclical weather changes, the corrosive effects of

atmospheric pollution, and sometimes to winds of hurricane force.

These are problems that confront every design engineer. It's his responsibility to make sure that the product he creates will stand up, that its finishes, materials and components will prove satisfactory within the range of potential use. In days gone by, this would have meant exhaustive experimentation, improvisation, and learning by bitter experience. The present-day engineer depends most often on specifications, on standardization, based on painstaking testing.

Since it is desirable to coordinate activities of this sort, and eliminate wasteful duplication of effort, RCA Victor's Engineering Administration has a specialized group on Division Standardizing. Its function is to provide within the Company a listing of the best available materials, components and finishes, and the most desirable procedures in their applications.

Higher quality, accompanied by lower costs, is the result of standardization, whose basic objective is to reduce the diversity of parts and materials fabricated or purchased for related products, and to establish uniform criteria.

Within a company, standardization develops along lines peculiar to its needs. On a broader scale,

standardization is carried on by industry-wide trade and technical organizations, and nationally, by the American Standards Association and government agencies such as the Department of Commerce and the Bureau of Standards.

## *Importance of Standardization*

The importance of standardization is readily seen, when one considers the essentially repetitive nature of modern mass production techniques. Components and assemblies of components must be interchangeable for products made on an assembly line; operations must be simplified. As effectuated by progressive industrial management, these requirements result in a constantly improved product at lower prices.

In a company like RCA Victor, whose products are the result of an unceasing flow of developments and refinements from its engineers and scientists, standards are of special importance. They are at once the tools of the laboratory and the means of communication with purchasing and manufacturing.

At this point, RCA Victor's Division Standardizing comes into

ELECTRONIC COMPONENTS MUST UNDERGO EXTREME HEAT TESTS IN THIS OVEN BEFORE BEING ACCEPTED FOR USE IN RCA PRODUCTS.

THESE INSTRUMENTS ARE USED TO TEST THE WIDE VARIETY OF CONDENSERS NEEDED IN RADIO AND TELEVISION APPARATUS.





EXPERTS COMPARE A SECTION OF METAL TUBING WITH REQUIRED SPECIFICATIONS FOR THE MASTS OF TELEVISION DIPOLE ANTENNAS.



A STANDARDIZING SPECIALIST SCRATCHES A CABINET TO DETERMINE ITS WEARING QUALITY UNDER ALL CONDITIONS OF USAGE.

service. Among its responsibilities is the publication of Company Standards. These are embodied in 13 volumes, in three categories. One covers the subject of Finishes, comprising some 500 active specifications, each supplying full information, including approved methods of application.

A second category, General, lists specifications and information on materials and mechanical and electrical components, including such data as recommended procedures in use and the hazards that are to be avoided.

The third category of RCA Standards books, Purchasing, lists specifications on the items that have been standardized and the sources of supply, greatly simplifying buying procedures.

Items are listed in the RCA Standards book mainly when used by two or more product departments. These listings are kept up to date by periodic additions and cancellations. Each category is indexed and its contents presented in a format especially engineered for maximum utility.

#### *Standards Books Widely Used*

These RCA Standards books are in use in some 200 locations at RCA Victor's ten plants and among RCA affiliated companies such as RCA Victor of Canada and the Radiomarine Corporation. They are also on file in a number of

government agencies and outside standards organizations.

In addition to the RCA Standards books, Division Standardizing has issued and maintains a widely used Drafting and Shop Manual, of which some 700 copies are in service.

Working closely with Purchasing activities, Division Standardizing seeks to coordinate standardization by each operating department. While concerned with everything that goes into RCA Victor products, the Division Standardizing unit concentrates on items that represent a large dollar volume.

#### *Miles of Wire Consumed*

This year, one of its important activities has involved plastic insulated wire. Annually, some 100-million feet of wire and cable of all types, costing several millions of dollars, are used in RCA Victor products. Objective of standardization on this item is to bring into use in all RCA Victor plants newer, better, and more economical types of wire.

Obviously when suppliers are able to concentrate on fewer items, in larger quantities than previously required, they can make them with greater efficiency.

From the consumer's point of view, there may appear to be an inconsistency between the functions of a standardizing activity and the

variety of styles in the many RCA Victor products.

#### *Cooperate in Setting Standards*

While there is a great deal of standardization in chassis of radios, phonographs and home television sets, there is no attempt to inject this factor into areas that are properly controlled by styling and merchandising considerations. But merchandise and styling people do standardize themselves within the limits of their requirements. It was found, for example, that the stylists could work with 14 colors of glass dial plates, instead of some 10. Sets of these approved colors for dial glass were made up, distributed to the styling sections, vendors, purchasing groups, and incoming material inspection, and purchasing of glass dials was put on a purely competitive basis.

The major part of RCA Victor Division Standardizing activities are conducted in the group's offices and laboratories in Camden, N. J.

In the laboratories, electrical and mechanical components, materials, and finishes are subjected to rigid testing, under extreme conditions that do not merely synthesize conditions that may be anticipated in normal use, but even exceeding those that might be encountered in abuse.

Electric ovens are used to bake parts for weeks on end. Finishes are subjected to heat, cold, and

humidity tests, then scratched and abraded with sensitive machines to record their durability. For products that might be used at sea or in the tropics, tests are made for fungus growth, resistance to rust and salt sea air. These are routine procedures utilized in determining RCA Standards. Then there are the special problems, brought to the group by the various product departments, which may require testing that makes Division Standardizing's normal "torture chamber" procedures seem pallid by comparison.

Even more dramatic is the trouble-shooting in the field for which Division Standardizing engineers are often called upon. A recent instance arose from a threat to production schedules of RCA Victor's new metal cabinet television receivers. As production lines were prepared for assembly of thousands of sets a week, it was found that the adhesive compound supplied to bond transfers of the wood-grain finish to the metal cabinets failed under heat and humidity tests. A Division Standardizing expert scoured the finishes field, found a company that could supply in quantity an adhesive solution that would do the job and stand up under heat and humidity cycling. Production schedules were not impaired, and the new sets reached dealers' stores in time for their debut.

#### *A Problem in Wire Insulation*

On another occasion, a large order of plastic insulated wire threatened to bog down production schedules because the cover slipped on the conductor. In assembly operations, it is customary to cut the wire in quantity to the precise size required, then drop it into a fixture or solder it directly to the terminals. When assemblers came to this operation, it was found that the plastic insulating coating was loose, and would slide over the wire. For each solderer to take time out to adjust the plastic coating would disorganize an assembly line, preventing the smooth flow that is an essential to low-cost, volume production.

A Division Standardizing engineer was reached on his vacation,

hurried to the supplier's plant. There he tracked down the trouble to the fact that the silk marker thread which was imbedded in the plastic coating would pick up moisture from the air. As the moisture-laden thread entered the heat of the extrusion machine, the water would vaporize, and expand the insulation. The latter, in turn, set in this semi-expanded condition, and failed to grip the wire tightly. "The Case of the Sliding Insulation" was solved by a simple expedient—drying the marker thread with infra-red lamps just before entering the extrusion machine.

"The Case of the Flying Paint" was another dramatic field problem solved by Division Standardizing. A scheduled production run of personal radios at the Bloomington, Indiana, plant had suffered two setbacks on production dates.

The supplier of the finish compounded it in his Newark, New Jersey, plant, and shipped a quantity by air express to another sup-

plier in Grand Rapids, Michigan, where the cabinets were made and finished. Applied to the first few cabinets, the finish appeared flat and unattractive, lacked luster, had poor adhesion, and was not at all in accordance with the approved RCA Standards upon which it was formulated.

It appeared that when the cans of paint were shipped by air, the plane gained an altitude of over 10,000 feet. This caused the top of the can to blow off, and the paint lost a substantial percentage of its top toners and pigments. Whoever observed this, replaced the missing top, wiped off the paint from the can, and delivered it to the consignee. But it was no longer the RCA Standard finish.

But the production schedule was met. The Home Office engineer drove in his car to another plant of the paint supplier, in Cincinnati, personally supervised the formulation of another quantity of paint.

*(Continued on page 32)*



CABINETS FOR TABLE MODELS OF TELEVISION RECEIVERS (ABOVE) MOVE IN A CONTINUOUS LINE AT RCA'S CAMDEN PLANT, WHILE COMPLETED 16-INCH TELEVISION CONSOLES (BELOW) RECEIVE FINAL ADJUSTMENTS AT THE COMPANY'S INDIANAPOLIS FACTORY.





CHARTER BOAT "TUNA III", OPERATING OFF LONG ISLAND CARRIES RADIOMARINE RADIOTELEPHONE AS A SAFETY ADJUNCT.

MRS. DOROTHY GARCIA, SKIPPER OF THE CRAFT, LEFES THE MICROPHONE OF THE RADIOTELEPHONE UNIT TO COMMUNICATE WITH SHORE TELEPHONE SYSTEM.



## Relies on Radiotelephone

*Woman Skipper of Charter Boat Depends on RCA Unit for Safety, Convenience and Entertainment of Her Guests*

WHEN Mrs. Dorothy Garcia, only licensed woman skipper of a charter pleasure boat in the New York area, pilots the 35-foot *Tuna III* away from her home dock at Freeport, Long Island, headed for the Hempstead Bay fishing grounds, she knows that the safety of her guests, mostly women and children, as well as their entertainment and convenience is assured by the presence aboard ship of an RCA radiotelephone. To her, the radio unit is one of the most important accessories of her craft.

Installation of the radiotelephone, Mrs. Garcia contends, was not a whim. As a pioneer of her sex in conducting charter boat excursions, she realizes the responsibilities she must assume while operating the craft. Knowing that emergencies may arise at any time, she feels reassured to be able to call the Coast Guard by radiotelephone if it should become necessary. Moreover, with

the same instrument, passengers may talk to their families ashore or be reached in similar manner while they are miles away at the fishing grounds. And as a final feature, the RCA set includes a radio broadcast receiver which provides programs for the entertainment of those aboard the *Tuna III*.

### *Family Boat Was Classroom*

Mrs. Garcia's interest in boats started four years ago when her husband bought the *Tuna III*. During spring overhauls of the boat, she helped with the sanding, painting and motor repairs. Then, under the guidance of her husband, a former merchant marine radio operator, she learned how to navigate the family boat.

This initial training intensified her desire to become a licensed operator. She studied the intricacies of motor-boat equipment, the regulations applying to safety at sea,

and mastered the complicated "rules of the road". She learned how to take cross-bearings and how to ride out a storm. To complete her training, she took a 10-week course in the handling of small boats. Thus, well primed on nautical subjects, Mrs. Garcia in March of this year passed the U. S. Coast Guard examination for her skipper's license.

So few women have invaded this masculine-dominated field that the government apparently has not yet thought it necessary to provide for them in the official license form. Neatly framed and hanging in the *Tuna III's* cabin is Mrs. Garcia's certificate which reads in part as follows:

"This is to certify that Dorothy V. Garcia has given satisfactory evidence to the undersigned Officer in Charge, Marine Inspection for the District of New York, N. Y., that he (sic) can safely be intrusted with the duties of operator of motor boats . . . when carrying passengers for hire, on the navigable waters of the United States. . . ."

## New Television Markets

(Continued from page 22)

Immediately after the meeting, newspaper stories appear, helping to sell the public on television and inspire it to purchase television receivers. Publicity releases on the news event, interviews with company executives in town for the television meeting, photographs of local celebrities with the new sets, facts about the effect of the new industry on local business and entertainment, all find their way into print. In the new television market, everything about television is news. Advertising to consumers is keyed to the beginning of commercial programs in each market.

While some of the introductory procedures have become fairly well standardized, constant vigilance is maintained to prevent this standardization from creating hackneyed operations or blind spots. For example, in Miami, marine equipment dealers were given franchises. An appreciable market was found

TELEPHONE OPERATOR AT TEXAS ENGINEERING PLANT ENTERTAINS 2500 EMPLOYEES WITH RCA 45-RPM RECORDED MUSIC, DURING LUNCH AND REST PERIODS.



among yacht owners who wanted television aboard their craft.

Simultaneously with the franchising of dealers, the RCA Service Company's local branch swings into action. Antennas are mounted on the roofs of stores requesting Service Company installations and the best possible reception is obtained, in order that every set may be demonstrated properly. Almost immediately after installations of the franchised dealers have been completed, each dealer is expected to have RCA Victor sets installed in his house and in those of his salespeople. This helps them to become well acquainted with television, able to discuss it as first-hand information. Also, it generates enthusiasm among them for the product, industry and programs.

Knowledge gained from these installations is invaluable to the Service Company later, since this preliminary work represents a sampling of all sections of the market and familiarizes the organization with reception conditions over much of the surrounding terrain.

Another early type of installation made in each new market is in public places such as hotels and taverns, clubs, churches, schools and fraternal organizations, where large groups of the public can have an early opportunity to see television in action. This creates the desire for it in the homes of all who see a good demonstration in public places.

Special newspaper sections devoted to television are published. A television column may become a daily or weekly newspaper feature. Television program listings take their place on the radio page and even on sports pages.

New television areas are of vital importance to our industry. They are tributaries that swell the mainstream of television. They expand the potential market out of proportion to their actual size because they are completely unsaturated and they have tremendous momentum right from the start.

Possibly more important than any of these points is the fact that each new television market brings new opportunities for achievement. Also, we are aware that, even in the oldest of television markets,

thousands of families are only now realizing that television is not a service only for "other people," but is something they may, should, and can afford to have in their own homes.

## Standardization

(Continued from page 30)

tested it for compliance with RCA Standards, put the cans of paint into the trunk of his car, and drove back to Grand Rapids.

There he supervised the finishing of the first 1,000 receiver cases, and saw them loaded on a truck and dispatched to Bloomington, where production ran as scheduled.

"The Case of the Smeared Silver" was not even a mystery—except to the supplier who failed to meet the RCA Standards specifications. This involved a silver-plated case for a piece of government equipment, which after plating, was to receive a green-tinted lacquer finish. When the first units were received from the supplier, they were dull and smudgy-looking. RCA Victor's Division Standardizing finishes specialist went to the supplier's plant in Buffalo, and spotted the trouble. The company was spraying the green pigment as it was received—cut in alcohol—without mixing it with clear lacquer, as specified in the RCA finish standards. When the alcohol evaporated, the green pigment could be rubbed off the case.

And so, another problem was solved, another threat to RCA quality standards eliminated.

The standards—the specifications and procedures—are as dynamic as the Division-wide engineering in which they are utilized, whether research, development, or product design. RCA Standards are not static. They are devoted to the best that is currently available, in each field they encompass. Tomorrow there may be something better, possibly something less costly, or more economical to use. If it offers advantages of more dependable performance, of economies that may lead to lower costs to the consumer, it will soon be listed in RCA Standards, and will hold its listing only until something better comes along.

*since 1929 together*

# RADIO AGE

RESEARCH • MANUFACTURING • COMMUNICATIONS • BROADCASTING • TELEVISION

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JANUARY



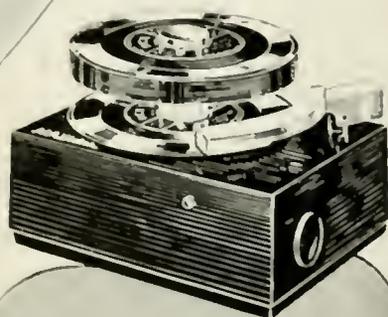
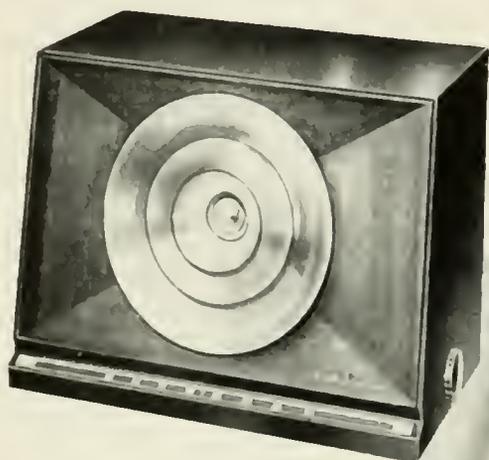
1950

# Tone you could never get before in a Table model



*Golden Throat*

Finest tone system  
in RCA Victor history



RCA Victor "45" plays the new 45 rpm records through any set! It's the world's finest, fastest automatic record changer. And the records? They're 7-inch size, non-breakable, last up to 10 times longer. AC. Model 9JY.

Here's a big, 8-inch speaker in this dramatic radio with the "Golden Throat". The cabinet's less than a cubic foot in size, yet you feel you are listening to a full-sized console! Dramatic in styling, too, with its golden center against rich mahogany "Fine-Wood" finish on plastic. (Blond "Fine-Wood" finish for a few dollars more.) And there's a "phono-jack" for attaching the "45" automatic record changer. RCA Victor 9X571.



## RCA VICTOR

Division of Radio Corporation of America

**WORLD LEADER IN RADIO ... FIRST IN RECORDED MUSIC ... FIRST IN TELEVISION!**

# RADIO AGE

RESEARCH • MANUFACTURING • COMMUNICATIONS • BROADCASTING • TELEVISION



VOLUME 9 NUMBER 2

JANUARY 1950

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Services of RCA are:

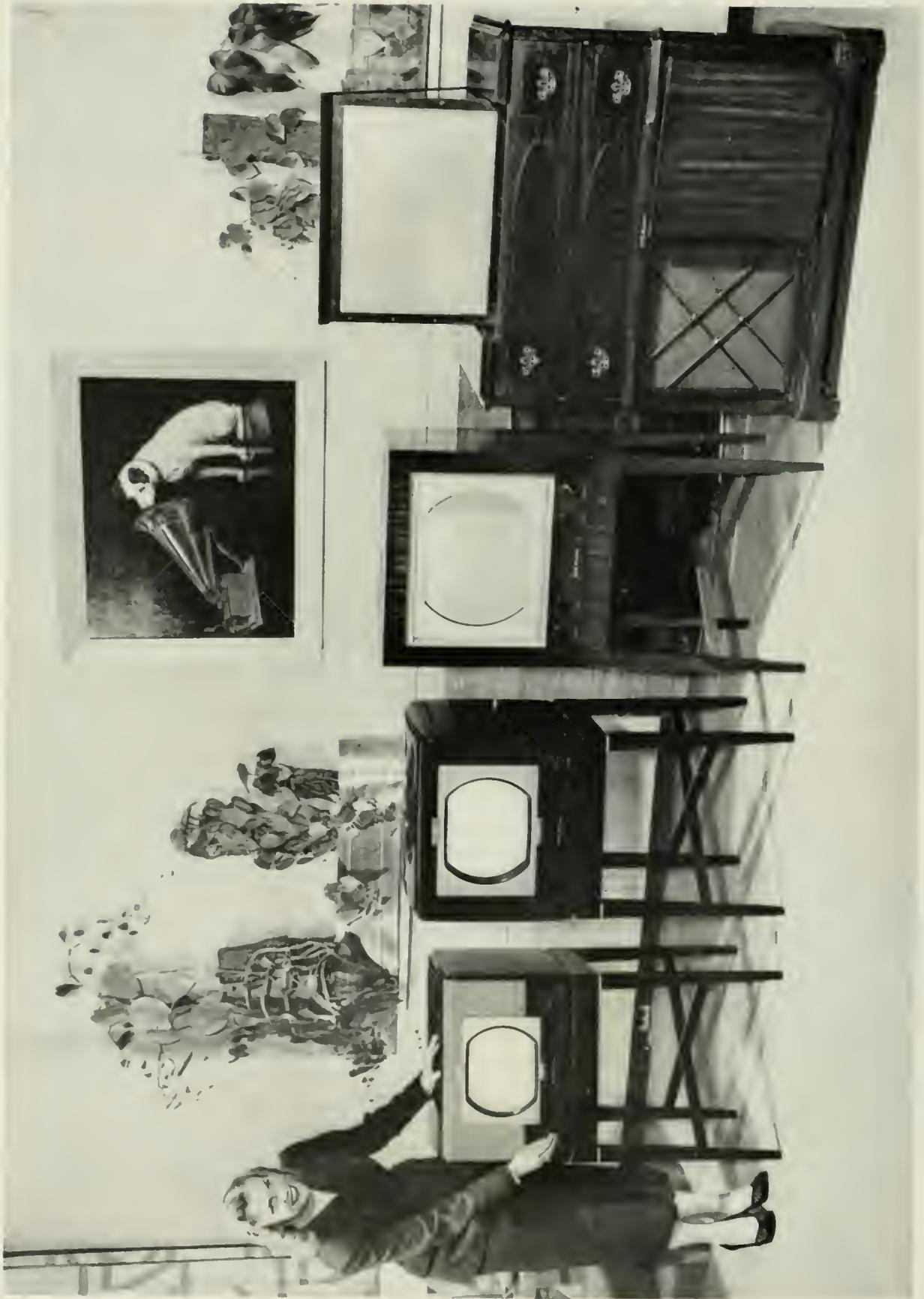
- CA Laboratories Division
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- RCA Victor Division
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- CA Communications, Inc.
- 
- Marine Corporation of America
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- al Broadcasting Company, Inc.
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- RCA Institutes, Inc.
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- CA Service Company, Inc.
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RCA TELEVISION RECEIVERS—LEFT TO RIGHT: TABLE MODELS WITH 10-INCH GLASS TUBE, 12-INCH GLASS TUBE, AND 16-INCH METAL-CONE TUBE, AND THE PROJECTION-TYPE CONSOLE.

# Radio and Television in 1949-1950

*Chairman of RCA Board Says Every Radio Home Should Be a Television Home When Potential of New Art Is Realized — He Reviews Electronic Developments and Other Scientific Achievements, Pointing Out Their Future Import*

By Brig. General David Sarnoff  
*Chairman of the Board  
Radio Corporation of America*

THE year 1949 completed a half century of historic achievements in electric communications, with the electron tube as the greatest basic radio invention in 50 years. It has been the master key to radio progress. It opened the pathways through space for world-wide radiotelegraphy and telephony, for radio broadcasting, television, radar, Ultrafax and numerous industrial applications. It will continue to unlock new developments from year to year.

Man's harnessing of the electron, and the progressive development of the kinescope, iconoscope, image orthicon and various other electron tubes, resulted in 1949 becoming television's first big year. In 1949 television began to exert a powerful impact on the entertainment habits of Americans. Home-life, education, news, politics, sports and all forms of entertainment are beginning to realize the social and economic import of this new art, for there are 3,700,000 television receivers in use. A comparison of this figure with the 61,000,000 radio sets in the United States reveals the great potentials of television's further growth. Eventually every radio home should be a television home.

I believe that within five years—by the end of 1954—there will be about 20,000,000 television receivers in American homes. This will mean a total viewing audience at that time of approximately 75,000,000 people.

The year 1949 was a good one for the radio-television industry and 1950 promises to be another good year.

## *Major Achievements In 1949*

The outstanding achievements in radio-electronics and television during 1949 were:

1. Expansion of television as a service to the public.



BRIG. GENERAL DAVID SARNOFF

2. Development of the RCA all-electronic, high-definition compatible color television system now being field tested.
3. Introduction of the RCA 45-rpm system of recorded music featuring the simplest and fastest phonograph record changer ever devised and providing the best quality of reproduction.
4. Advanced development of radar and its increased application for national security and safety at sea and in the air.
5. Application of the electron microscope and electronic techniques in the fields of biology and medicine; for example, its use in research for close-up study of cancer cells and tissues.

Indeed, the achievements of RCA scientists and research men, coupled with the accomplishments of commercial engineers, contributed much to the advance of radio-electronics

RCA VICTOR 45-RPM AUTOMATIC RECORD PLAYER HAS THE FASTEST PHONOGRAPH RECORD-CHANGING MECHANISM EVER DEvised.

in 1949. New fields of research were opened with promising possibilities for the future not only in communications but in science and industry. For example, the "memory tube," developed as an electronic brain for rapid computing machines, makes it possible to complete the multiplication of two numbers, each having as many as 12 digits, in a hundred millionth of a second. It is called a "memory tube" because the figures fed into it can be retained for an indefinite time and be extracted when desired.

Another new RCA tube called the Graphechon has "visual memory." It can store radar signals and transient phenomena which occur in less than a millionth of a second and which ordinarily fade out in only a few seconds when traced on fluorescent screens yet this tube stores such signals for more than a minute.





NEW, SMALL, COMPACT RADAR UNIT DESIGNED FOR TUGS AND PLEASURE BOATS.



SETS WILL COME OFF PRODUCTION LINES IN GREATER NUMBERS AS INCREASED MASS PRODUCTION MAKES IT POSSIBLE.

New photo-tubes developed by RCA have made possible a new instrument, called a "scintillation counter," which detects and measures atomic and nuclear radiation at a rate which the Geiger counter cannot attain.

A new super-sensitive electron tube, called an "electronic transducer," perfected by RCA, measures minute vibrations with great accuracy and makes it possible to convert the readings into visible or audible signals.

Investigation by RCA of the performance of amplifying devices utilizing germanium crystals in circuits now dependent on electron tubes has revealed many uses for these so-called semi-conductors. As one possible application, these crystal devices eventually may replace some of the electron tubes now required in the operation of electronic computing machines.

For marine use, RCA in 1949 introduced a new small, compact radar unit designed for tugs and pleasure boats.

Advanced techniques in the preparation of specimens for viewing by the electron microscope have ef-

fectively increased the application of electronic vision to such an extent that the RCA electron microscope is now playing an important part in cancer research. Medical research men have succeeded in viewing and photographing consecutive slices of cancer tissue cut so thin that there are 250,000 of them to the inch. Thus, a perplexing problem that has retarded a thorough study of cancer cells and tissue has been solved. The high magnification power of the electron microscope—up to 200,000 diameters—makes this possible.

The electron microscope has significant applications in many fields of medical research and has already proved invaluable in the study of viruses—the causative agents of many diseases, including influenza, poliomyelitis—and the infinitesimal structure of bacteria.

### Television

Television shook off its adolescence and came into man's estate during the year. Wherever it appeared the public embraced it, no longer as a novelty of sight and

sound but as a service of untold potentiality. Great as is its future, from industrial, scientific and educational standpoints, the American people have been quick to recognize the new era of entertainment it has brought to the home, the significant informational services it has begun to develop, and its importance in communications by serving the eye as well as the ear. The strides it is making as an advertising and marketing medium of unsurpassed impact on the business and buying habits of the nation are now widely recognized, and new technical developments give promise of continuous improvement.

As 1950 opens, there are 98 television broadcasting stations in the United States. New York has 1,000,000 receiving sets; Philadelphia has 350,000 receivers; Chicago 350,000; Los Angeles 340,000; Boston 230,000; Cleveland 110,000; Baltimore 110,000, and Washington 80,000. Networks are being extended by coaxial cable and radio relay interconnections. Millions of people in areas still out of range of the wave-borne pictures eagerly await the arrival of TV. In February

1950, RCA Victor will manufacture its millionth television set, and sets will come off the production lines in greater numbers as increased mass production makes it possible.

A further important development in television is RCA's new field-type camera and associated apparatus which soon will be ready for field tests. Because of the camera's small size, about the dimensions of a home-type motion picture camera, it is expected to have widespread use in outdoor pickups as well as in medical and industrial television applications.

**Color-Television**

While black-and-white television captured the public imagination in 1949, scientists and research experts kept their thoughts on the future. They demonstrated that television can "paint" pictures electronically in color. RCA Laboratories demonstrated a new all-electronic, high-definition color television system, completely compatible with present monochrome receivers.

Scientists, broadcasters and radio manufacturers heralded this new system as an important and logical forward step. Its eventual introduction as a service to the public would not obsolete existing television receivers. Black-and-white sets would continue to receive color telecasts in monochrome, without the necessity for any changes in the receivers. Viewers who would want programs in color could attach a converter to their present sets, or use a color television receiver.

Much experimental work, as well as further engineering development and exploration of the radio spectrum, will be required before color television attains the present status of black-and-white. To this end, field tests of the new RCA color system are now under way in Washington, D. C. The preliminary results have been highly encouraging.

Notable progress is being made by RCA Laboratories in the development of a color picture reproducer of the single-tube type. Perfection of this color picture tube will greatly

simplify television sets of the future, because in an electronic system it will replace the three tubes now necessary to reproduce the three primary colors and will make conversion of a black-and-white receiver for reception of color programs a relatively simple matter.

**The Newest Phonograph**

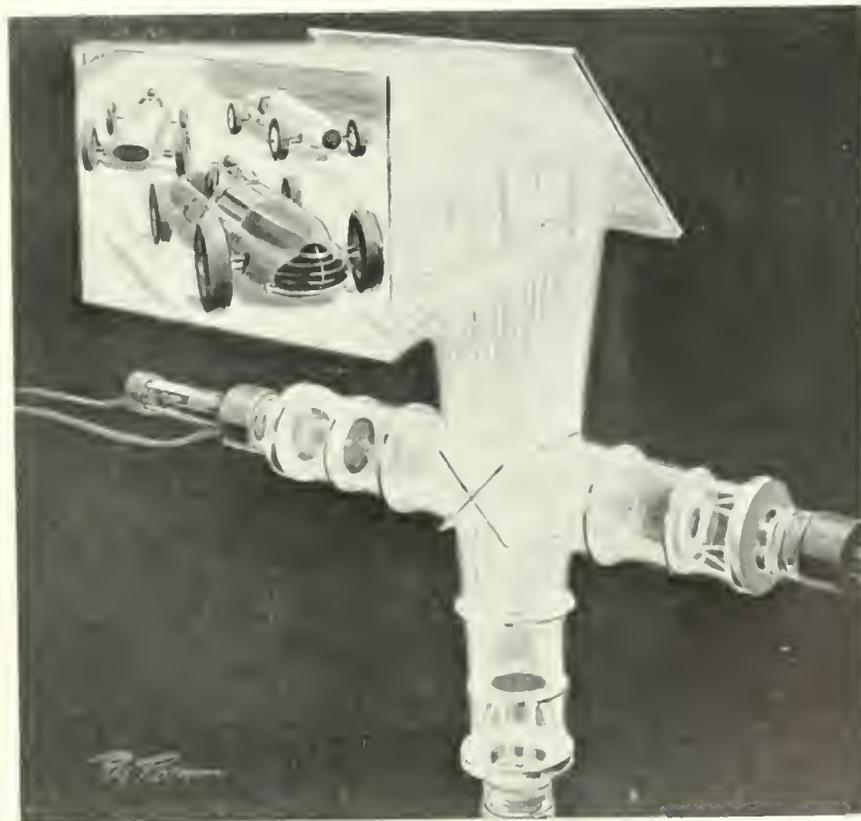
Television, however, is only one field in which the magic of electronics is being felt. In 1949, RCA Victor introduced a new and revolutionary system of recorded music, with the phonograph further electrized and embodying the fastest record-changer ever to be developed. This new and compact record-player operates at the speed of 45 revolutions per minute and achieves distortion-free quality in music picked up by a permanent sapphire point from vinyl plastic disks 6 7/8 inches in diameter. This RCA achievement has modernized the phonograph and added greatly to its distinction as a musical instrument, winning acclaim of music lovers and music critics alike. As the year 1949

*(Continued on page 12)*



"MEMORY TUBES," SHOWN ABOVE, WERE DEVELOPED AS ELECTRONIC BRAINS FOR RAPID CALCULATING MACHINES.

PROJECTION PICTURE - REPRODUCING COLOR TELEVISION SYSTEM USING THREE PROJECTION KINESCOPIES, REFLECTIVE OPTICS AND A PAIR OF DICHROIC MIRRORS.



# Television—Billion Dollar Industry

*Spectacular Advance of Video Business Surpasses that of Any Other New Enterprise, Says RCA President in Reporting on Achievements of the Past Year*

By Frank M. Folsom  
*President,  
Radio Corporation of America.*

TELEVISION'S overwhelming acceptance by the American people, as reflected by its tremendous growth during 1949, is an economic and social development of major national significance.

The spectacular rise of this new service of mass communication is without precedent in the industrial history of the United States. During October, after only three years of production, television achieved the going rate of a billion-dollar-a-year industry. No other new enterprise of the past has moved ahead so far in so short a time.

At the end of 1949, the wholesale value of all television sets purchased by the American public exceeded one billion dollars — another unequalled record. The automobile industry, operating in a much higher price bracket, required more than ten years to achieve a similar status.

So great was the public demand for television receivers, particularly in the last half of 1949, that some of the major producers were from two to eight weeks late in deliveries. The total number of sets produced and sold during the year amounted to 2,500,000, or 500,000 more than had been predicted. In New York City alone, the number of television sets in use rose to 1,000,000.

## *Outlook for 1950*

The outlook for television in 1950 is exceptionally good. The industry may be expected to produce and sell between 3,500,000 and 4,000,000 video receivers, bringing the total number of sets in use by the beginning of 1951 to more than 7,000,000. The potential television audience will then number at least 25,000,000 persons.

To achieve new production records in 1950, industry reports indi-



FRANK M. FOLSOM

cate that capacity will be increased by nearly 50 per cent. This will be accomplished through the addition of new manufacturing facilities. The only limiting factor that can be foreseen at this time will be, as it was in 1949, the ability of component parts manufacturers to keep pace with demand.

One of the outstanding developments in television during 1949 was the introduction by RCA of the new 16-inch metal-cone kinescope, or picture tube. This new tube, more economical to produce than its all-glass counterpart, enabled substantial reductions in the cost of large-screen, direct-view television receivers. Their success was immediate, and at no time during the year was RCA able to produce 16-inch receivers in sufficient quantity to meet the public demand.

## *TV Tube Production Increases*

In response to the growing interest in larger viewing screens, RCA opened a new tube manufacturing plant at Marion, Ind., in the Fall of 1949, and its entire production is devoted to 16-inch metal-cone kinescopes.

The impact of television on the national economy is already having

far-reaching effects. Vast amounts of raw materials are being drawn from all sections of the country, and tens of thousands of workers are being employed to turn these materials into television set components and sub-assemblies. This activity, together with the larger operation of manufacturing complete receivers, contributed substantially in helping to stop the general industrial slump experienced in the early part of the year.

The reasons for the public's enthusiastic and wholehearted acceptance of television as a fundamental addition to home life are clear:

1. High standards of performance and value adhered to by most manufacturers in the television industry.
2. Rapid increase in the number, variety, and quality of television programs.

## *Television Appeals to Masses*

When television got its first start as a full-fledged industry immediately after the end of World War II, there was general belief that its greatest appeal would be to people in the upper income brackets. The contrary has been true. Television's appeal is to the masses—people in all economic levels—and its greatest support has come from families in the middle and lower income brackets.

The social implications of television's wide public acceptance already are becoming apparent. There is much evidence to show that it is becoming an influential factor in establishing closer family relationships—reversing a trend set in motion by other modern developments. People have an innate desire to see, as well as hear, subjects of entertainment, education, and news, and television comes closer than any other medium to fulfilling this basic human want.

Telecasters, stimulated by the public's keen interest, stepped up the number and quality of programs

in 1949. Improvements were made and new ideas were tried out. During the evening, the viewing audiences, especially in New York where seven stations are on the air, are finding it increasingly difficult to choose between the many fine programs being offered. As a result, the demands on artists and performers of all types are increasing. This condition is certain to bring about better programs, greater variety, and higher levels of entertainment.

While the progress of television held the spotlight during the past year, sound broadcasting steadily advanced. Far from being doomed—as some pessimists predicted—broadcasting continued to function as the greatest single medium of mass communication available to the American people. Reflecting the soundness of its position is the fact that the radio industry expects to produce and sell between 8,000,000 and 10,000,000 radio receivers during 1950. Moreover, there is every reason to believe that there will be a market for 6,000,000 to 8,000,000 radio sets a year for an indefinite period in the future.

#### 45-RPM Record System Advances

In the phonograph field, the outstanding event of 1949 was RCA Victor's introduction of the revolu-

tionary new 45-rpm system of recorded music. As more and more people became acquainted with the quality, convenience, and economy of this new system, its public acceptance soared. In October, only seven months after the "45" was introduced, the new records were being produced and sold at the rate of 20,000,000 a year and the new record players at the rate of 65,000 a month.

#### System to be Standard

The progress of the 45-rpm system provides ample justification for the prediction that it will be the standard of the phonograph industry within a period of five years.

Aside from other favorable characteristics, one of the chief factors in the "45's" growing popularity is the complete selectivity it affords in every classification of music.

The major advances of the radio-television-phonograph industry in 1949 are but proof of still better things to come. At no time in the history of the radio-electronic arts have conditions been more favorable for continued growth and expansion in service to the American people. To the fulfillment of this

promising outlook, RCA wholeheartedly dedicates its facilities and services in scientific research, manufacturing, and communications.

## Major Radio Developments Since 1900

The ten outstanding developments in radio science during the first half of the Twentieth Century have been listed by Dr. C. B. Jolliffe, Executive Vice President in Charge of RCA Laboratories, as follows:

1. Wireless communication
2. Electron tube
3. Radiotelephone communication
4. Radio broadcasting
5. All-electronic television
6. Facsimile—radiophoto and Ultrafax
7. Radio navigation and direction finding aids—loran, shoran, teloran
8. Radar
9. Radio remote control of airplanes, rockets and vehicles
10. Microwave radio relay systems.

Many of these developments, Dr. Jolliffe pointed out, have been facilitated by the accumulation of new basic knowledge of radio wave propagation, thus making it possible over the past 50 years to extend the breadth of the usable radio spectrum for many new services.

DEVELOPMENT OF THE 16-INCH METAL-CONE KINESCOPE ENABLED SUBSTANTIAL REDUCTION IN THE COST OF LARGE-SCREEN, DIRECT-VIEW TELEVISION RECEIVERS.



## RCA is Subject of Film

The Department of State, in its program of world information on life in the United States, is distributing abroad fifty prints of a 16 mm. sound film depicting research activities of the Radio Corporation of America. Exhibitions will be held in 95 different countries.

The film, which is being supplied with sound tracks in English, Spanish and French, is entitled "To a New World." It was filmed at the RCA Laboratories in Princeton, New Jersey, and shows RCA scientists at work on problems of radio, television and electronics.



BRIG. GENERAL DAVID SARNOFF RECEIVES THE PETER COOPER MEDAL FOR THE ADVANCEMENT OF SCIENCE FROM DR. EDWIN S. BURDELL, DIRECTOR OF COOPER UNION. AT RIGHT, THE OBTVERSE AND REVERSE OF THE MEDAL, DESIGNED IN 1909 AND AWARDED ONLY ONCE BEFORE, TO J. P. MORGAN IN 1942, IN RECOGNITION OF HIS 30 YEARS OF SERVICE AS A TRUSTEE OF THE EDUCATIONAL INSTITUTION.



## SARNOFF HONORED

*RCA Board Chairman Receives Peter Cooper Medal for Advancement of Science, and a Citation from UN for "His Contribution in Field of Human Rights".*

**I**N recognition of his contributions to the advancement of science and to the field of human rights, Brig. General David Sarnoff, Chairman of the Board, Radio Corporation of America, has received the Peter Cooper Medal, awarded by Cooper Union, and a citation by the United Nations.

In accepting the award from Cooper Union at ceremonies commemorating the institution's 90th anniversary on November 2, General Sarnoff said:

"Tonight, I feel very much at home in these familiar surroundings—for it was in this very neighborhood that I had my beginnings. I lived in this vicinity, went to public school and worked in this neighborhood. In fact, just across the street, a stone's throw from the very spot I now occupy, I served as the wireless operator atop the enterprising Wanamaker store. That was 37 years ago—a time when there was born the first public recognition of the importance of wireless. For it was in April, 1912, while I

was working at my wireless key on the roof of the building across the street, that I was able to pluck from the air the feeble dots and dashes that brought to an anxious world the list of survivors of the ill-fated Titanic, which went down with so many precious lives. That disaster proved the true value of wireless at sea and gave great impetus to the further development of that new method of communication.

"It is natural, perhaps, that standing at the crossroads of the scientific age and despite the vision of the more abundant life which it brings, men should be awed by terror of the remorseless physical forces unleashed by Science. True, Science has placed in men's hands the matches that could ignite a world-wide conflagration; but they could also light the furnaces of a technological age of undreamed benefit to humanity. The great question of our time is what men and nations will do with the new forces at their command.

"I am thrilled, not saddened by

the thought that we live in the Atomic Age. It was my good fate to be born on the threshold of the 20th Century, when Marconi invented the wireless, Thomson discovered the electron and Crookes the cathode rays. All of them are vital in present-day communications, industry and in many other fields that serve the needs of modern society.

"The discovery of the electron alone has wrought such changes in the everyday lives of all of us that it can justifiably be compared to the historic achievements of Galileo and Faraday. It has extended man's range of speech, hearing and sight and through the electron microscope has opened a complete new world of the infinitesimal, hitherto unseen by the human eye or by any mechanical microscope. This alone promises much in the advance of biology and medicine.

"The tiniest thing in the universe, it is at work in many industries. To mention only a few—radio, television, motion pictures,

chemistry, mining, textiles, aviation and other forms of communication and transportation. The field of practical and commercial application of the electron still is in its early stages of exploration. In its use mankind has the most versatile tool that was ever discovered.

"Those who behold the electron's unlimited possibilities can see the day when every part of the world will be seen by television. We shall look across the hemispheres from nation to nation and see as clearly as we are now accustomed to hear by radio. Perhaps this added sense of neighborliness will help us better to understand each other.

At ceremonies held on December 10 to mark the first anniversary of the adoption by the United Nations of the Universal Declaration of Human Rights, General Sarnoff was awarded a United Nations citation for his "notable cooperation in the development of public understanding of the work of the United Nations and for his contribution in the field of human rights through advocacy of concepts of Freedom to Listen and Freedom to Look as fundamental expressions of Freedom of Information."

Presentation of the citation to General Sarnoff took place during a 2 hour and 15 minute program, which was telecast from Carnegie Hall, New York, by the National Broadcasting Company and featured participation by world leaders and prominent musical artists.

Upon receiving the citation, General Sarnoff described the award as a "generous commentary and kind recognition . . . directed more to a principle than to a man." He said: "I had the privilege of discussing this principle on several occasions with President Roosevelt, President Truman, Secretaries of State Hull and Marshall, and with other high officials of our government. It was gratifying to see creation of an international broadcasting service that disseminates information to the rest of the world and that is now known as the 'Voice of America.'

"Shortly after the United Nations was organized, I presented to Mr. Trygve Lie and other ranking officers of the U.N., a plan for international broadcasting that would be known as the 'Voice of U.N.'



GENERAL SARNOFF RECEIVES FROM TRYGVE LIE, SECRETARY-GENERAL OF THE UNITED NATIONS, A SCROLL CITING RCA'S BOARD CHAIRMAN FOR HIS "NOTABLE COOPERATION IN THE DEVELOPMENT OF THE PUBLIC UNDERSTANDING OF THE WORK OF THE UNITED NATIONS . . ."

And it is encouraging to observe the steady growth of your broadcasting service.

General Sarnoff participated in a roundtable discussion on "Freedom of Information" with Brig. General Carlos P. Romulo, President of the United Nations General Assembly and Dr. Gerrit Jan vanHeuven Goedhart, Netherlands' representative to the United Nations. Benjamin Cohen, United Nations Assistant Secretary-General in Charge of Public Information, acted as moderator.

#### *Concepts Vital to Peace*

In a statement on Freedom to Listen and Freedom to Look, General Sarnoff said that only free access to information flowing across all boundaries can make possible a world peace that rests upon mutual awareness of common goals, upon the accommodation and adjustments necessary to reach them, upon the conviction that all people want and require a peaceful world. He said that never before have the concepts inherent in Freedom to Listen and

Freedom to Look been more important to the peace of the world than they are today.

General Sarnoff expressed the opinion that peace, like liberty, can never be safe, except in the hands of the people and declared that the world can never be free from fear as long as destructive propaganda has the opportunity anywhere to breed without exposition and opposition.

"Radio speaks to a mass audience and delivers its message with a powerful impact," he asserted. "It can break through any blockade against the influx of facts and ideas. In the struggle for peace, the electron—the heart-beat of radio—may prove mightier than the atom."

#### **NBC Network Grows**

On Dec. 31, 1949, the NBC television network consisted of 53 stations operating in 32 states, with 26 of the stations connected by coaxial cable. A year ago, NBC had only 23 outlets, all along the East Coast.



THE SHAH OF IRAN WATCHES AS DR. JAMES HILLIER OF RCA LABORATORIES EXPLAINS OPERATION OF AN ELECTRON MICROSCOPE.

## Shah Visits Laboratories

*Iranian Ruler Views Research Projects in Radio, Television, Acoustics and Electronics at Princeton*

**H**IS Imperial Majesty, the Shah of Iran, was given his first look into the wonders of one of American industry's great centers of scientific research during a visit to the RCA Laboratories on November 22. Accompanied by a group of Iranian and U. S. State Department officials, the Shah was greeted by Meade Brunet, a Vice President of the Radio Corporation of America and Managing Director of its International Division, and was conducted through the Laboratories to view some of the latest research projects in radio, television, acoustics, and electronics.

He was interested and amused when he saw himself on the kinescope of new industrial television equipment. He shifted from side to side in his seat in order to see his image move on the tube.

When RCA's new all-electronic color system, now under development, was demonstrated to His Majesty, he followed with close attention the explanation of color separation at the camera and the later re-assembly of the colors at the receiver.

Later, the group witnessed the operation of an electron microscope which, by magnifying submicroscopic objects more than 100,000 times, enables scientists to probe more deeply than ever before into the unknown. His Majesty gave every indication of being impressed with the microscope's ability to penetrate deeply into the structure of materials thereby opening up new fields of research, development and use.

Other demonstrations included a comparison of a conventional radio

receiver loudspeaker and a full frequency range unit, which can reproduce music from 30 to 15,000 cycles; an electronic counter; and the "snooperoscope", an electronic device which permits seeing in total darkness by means of invisible infra-red light.

While visiting the free-field sound room, one of the quietest places in the world, the royal visitor asked members of his party and photographers to leave. After they had left and the door closed, the much-feted Shah soaked up the silence for several moments. He then turned to Dr. Harry F. Olson, Director of the Acoustic Research Laboratory: "I like it here," he said. "This is the first moment of peace and quiet I've had in weeks."

### Develops Black Screen For TV Backgrounds

A black screen for rear projection of television backgrounds, capable of providing greater pictorial contrast than the present conventional translucent white projection screen, is the latest innovation in video production to be introduced by the National Broadcasting Company.

The screen, which has already been used on several NBC television programs, was designed and specially developed for video by the Trans-Lux Corporation and is known as a Tele Process screen.

According to O. B. Hanson, NBC vice president and chief engineer, NBC, as the pioneer user of this type of screen, has made extensive tests which indicate that more "spill-light," a troublesome feature in the past, can strike the screen without loss of contrast or detail. "Spill-light" is the excess unwanted light that is reflected from a lighted stage or set onto a background projection screen. This formerly caused a fading of picture detail. The new black translucent screen absorbs this additional light without any noticeable loss of clarity.

"The new screen, used in conjunction with our latest rear-screen projection process, will enable Production and Programming Departments to provide more realism in story presentation and better pictorial values to home viewers," Hanson said.

# Electron Microscope Made More Effective in Cancer Research

*Development of New Techniques in Preparing Specimens Eases Problems Encountered in Examination of Tissue*

DETAILS of advanced techniques that increase the effectiveness of electronic vision in the fight against cancer were disclosed recently by scientists and medical researchers who have succeeded in viewing and photographing consecutive slices of cancer tissue, cut so thin that there are 250,000 of them to the inch.

The disclosures coincided with the start of public demonstrations of an electron microscope loaned by the Radio Corporation of America to the exhibit of the United Hospital Fund at the Museum of the City of New York.

In announcing the new tech-

niques, Dr. James Hillier, co-developer of the RCA electron microscope, said they evolved from research in cooperation with medical scientists of the Sloan-Kettering Institute at Memorial Hospital.

"It can now be revealed," Dr. Hillier said, "that we have overcome a problem which has retarded penetrating study of cancer cells and tissue. Solution of this problem involves the sectioning of specimens in such a manner that, with the high magnification power of the electron microscope, we can examine and photograph each consecutive slice of tissue. By keeping the minute slices in consecutive order,

we can then reconstruct exact three-dimensional pictures of affected areas. This achievement may be regarded as having great promise in the field of cancer research."

Describing the new process used in obtaining consecutive slices of specimens, Dr. Hillier said the first step had been to modify a standard rotary microtome, or cutting blade, to a point where it could produce successive sections of exactly the same thickness—about four millionths of an inch.

The next step was to provide a means of assuring that each slice would be preserved in the proper order of cutting. To achieve this Mr. Mark Gettner, of Sloan-Kettering Institute, has developed a trough which can be attached to the microtome and filled with a liquid of appropriate surface tension so that, as sections are cut, they float directly on the liquid surface, with the trailing edge of one section remaining attached to the edge of the knife until it is pushed on by the leading edge of the succeeding section.

Dr. Hillier said that, in addition to permitting the cutting of serial sections, this technique completely eliminates destruction of the thin slice normally caused as it slides over the blade of the knife.

## *Another Major Advance*

Another major advance, he said, is in the preparation of the slices of specimens after they have been cut. The problem was this: a section of tissue cannot be permitted to dry, as this introduces basic structural changes; yet the specimen must be dried if it is to be examined in an electron microscope.

Solution of the problem was achieved by applying what is known as the principle of embedding, Dr. Hillier said, explaining that this consists of treating the specimen slices chemically in a manner that leaves them embedded in a transparent plastic.

This process created a secondary problem which arose when it was



RCA ELECTRON MICROSCOPE WAS ONE OF MAIN ATTRACTIONS AT A PUBLIC EXHIBIT ARRANGED BY UNITED HOSPITAL FUND AT THE MUSEUM OF THE CITY OF NEW YORK.

found that the plastic covering the specimen reduced contrast of detail in micrographs. It was overcome by employing a device known as the "high contrast double objective," which sharpens detail in images viewed through the electron microscope.

Dr. Hillier said that results obtained by applying the advanced techniques have aroused interest not only at Sloan-Kettering Institute, but in other medical groups conducting cancer research. He said that advances in the use of the electron microscope are being followed closely by pathologists as well as by cytologists and histologists.

"With our new methods," Dr. Hillier said, "it is possible to slice a single cell into a hundred sections. Were each section to be a sixteenth of an inch square, such a specimen would have the equivalent of 2,500 square feet of surface under a magnification of 10,000 diameters in an electron microscope. That gives you an idea of the vast amount of new information made accessible by these advanced techniques."

MICROGRAPH OF TISSUE SLICE FOUR MILLIONTHS OF AN INCH THICK, OBTAINED WITH RCA ELECTRON MICROSCOPE USING ADVANCED TECHNIQUES.

Dr. Sidney J. Cirele, Acting Director of the Electrophoresis Laboratory, Columbia-Presbyterian Medical Center, demonstrated the RCA electron microscope to the public during part of the time that it was on loan to the United Hospital Fund exhibit in the Museum of the City of New York. Dr. Cirele, who is well acquainted with the advantages of electron microscopy, declared:

"The light microscope reached the practical limits of its theoretical possibilities some years ago with regard to its ability to discern fine structure, the finest detail resolvable by this instrument being approximately a hundred-thousandth of an inch.

"The electron microscope, which is a radical departure from the light microscope, permits for the first time direct viewing of particles and structures not visible in the ordinary microscope.



"This electronic development has significant implications for many fields of medical research and has already proved invaluable in the study of viruses, the causative agents of many diseases, including influenza and poliomyelitis, and the fine structure of bacteria and pathology."

## Radio and Television in 1949-1950

(Continued from page 5)

ended, RCA was producing the new records at the rate of 20,000,000 a year to meet the public demand.

### *The Challenge to Advance*

Like other new inventions, television and the 45-rpm Victrola phonograph have been challenged by those who resent change, by those who would impede or delay progress by clinging to the old. Nevertheless, the year's results confirmed commercially that the American public is eager to welcome improvements and advances. As with the electric light, the wireless, the automobile and the airplane, the public finally decided the fate of each. Lamp-makers cast dark glances at Edison's electric lamp, cables assailed wireless, carriage builders and blacksmiths frowned upon the automobile, the phonograph makers saw no future in radio, and the theatre belittled the movies. Now the motion pictures, theatres, and even radio itself are confronted with a new art created by science within their own fields. They must

meet the challenging newcomer and advance with it or take their places



A NEW TUBE, CALLED THE GRAPHICON, CAN STORE FOR MORE THAN A MINUTE CERTAIN TYPES OF ELECTRICAL SIGNALS WHICH ORDINARILY WOULD FADE OUT IN A MILLIONTH OF A SECOND WHEN TRACED ON A FLUORESCENT SCREEN.

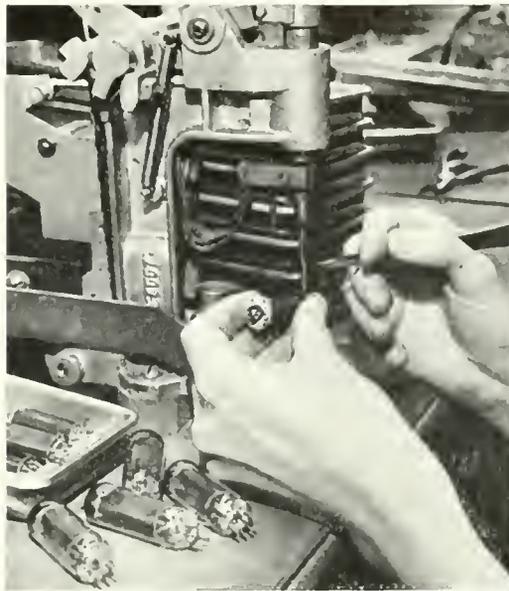
in memory as old-fashioned things that constituted entertainment not so long ago.

On the threshold of 1950, the thoughts of those who would advance must be on the future, for modern science moves swiftly. To take one's eyes off the road and look back wistfully to the past, is to lose sight of the vast new opportunities ahead. RCA and its predecessors have 50 years of experience and know-how in all phases of radio communications, electronics, phonographs and records, radio, and television. Their scientists, research men and engineers pioneered to give America pre-eminence in all realms of this great science, art and industry. As a result, RCA moves into the next 50 years determined to progress in service to the Nation and its people and to people everywhere. They will not only hear, but they will see the daily activities, the scenic surroundings and the achievements of each other, leading to the promise of greater understanding among nations.



ELEMENTS SO SMALL THAT THEY MUST BE HANDLED WITH TWEEZERS ARE ASSEMBLED TO FORM THE TUBE'S INTERNAL STRUCTURE.

WELDING OF THE HAIR-LIKE FILAMENTS OF MINIATURE TUBES REQUIRES KEEN EYES AND STEADY HANDS.



BEFORE THE ELEMENTS ARE SEALED INSIDE THE TUBE, EACH PART IS CAREFULLY TESTED FOR PERFECTION.



## MAKING MINIATURE TUBES

*At the Indianapolis Plant of the  
RCA Victor Division*

ON THIS TURNTABLE, THE GLASS TUBE IS SEALED TO THE STEM AND THE AIR IS EXHAUSTED TO PRODUCE A VACUUM.



WRAPPING THE TUBE WITH A SMALL Mallet REVEALS ANY IMPERFECTIONS IN ELEMENTS AND THEIR CONNECTIONS.



TUBES ARE SUBJECTED TO HIGH AND LOW TEMPERATURES AS ONE STEP IN THE QUALITY CONTROL PROCEDURE.



AT THIS AGING RACK, EVERY MINIATURE TUBE IS STABILIZED TO ASSURE ITS LIFE-TIME UNIFORM OPERATION.



ONE OF THE TWO OFFICERS OF A RADIO-EQUIPPED PROWL CAR REPORTS TO HEADQUARTERS AFTER SURVEYING CONDITIONS AT A HUDSON RIVER PIER. RIGHT: INDIVIDUALS SUSPECTED OF CARRYING UNDECLARED MERCHANDISE FROM SHIPS ARE SEARCHED BY A CUSTOMS OFFICER DIRECTED TO THE WHARF OVER THE BUREAU'S TWO-WAY FM SYSTEM.



## Customs Bureau Adopts FM

*Patrol Cars at Eight Seaports Use New RCA Communications System to Catch Smugglers and Thieves.*

A STANDARD sedan, undistinguishable from others on the road except for its two front-seat occupants wearing uniforms, swung out of a downtown street in New York and headed for the West Side highway. Once on the elevated road, the driver pressed a heavy foot on the gas pedal and the car quickly reached top speed along the concrete. Occasionally, a loudspeaker under the dash roared alive with a few cryptic phrases and subsided as quickly. Occasionally, too, the officer beside the driver reached forward, lifted a telephone handset from its hook and replied, just as briefly and succinctly. Finally, near 14th Street, the sedan was driven off the highway and brought to a stop in front of one of the piers

where transoceanic liners drop their passengers and cargoes.

"Here," explained one of the uniformed men, "is where we would go into action if this assignment happened to be in line of duty. It might be a brawl between ships' crews or a typical pier free-for-all that seemed to be getting out of hand. It might be a suspected theft of merchandise

held in custom's control. Or still again,—and more likely—we might be ordered to search for goods being carried off ships illegally. We never know what we'll run into when we get a call."

But this trip was, in a sense, unofficial. It was a field demonstration of the new 2-way FM radio system developed by RCA and now in operation in eight of the nation's leading seaports as an adjunct of the U. S. Bureau of Customs. The Bureau adopted the new system as a basic move to realign its law enforcement activities and gear them

*(Continued on page 31)*

INSPECTOR HESS DIRECTS PATROL ACTIVITIES OF THE FM NETWORK OF RADIO-EQUIPPED CARS OPERATED BY THE PHILADELPHIA BUREAU OF CUSTOMS.

[14 RADIO AGE]





DR. C. B. JOLLIFFE ADDRESSES THE GRADUATING CLASS OF RCA INSTITUTES IN AN NBC STUDIO IN RADIO CITY.

## RCA Institutes Graduates 198

*In Commencement Address, Dr. Jolliffe of RCA Laboratories Points to Possible Developments in World of Electronics.*

WORLD-WIDE television networks, self-powered portable television receivers, and other electronic developments of the future will emerge from the creative imagination of scientists, Dr. C. B. Jolliffe, Executive Vice President in Charge of RCA Laboratories, declared in an address to the graduating class of RCA Institutes on November 29.

During the commencement exercises, which were held in Studio 8H of NBC in Radio City, diplomas were presented to 198 students—the largest class to be graduated from the Institutes. The graduates had completed courses in radio and television servicing, operating and broadcasting, and advanced technology covering maintenance, operation and development of circuits and equipment in radio and television.

Maj. Gen. George L. Van Deusen, President of the Institutes, made the welcoming address and the invocation was pronounced by Rabbi Daniel L. Davis, Director of the New York Federation of Reformed Synagogues.

"The future belongs to those who imagine it," Dr. Jolliffe declared. "What we have accomplished in science and industry is just about enough to provide us with a spring-

board into the future and the wonders it holds. Don't be afraid to speculate and dream—they are fine companions for work."

He said that radio and electronics, "because of their inherent capabilities and versatility, constantly goad us into finding or devising new tasks for them."

### *Planetary Communication Possible*

Though it seems unlikely that we shall ever hear from another planet by radio, this is scientifically possible, Dr. Jolliffe said, adding:

"We have bounced radio and radar signals off the moon and observations have been made of radio noise which originates in interstellar space.

"Closer to realization but still a major problem, is how to create a world-wide television network. This is an economic as well as a technical matter, since it would be necessary to have television systems all over the globe, but scientifically we can see it pretty closely. Transoceanic planes, flying a predetermined distance from each other, could serve as radio relay stations and speed video programs to and from England and Europe.

"You might couple imagination and technical knowledge and try to figure out a method of producing a

practical portable television receiver—providing an adequate sized picture from a set weighing less than 20 pounds," he suggested. "This involves several problems, none of them simple, such as greatly simplifying the circuits, reducing the number of tubes, lowering the power requirements and developing an efficient picture-reproducing system which can be folded up."

Dr. Jolliffe pointed out that there exists a broad field for exploration in closed circuit and special purpose television.

"Television cries out for use in any application where observation and danger overlap," he said. "The making of explosives involves mixing operations of a perilous nature and there is no necessity to expose men to death when the mixing can be observed by a television camera and the process remotely controlled.

"The mining of coal in dangerous areas of marginal productivity is not morally justified if we must send men under the ground to do it. But a mining machine that would find its own way with its television 'eye' would be expendable."

Pointing out the scarcity of fine teachers, Dr. Jolliffe said that television in education would make it possible for hundreds or thousands of students to have "front row" seats at lectures or demonstrations given by topflight instructors. In wartime, television would be an invaluable training aid for the same reason and because it could be used to demonstrate the use of scarce equipment to large numbers of men at widely separated points.

# Counts Nuclear Radiation

*Development of Sensitive Phototube Increases Utility of Scintillation Counter in Studies of Radioactivity.*

**S**PLIT-SECOND flashes of light, produced when radioactive particles strike a suitably prepared surface may now be measured with great accuracy by an electronic counting system embodying recent developments in phototubes by the RCA Tube Department. Because of its greater sensitivity and flexibility, the instrument, called a scintillation counter, is fast replacing the Geiger counter in many applications involving atomic and nuclear radiation.

The scintillation counter consists essentially of an extraordinary phototube "eye" and a fluorescent screen or phosphor crystal. When the instrument is exposed to radiation, radioactive particles strike the fluorescent screen and produce flashes of light. The light from each flash is picked up by the phototube and converted into a tremendously amplified electrical signal. The signals are then further amplified and registered on a meter or other device to indicate the presence and strength of radioactivity in the immediate area.

The heart of the scintillation counter is a remarkable electron tube called the multiplier phototube. This photo-electric eye picks up the feeblest phosphorescent flash and converts it into an electrical current which is amplified as much as a million times before it is released to the other circuits of the instrument.

The tube is capable of discriminating or "counting" radioactive particles arriving less than one 100-millionth of a second apart. This counting rate, considerably faster than that of the Geiger counter, greatly enhances the usefulness of the scintillation counter.

The tremendous amplification power of the multiplier phototube is accomplished by the phenomena of "secondary emission" within the tube. The tube contains a photocathode and a series of ten "dynodes" or amplifying stages. The

flash of light, caused by a radioactive particle striking the fluorescent screen, falls upon the photocathode of the tube, releasing a number of electrons. These electrons are directed or focused electrically to the first of the amplifying stages, where each electron knocks off a new shower of electrons. Each of these new electrons, in turn, is swept to the second dynode and again each knocks off a shower of electrons.

## *Process is Repeated*

This process is repeated at successive dynode stages, until at the last stage a veritable avalanche of electrons is emitted, representing a multiplication of as much as one million times the number of initial electrons released by the original light flash entering the tube. The electrons are collected at the last electrode to become the electrical current put out by the tube.

In addition to the increased counting rate and the enormous

amplification provided by the scintillation counter, the new instrument has still other advantages over the Geiger counter. With suitable phosphors, this new detector is capable of detecting all atomic radiations known today, including "soft" radiations, such as alpha particles and soft beta-rays and x-rays. The detection of these soft radiations with Geiger counters requires thin, hard-to-make "windows" to minimize the absorption of the soft radiations by the envelope of the detector tube. On the other hand, the scintillation counter built around the new phototube is rugged and stable, and has high intrinsic efficiency and indefinitely long life.

Although several multiplier phototubes have been previously introduced by RCA, the type designed specifically for scintillation counter work incorporates many new features. For one thing, a new design, including a photocathode measuring  $1\frac{1}{2}$  inches in diameter, provides a sensitive area many times greater than that of previous tubes. This large cathode area permits very efficient collection of light from large-area light sources and allows the design of a scintillation counter which can "sweep" a broad area for traces of radioactivity.



DR. G. A. MORTON OF RCA LABORATORIES SEATED BEFORE AN EXPERIMENTAL MODEL OF SCINTILLATION COUNTER EMBODYING A NEWLY DEVELOPED RCA MULTIPLIER PHOTOTUBE.

# Folsom Receives Plaque

*Denver Hospital Presents Award to RCA President for His Service to Humanitarian Causes.*

AS a tribute to his years of service to humanitarian causes, Frank M. Folsom, President, Radio Corporation of America, was awarded a bronze plaque at a testimonial dinner in Philadelphia, held in his honor by the Jewish Hospital of Denver on November 20. More than 800 leading industrialists, civic and social leaders witnessed the presentation.

In presenting the award, John B. Kelly, chairman of the dinner, pointed out that Mr. Folsom "typifies the men of broad vision, patience, understanding and charity, who have made democracy work." He told the guests that they are "providing the means to carry on the fight against tuberculosis—a fight which has been so well advanced by the National Jewish Hospital at Denver."

In his reply, Mr. Folsom called attention to the hospital as a "great humanitarian institution," adding that "in accepting this award, I am accepting your tribute to the Hospital.

"I recognize that in gathering here tonight, Philadelphians are opening their hearts to what this hospital is and has been doing for half a century.

"This great institution opened its doors 50 years ago for a single purpose—to cure and rehabilitate the needy victims of the disease that once brought such hopeless, helpless despair—tuberculosis.

"How well it has fulfilled its objective is attested to not only by its international renown as a center for the treatment and rehabilitation of tuberculosis victims and for research and education in the field, but even more important by the thousands of wasting bodies and potentially broken lives that have been saved and restored to usefulness."

Mr. Folsom saluted the hospital on its 50 years of progress and pioneering in the treatment of tuberculosis and predicted a centennial celebration "as meritoriously deserved."

The plaque cited him for "his con-



FRANK M. FOLSOM, (LEFT) RECEIVES PLAQUE FROM ALBERT M. GREENFIELD (CENTER) AND JOHN B. KELLY, TREASURER AND CHAIRMAN RESPECTIVELY OF THE PRESENTATION CEREMONY.

cern for his fellow men of every station, race, color and creed, his devoted loyalty and eagerness to serve those in distress; and his meritorious service in providing free tuberculosis treatment to the needy of all faiths as trustee of the National Jewish Hospital at Denver."

## NEW INSTRUMENT SAFEGUARDS WORKERS IN RADIOACTIVE MATERIALS

ROUTINE checking of personnel who work with radioactive substances in laboratories and manufacturing plants is simplified by the use of a new radiation counter developed by the RCA Engineering Products Department as part of the Atomic Energy Commission's program to safeguard those engaged in atomic work.

The instrument, called a Hand and Foot Monitor, measures simultaneously the extent of beta and gamma contamination on hands and feet of those engaged in handling radioactive material, while compensating automatically for background radiation.

The Hand and Foot Monitor consists of a platform flanked by two posts and a control cabinet. The platform and posts are designed to be installed in any corridor or passageway travelled by workers leaving the radioactive area. The con-

trol cabinet is installed in any out-of-the-way space that is free of contamination and excessive vibration.

On the platform are two clearly defined foot positions, and at a convenient height and angle near the top of each post is a hand cavity. When a worker stands on the foot positions and inserts his hands in the cavities, indicator lights on the posts flash red, yellow or green to show whether he may safely leave the premises or must undergo further decontamination. A duplicate set of lights flashes on the monitor control cabinet for the benefit of the operator. Circuits controlling the indicator lights are actuated by the degree of radiation picked up by Geiger-Mueller tubes installed on each side of the hand cavities and under the foot positions.

The control cabinet houses all the electronic amplifying and counting

circuits and the necessary power supplies. Front and rear doors give easy access to the equipment units, which are mounted on removable chasses. In the top cover is a clear plastic window to permit reading the positions of "step relays" which indicate the counts of both subject and background radiations. This unit permits monitoring by a trained operator.

In order to operate the instrument, the subject merely steps onto the foot positions on the platform and presses his hands down on base plates in the cavities. These plates operate switches which start the tubes counting. It is necessary for both plates to be depressed before the machine will operate. After a 15- to 90-second counting cycle, the appropriate green, yellow, or red indicating lamps reveal the degree and location of contamination.

# Radio Outlook Continues Good

*In Year-End Statement, NBC's President Says Competition of Television is Good for Sound Broadcasting — Both Services, He Declares, Will Make Parallel Progress.*



By Joseph H. McConnell  
*President,  
National Broadcasting Company.*

**R**ADIO broadcasting reached new economic levels in 1949, and the outlook for 1950 is equally good.

Program-wise, radio's contributions to the entertainment of the American people will continue to improve. For the first time since its advent in 1920, broadcasting has a rival in its own domain, and the competition is good for it. Television, which progressed so rapidly in 1949, will, in 1950, far exceed its best previous year.

Television as a service to the public is but four years old, and within this period of growth, it has been nurtured and supported largely by radio, using its studios, equipment and personnel.

From now on television at NBC will be "on its own" as a separate and independent organization. It now has its own studios, showmen, engineers, sales force, newsmen, talent scouts and financial set-up. Henceforth, competition between radio and television will be keener in all phases of operation.

## *Some TV Stations Show Profit*

Television finds encouragement in the fact that four of its seven lean years are past. Within the next three years more television stations will move out of the red and into the black. Several video broadcasters already report that they are showing a small profit.

Every year should find an increase in this upward trend so that by the end of the next decade television will be established on a highly profitable basis. It will be nation-wide in scope.

Radio broadcasting, on the other hand, not only is nation-wide in scope, but world-wide. There are 63,550,000 home receiving sets and 13,200,000 automobile radio sets in the United States alone.

There are more than 2,000 standard broadcasting stations, 741 FM stations and 98 television stations in this country.

Sound by radio has been, and will continue to be, a great source of entertainment for people of all ages. It has been a great teacher from kindergarten to college and home extension. It has had profound effect upon children born since 1918.

By the time these children could walk, they went toward the radio set to try to turn it on. As they grew up they looked upon radio as something that had always been in the home—at least in their lifetime—and now it is difficult for that generation and those that have followed to believe that before their time there was no radio in the home. When public broadcasting began, only a few men of vision could see its wondrous potentialities.

They were young pioneers at the time, yet they were veterans of wireless, and among them was David Sarnoff, now Chairman of the Board of the Radio Corporation of America, who as early as 1916 envisaged what he called "the radio music box." He predicted it would bring concerts, news, baseball scores and no end of entertainment directly into the home.

Today, everyone knows how David Sarnoff's "dream" came true; it is a reality with everyone, everywhere. Yet there were skeptics

soothsayers in the early Twenties who scorned the idea and believed it was impossible. They brushed broadcasting aside as a fad and a "craze" that would soon pass from American fancy along with Mah-jong and the crossword puzzle. Likewise, the bold prophet of today, who declares that radio broadcasting is doomed endangers his sagacity.

## *Radio Has Served the Nation*

Indeed, the alliance of sound broadcasting with science has made it the backbone of the American radio industry. It has faithfully served this Nation and its people for 30 years. As the "Voice of Freedom" it spoke out across the hemispheres throughout World War II bringing hope to people everywhere.

It played a vital role in rallying Americans to the cause of liberty and justice. It marshalled the spirit of America; it was a modern Paul Revere on a world-wide scale. It instantaneously linked battlefronts and war zones as they had never before been linked in wars of the past; the voices of President Roosevelt and Winston Churchill made history as they encircled the earth.

## *Credit Goes to Advertisers*

Much credit for the success of radio broadcasting goes to American advertisers who have sponsored the shows and made commercial progress possible. The radio receiver was welcomed into many millions of American homes because the sponsors kept faith with the people and maintained a high standard of etiquette in entering the home as a friend.

The new art of television is so fascinating with its double appeal and service of sight and sound that "starry-eyed soothsayers again have rushed to their crystal balls to catch a picture of the future.

*(Continued on page 21)*

SINCE MARCH 20, 1948, WHEN MAESTRO TOSCANINI AND THE NBC SYMPHONY WERE FIRST TELECAST, THOUSANDS HAVE CONTINUED TO BE THRILLED BY THE SUBSEQUENT SIMULCASTS.



FORTUNES OF CONTESTANTS STRIVING FOR CASH PRIZES OF NBC'S "BREAK THE BANK" PROGRAM ARE FOLLOWED CLOSELY BY RADIO AND TV AUDIENCES.

## S I M U L C A S T S

*Scenes from Some NBC Programs That Are Broadcast and Also Telecast.*



TALENTED JUVENILES OF THE HORN AND HARDART CHILDREN'S HOUR REMAIN NATURAL BEFORE THE TELEVISION CAMERA AND THE MICROPHONE.

FIRST NBC NETWORK PROGRAM TO BE SIMULCAST WAS THE LONG-ESTABLISHED AND POPULAR "VOICE OF FIRESTONE".

ACTRESS EDITH PIAF AND ANNOUNCER DAN SEYMOUR SIMULCAST A SKIT ON "WE THE PEOPLE."

BELOW: THE CITIES SERVICE PROGRAM, OLDEST NBC COMMERCIAL FEATURE, RETAINS ITS WIDE APPEAL AS TELEVISION ADDS SIGHT TO SOUND.



# RCA Policy on Records

*Folsom Reports on Success of 45-rpm Record System and Announces Plans of RCA Victor, in Addition, to Make Available Its Artists and Classical Library on New and Improved Long-Playing (33 1/3-rpm) Records.*

**I**N a statement of policy with respect to RCA Victor records, issued on January 4, Frank M. Folsom, President of the Radio Corporation of America, told of the vast success of the 45-rpm record system in attaining nation-wide public acceptance and announced plans of RCA Victor, in addition, to make available its great artists and unsurpassed classical library on new and improved long-playing (33 1/3-rpm) records.

"So great has been the American public's acceptance of RCA Victor's new 45-rpm system—the greatest advance in 50 years of recorded music," said Mr. Folsom, "that today, only nine months after its introduction—this revolutionary advance has set a new standard of musical enjoyment in the phonograph field. Never in the history of the record industry has a new development moved ahead so fast in so short a time.

"In recent weeks, sales of '45' records soared to a rate of more than 20,000,000 a year, and the new record players were being sold at the rate of 65,000 a month . . . These figures tell a story of outstanding success for the unmatched tone quality, convenience, and economy of the '45.' It is a smashing triumph in recorded music."

## RCA Policy

Mr. Folsom enumerated the following points of RCA policy:

1. To make available to the public RCA Victor's unsurpassed library of the world's greatest artists and music recorded for all record players: 45-rpm; 78-rpm; 33 1/3-rpm.
2. To give the public recordings of the finest artists and the finest music.
3. To achieve through our instruments and records the finest possible musical reproduction.
4. To make available to the public the achievements of world-

renowned scientists and engineers at work in the RCA Laboratories. Through scientific research and development they created the incomparable "45 system." Through further progress they have also succeeded in including the same matchless tonal qualities in the new and improved RCA Victor long-playing records.

With respect to RCA Victor's plans to produce the long-playing records, Mr. Folsom declared: "To serve those music lovers who wish to play certain classical selections on long-playing records, RCA Victor will introduce, on or about March 1, a new and improved, non-breakable long-playing record (33 1/3-rpm) made possible by an exclusive RCA Victor processing method which insures high quality and tonal fidelity."

He said selections from the RCA

Victor library, suitable for long-playing records, will feature its great orchestras and musical artists, and asserted that as new recordings are made, from time to time, they will be available as appropriate additions to the long-playing repertoire. Orders are now being booked for delivery in March.

In the interest of millions of homes still equipped for playing such records, and as long as there is a demand for them, RCA Victor will supply a complete catalog of conventional 78-rpm records, Mr. Folsom stated. He stressed the fact that every new selection will be available on both "45" and "78" disks.

The RCA Victor 1950 line of Victrola phonographs and radio-television combinations, Mr. Folsom pointed out, includes instruments that play all three speeds—45, 78 and 33 1/3 rpm. All of these three-speed instruments feature an independent "45" record player in order that the fullest advantages of "45" quality and simplicity can be enjoyed, he declared.

## "45" Destined to Lead

"The '45' is here to stay and is destined to lead all other types of



MRS. WILSON STUHLMAN OF BROOKLYN, THREE-MILLIONTH VISITOR TO THE RCA EXHIBITION HALL IS GREETED BY PERRY COMO, RCA VICTOR RECORD SINGING STAR, WITH A GIFT OF A 45-RPM RECORD PLAYER AND RECORDS.

recorded music." Mr. Folsom emphasized and added: "We will continue to record both classical and popular selections on the 45-rpm records. The '45' meets the demands of music lovers who want their tunes and songs on single disks, easy to select and simple to play. It offers the world's greatest music and the finest artists, reproduced with the highest fidelity.

"The 45-rpm record has the finest tone quality in the history of the phonograph art. Only the 'quality zone' of the record's surface is used, and the music comes to you completely free of distortion and surface noise. There is a full range of sound—clear and brilliant."

One of the fundamentals of musical enjoyment is selectivity—complete freedom of choice of music desired, he continued, declaring that this is obtained in the "45"—"The Music You Want When You Want It!" He said the "45" system is simpler, more satisfying, and it saves music lovers energy, time and money.

"The '45' has the widest possible range of music selection—popular, classical, folk, musical comedy—whatever the music lover wants," said Mr. Folsom. "The present '45' catalog numbers more than 2,000 selections, and is growing daily.

"Moreover, RCA Victor is producing scores of old favorites from the conventional 78-rpm catalog on the new '45's'."

Mr. Folsom described the automatic changer of the "45" record player as the fastest and simplest changer ever developed. Operating within the central spindle post, the changer handles up to ten records with a time lapse of only five seconds between each record. It is silent and cannot damage records. In addition, there is no needle to change, since the player uses the famous RCA Victor "Silent Sapphire" permanent point pick-up.

"Operation of the '45' player is simplicity itself," Mr. Folsom said. "Just stack ten records on the spindle and, with the touch of a button, you can enjoy more than fifty minutes of music without touching the player again.

"Because they are the first record and record player ever designed to

go with each other, the elements of the RCA Victor '45' Victrola system provide a new measure of convenience for the music lover," Mr. Folsom said.

He emphasized that the player attachment is small and compact and that the "45" record is made of non-breakable vinyl plastic, wafer-thin and  $6\frac{7}{8}$  inches in diameter, making for ease and convenience in storage.

"Each '45' record," he concluded, "has a longer playing life—up to ten times as long. The smallness and lightness of the new '45's' enable a new degree of speed and economy in their distribution. This means a better record at less cost."

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## Radio Outlook Continues Good

*(Continued from page 18)*

Enchanted by what they have seen they have hastily predicted that the future is all television, that "sound broadcasting is doomed."

But consulting the record of invention in the past, reveals evidence that these hasty prognosticators may be "looking in the dark." The telegraph was not banished by the telephone; wireless has not eliminated the cables; the phonograph was not killed by radio, the movies did not destroy the theatre, nor did any of these forces do away with books, magazines and newspapers. All these still have their place.

It is well to observe, however, that the older inventions that have survived the onslaught of progress, have done so because they adapted themselves to new conditions created by science rather than complacently mold and decay with the old. The electrified phonograph in combination with radio is an outstanding example of what happens when an older art or instrument keeps pace with progress. It, too advances, gains added appeal and extends its scope of service.

Sound broadcasting will continue to serve and sell, while television continues to develop as a parallel industry.

By no means is radio doomed. It begins a new half century as an

ever-widening horizon for service. Sound accepts the challenges of sight in tandem as well as in competition as the camera joins with the microphone to advance the art of broadcasting. The microphone will continue to speak the message of its sponsor, while television displays the products and through illustration adds to the pictorial effectiveness of the spoken word.

## Tube Retains Signal Traces on Screen

A storage oscilloscope, capable of "freezing" for a full minute electrical signals or traces which occur in a billionth of a second, was revealed recently by L. E. Flory and W. S. Pike, RCA Laboratories research engineers, at a meeting of the Institute of Radio Engineers.

The device, based on the Graphechon—a tube with "visual memory" developed by RCA Laboratories—and the use of a television screen instead of the conventional oscilloscope, permits scientists to study and photograph instantaneous phenomena which previously had been impossible to see and most difficult to photograph, Mr. Flory said.

"The trace resulting from a miniature atomic 'explosion' may occur on the screen of an oscilloscope in a billionth of a second," Mr. Flory explained. "The human eye can't detect it for study and it can be photographed only on super-sensitive film.

"The storage oscilloscope can probe the secrets of other devices and processes, less dramatic than nuclear fission, perhaps, but of great importance to our everyday living. It can record and retain a trace indicating exactly what happens when a circuit breaker is opened and a current leaps across the gap, thus making possible the development of better breakers which will give the public better electric service."

The Graphechon memory tube is the heart of the storage oscilloscope, which was developed by Mr. Flory and Mr. Pike with the assistance of J. E. Dilley and R. W. Smith, also of RCA Laboratories.



WORKMEN HOIST THE 40-FOOT UHF ANTENNA INTO PLACE AT NBC'S NEW EXPERIMENTAL TELEVISION STATION NEAR BRIDGEPORT, CONN.

## New UHF Television Station Operating in Bridgeport

*Satellite Outlet for WNBT, New York. Erected by RCA-NBC to Study Program Service Characteristics of Upper Frequency Band*

A NEW ultra-high-frequency experimental television station, which is expected to have a vital effect on the future of all television broadcasting in the United States, was put in operation by the National Broadcasting Company in the Bridgeport, Conn., area on Tuesday, January 3.

Completion of the experimental station was announced by Joseph H. McConnell, president of NBC, who said it was a major step by the industry toward solving the broadcast and reception problems of ultra-high-frequency telecasting.

"The eyes of the entire television industry are upon us as we embark on this experiment," McConnell said. "We are confident that

the operation of this UHF station will demonstrate the feasibility of broadcasting in the upper reaches of the spectrum. The experiments are being conducted by NBC to unravel the complex problems confronting the industry in the present space log-jam. If the experiment is successful it will show the way to opening up vast new areas for hundreds of additional television outlets in this country."

A product of years of research and scientific pioneering by NBC and its parent company the Radio Corporation of America, the Bridgeport experimental transmitting equipment was built by the Engineering Products Department of the RCA Victor Division, under the di-

rection of V. E. Trouant, for the purpose of solving the many problems of ultra-high-frequency transmission and home reception of television signals.

This is a continuation of RCA's investigation of ultra-high-frequency television, commenced several years ago by RCA under the direction of Dr. C. B. Jolliffe, executive vice president in charge of RCA Laboratories.

The entire project, McConnell announced, is being conducted under the direction of O. B. Hanson, NBC vice president and chief engineer.

With the industry watching the development of the station closely, the experimental UHF outlet will operate as a "satellite" to NBC's pioneer New York television station WNBT and will retransmit the programs and test patterns of that station.

Special experimental UHF television receivers have been designed by the Home Instruments Department of RCA Victor, under the

direction of D. D. Cole, for engineering observation of the test transmissions from the Bridgeport station. In addition, RCA has developed an experimental converter which can be attached to present television receivers to make possible reception of these UHF signals. A limited number of the new receivers and of the converters will be placed in specially selected locations in Bridgeport and neighboring areas during the experimental period to evaluate the effects of the radiated signal. Between January 3 and January 15, NBC television engineers will make adjustments in the antenna and transmitter. Receivers will be installed within 25 miles of the station, after January 15. The station will broadcast in the frequency band between 529 and 535 megacycles, and pictures and sound will be received only on the special receivers.

Selection of the Bridgeport area as the site of the new station was made for the following reasons:

1. It is on the edge of the New York television service area and therefore may be typical of possible future "satellites" which might be located in densely populated areas not adequately served by nearby stations located in large metropolitan centers.

2. Homes in the Bridgeport area are located in rolling or hilly countryside which will provide an opportunity to study the effects of this

type of terrain on UHF propagation and reception.

Primarily designed to gather technical information on propagation characteristics and reception problems of UHF transmissions, the station has been given the temporary call letters of KC2XAK. An antenna gain of 20 is expected to increase the one-kilowatt output of the transmitter to 20 kilowatts of effective radiated power. Future tests will determine whether the radiating system performs as expected.

The transmitter is housed in a residential-type Cape Cod cottage on the outskirts of the city—in Stratford, Conn. It is on Success Hill, one of five hills overlooking Bridgeport.

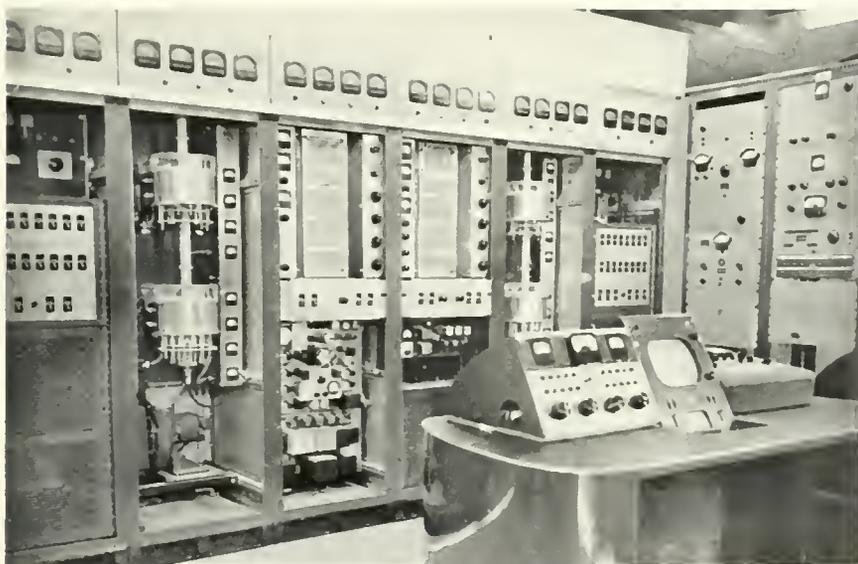
Application for a construction permit for the station was filed with the FCC February 8, 1949 and was granted to NBC May 4, 1949. Construction of the building was completed November 15, 1949.

Erection of the tower, a four-cornered self-supporting structure 210 feet high, was started on November 17 and completed one week later. The antenna itself, received December 19 and installed atop the tower December 21, projects 40 feet above the top of the tower.

According to the program of tests, which will last for anywhere from 6 to 12 months, observations of the service will be made in homes within the area where service might be



THIS 210-FOOT TOWER SUPPORTS THE ANTENNA IN NBC'S UHF EXPERIMENTS.



TRANSMITTER CONTROL ROOM OF STATION KC2XAK, WHICH COMMENCED FIELD TESTS ON JANUARY 2.

obtained, at distances and under conditions which will determine the extent to which such a station can provide service. It is proposed to test various types of receiving antennas, investigate shadow areas and multipath problems, to make field intensity measurements, and observations of tropospheric transmission. Some of these measurements will be made at representative receiver locations. The project also will include measurements with mobile equipment on radials, the investigation of field intensity versus antenna height under various conditions and other factors contributing to UHF propagation and reception.

The detailed work will be supervised by Raymond F. Guy, NBC radio and allocations engineer.

# TV Newsreels to be Exchanged

*Arrangement Made by NBC with Foreign Broadcasters Calls for Showing of Latest Films Here and Abroad.*



By William F. Brooks

*Vice President in Charge of  
Radio News and Special Events,  
National Broadcasting Company, Inc.*

**U**NDER the provisions of agreements recently arranged between the British Broadcasting Corporation, French Television and the National Broadcasting Company for the exchange of newsreel films, news events occurring in foreign countries will be witnessed by television audiences in the United States. Representatives of the organizations discussed terms for the extension of newsreel coverage at meetings held in London and Paris last October. NBC now has access to newsreels made in Belgium, Egypt, Holland, North Africa, Spain, Switzerland, South America, Yugoslavia and Scandinavian countries, in addition to the output of special cameramen stationed in Jerusalem and Tokyo.

NBC maintains a London staff to perform the necessary screening before films are shipped to the United States, a precaution that is possible under mutual arrangements that give both NBC and BBC the right to edit all films.

Although at the year's end Great Britain had only an estimated 200,000 licensed television sets installed in the London area, BBC has discovered that its viewers are keenly interested in international affairs. Using portions of films supplied by NBC, the British station now sponsors two weekly newsreel telecasts, originating from Alexandra Palace in London, BBC's main television studios and transmission center.

A new BBC transmitter recently completed at Sutton Coldfield, near Birmingham, with dual connections to London by radio relay link and a coaxial cable, is expected to serve a population of 6,650,000. Other BBC video stations are planned in Yorkshire and Scotland. Those acquainted with the situation believe that the British demand for a larger number of informative news programs and educational features will be intensified as BBC extends its television coverage with these additional transmitting facilities.

France's only television station, located on the base of the Eiffel Tower, recently began broadcasting a series of 15-minute newsreel programs for the benefit of an estimated five thousand set owners in the Paris area. Programs are produced by the station's staff cameramen with additional film contributed by part-time lensmen operating in Paris and the provinces.

Since November 11, 1949, when the film exchange agreement went into effect, French Television's entire newsreel supply has been available to NBC. In turn, the American company has offered its staff-produced films for French telecasts.

Here again, each party edits the other's films whenever necessary.

NBC's news films dealing with subjects ranging from sports to diplomatic conferences have been enthusiastically accepted by English and French TV audiences. Because newsreels are sent to and from Europe by air express, events happening on opposite sides of the Atlantic are often viewed on television screens no later than the day after they occur.

Here in the United States, two NBC network shows, the "Camel News Caravan", a Monday-to-Friday feature and "Leon Pearson Reports", a Saturday night presentation, use the foreign newsreels along with films produced by the NBC newsreel staff and 100 correspondent cameramen scattered throughout the country.

The "Camel News Caravan", which has been called the most up-to-the-minute show in television, employs the complete news-gathering facilities of the network, involving more than 200 persons. The program uses all of the video industry's methods of news reporting including mobile units (live pickups), newsreels, visual aids supplemented by personalities and commentators. The "Caravan", less than a year old, already has established an impressive record of "firsts" and "exclusives" on television, many of them made possible by film exchanges with foreign nations.

MOTION PICTURE FILMS ARE EDITED FOR NBC'S TELEVISION PROGRAMS AT THIS MACHINE. THE OPERATOR VIEWS THE MOVING STRIP THROUGH A LENS AND SYNCHRONIZATION OF SOUND AND PICTURE IS CHECKED BY MEANS OF THE LOUD-SPEAKER MOUNTED ABOVE THE APPARATUS.



# Multiple Unit Antennas

*Plans Under Way for Use of RCA Antenaplex in Three Large Housing Projects in New York.*

**T**HE first concerted action by a group of realtors to solve television antenna problems of apartment dwellers was disclosed on November 29 at a meeting of realtors and their architects with executives of RCA and the Commercial Radio Sound Corporation. The group's action, providing for installation of multiple-outlet TV antenna systems in three large apartment projects, will enable 1,000 New York families to have television without installation costs, interference and reflection problems, or the tenant-landlord conflicts which have frequently developed over rooftop antenna installations.

The three projects installing the system are Schwab House, 11 Riverside Drive; 40-44 Park Avenue, and 715 Park Avenue. Schwab House, with approximately 700 apartment units, will have the largest TV mass-viewing system ever installed.

The Antenaplex Systems will be installed as integral engineering features of the apartment buildings during construction, on the same basis as heating, plumbing, and ventilating systems.

To obtain the highest quality reception from all stations, the tenant in a building equipped with such a

system needs only to plug the TV set into a wall or floorboard antenna outlet, in the same manner that the power cord is plugged into a utility outlet.

The action of the New York group, as an outgrowth of joint deliberation and planning, is believed to indicate a trend among metropolitan realtors toward making built-in TV antenna systems available to the millions of apartment dwellers in TV areas throughout the country.

In addition to its usefulness in apartment houses, it was pointed out, the RCA Television Antenaplex System also meets the TV antenna requirements of hotels, department stores, office buildings, hospitals, and schools.

## *Contract is First of its Kind*

According to Frank M. Folsom, President of the Radio Corporation of America, the concerted action of the three apartment owners, leading to the signing of contracts for the Antenaplex system, is believed to be the first in which realtors have joined to solve the TV reception problem for their tenants.

"As a leader in the distribution of television to American families



ANTENAPLEX INSTALLATION ON PARK LANE HOTEL IN NEW YORK.

in all kinds of homes, from cottages to mansions," Mr. Folsom said, "RCA is gratified by this step toward solution of the TV reception problems of thousands of families and individuals in metropolitan areas who make their homes in apartments and hotels. The Antenaplex system is designed to remove this last barrier to enjoyment of the increasingly rich variety of television programs by all Americans in all of the nation's rapidly expanding TV service areas."

In announcing the signing of the contracts, W. W. Watts, Vice President in charge of the RCA Engineering Products Department explained that the RCA system consists essentially of a rooftop array of antennas, matching in number the channels on which service is available at the point of installation; a master signal amplifier, which boosts the strength of signals received on each channel, and a network of coaxial cable carrying signals on all channels to outlets in all apartments or other units of the building.

"In contrast to the countless numbers of individual antennas required on the roofs of buildings not equipped with such a system—one antenna for each television set—the New York installations will each require only seven antennas, custom-engineered for the seven channels in use in the New York area.

SIGNING OF CONTRACT FOR USE OF RCA ANTENAPLEX SYSTEM IN HUGE NEW YORK APARTMENT HOUSE DEVELOPMENTS. SEATED, LEFT TO RIGHT: FRANK M. FOLSOM, PRESIDENT, RCA; SAMUEL RUDIN, PRESIDENT, PIERMONT ESTATES, INC.; ALEXANDER FISHER, PRESIDENT, COMMERCIAL RADIO SOUND CORP., AND JULIUS PERLBINDER, PRESIDENT, 11 RIVERSIDE DRIVE CORP. STANDING: FRANCIS J. KLEBAN, PRESIDENT, 715 PARK AVENUE CORP., AND HIS PARTNER, S. A. SEAVER.





WILLIAM A. CRAVEN, JR., WHO WILL CONTINUE MICROWAVE RESEARCH WORK AT PRINCETON UNIVERSITY UNDER THE RCA FELLOWSHIP PLAN.

## Students Receive RCA Awards

*Fourteen Fellowships and Ten Scholarships Go to University Students Under Company's Plan.*

**A**WARD by the Radio Corporation of America of fourteen fellowships and ten scholarships for the 1949-1950 academic year to outstanding students of science has been announced by Dr. C. B. Jolliffe, Executive Vice President in Charge of RCA Laboratories Division, Princeton, N. J.

Dr. Jolliffe, who is Chairman of the RCA Education Committee, said the purpose of the awards is to encourage scientific training, particularly in radio-television and electronics, in accordance with an RCA Scholarship Plan which has been in operation since July, 1945.

This year's award winners include eight graduate students selected by the RCA Fellowship Board of the National Research Council, two graduate students chosen for fellowships established at Cornell and Princeton Universities, and four engineering employ-

ees of RCA selected on a competitive basis by the RCA Education Committee.

Graduate students scheduled to receive RCA Fellowships in Electronics through the National Research Council are:

Arthur LaVerne Aden, 25 years old, of Cullom, Ill., who will continue work in electrodynamics at the Engineering Sciences Department, Harvard University. It is the second consecutive year that Mr. Aden has won an RCA Fellowship.

Robert William Olthuis, 27 years old, of Rutherford, N. J., who will continue research work toward a doctorate at the Electrical Engineering Department, University of Michigan. For Mr. Olthuis, this also represents a renewal of the RCA Fellowship in electronics.

Charles K. Birdsall, 23, of Rocky River, Ohio, who will study at the Electrical Engineering Department,

Stanford University, under Professor L. M. Field.

David Carter, 29, of Stanford Village, Calif., who will study in the Department of Physics, Stanford University, under Professor M. Chodorow.

William A. Craven, Jr., 25, of Princeton, N. J., who will continue research work in microwave techniques at the Department of Electrical Engineering, Princeton University, under Professor William H. Surber, Jr.

Gerald Estrin, 27, Elmhurst, Queens, N. Y., who will continue studies in microwave propagation at the Department of Electrical Engineering, University of Wisconsin.

Bob Fumio Naka, 25, of Cambridge, Mass., who will do research work in electron optics in the Department of Electrical Engineering, Harvard University. He received his Master of Science degree in Electrical Engineering at the University of Minnesota.

Howard C. Poulter, 23, of Menlo Park, Calif., who will study interaction of electromagnetic waves at the Department of Electrical Engineering, Stanford University, under Dr. Lester M. Field. Mr. Poulter received a Master of Science degree in Electrical Engineering at the Illinois Institute of Technology.

### *Universities Cooperate*

The graduate students selected to receive fellowships established in cooperation with Cornell and Princeton Universities are:

David F. Woods, 24, of Ithaca, N. Y., who will continue studies at Cornell University for a doctorate in Engineering Physics. He first entered Cornell in September, 1941.

T. R. Williams, of Indianapolis, Ind., who is seeking a doctorate in Electrical Engineering at Princeton University. Mr. Williams received a master's degree in Electrical Engineering in 1948 and since then has been a full-time instructor at Princeton.

Engineering employees of RCA

selected for RCA Fellowships are:

Joseph Reed, 28, of Brooklyn, N. Y., who will do graduate work at the Polytechnic Institute of Brooklyn. He received a Bachelor of Science degree in Electrical Engineering at Cooper Union in 1944 and is employed at RCA Communications, Inc., 66 Broad Street, New York.

Alan D. Sutherland, 24, of Uplana, Ill., who will study for his doctorate at the University of Illinois, where he received a Master of Science degree last June. He is employed at RCA Laboratories, Princeton, N. J.

#### *Staff Engineer Participates*

Jerome L. Grever, 23, of Haddonfield, N. J., who will continue electronic studies at Purdue University. He is a graduate of the University of Louisville and is employed on the engineering staff of the RCA Victor Division, Camden, N. J.

Joseph P. Ulasewicz, 22, of Collingswood, N. J., who will do graduate work at Rensselaer Polytechnic Institute, where he graduated in 1947 with a degree in Electrical Engineering. He also is employed by RCA Victor.

In announcing the fellowships, Dr. Jolliffe said prominent science educators participated as members of the RCA Fellowship Board of the National Research Council in the selection of winners of the awards. Dean Frederick E. Terman, of the School of Engineering, Stanford University, is Chairman. His associates on the Board are Professor Arthur B. Bronwell, of the Electrical Engineering Department, Northwestern University; Dean William L. Everitt, of the College of Engineering, University of Illinois; Professor Frederick Seitz, Jr., Department of Physics, University of Illinois; Professor Wayne B. Nottingham, Department of Physics, Massachusetts Institute of Technology; R. Clifton Gibbs, Chairman of the Division of Mathematical and Physical Sciences of the National Research Council and C. Richard Soderberg, Chairman of the Division of Engineering and Industrial Research of the NRC, who is Professor of Mechanical Engineering, Massachusetts Institute of Technology.

Dr. Jolliffe disclosed that the annual individual grants for fellowships under the auspices of the NRC range from \$1,600 to \$2,000, the exact amount being determined by the RCA Fellowship Board for graduate work in electronics during the academic year. RCA Fellows are expected to continue work on scientific problems related to electronics, but the RCA Fellowship Board accepts applicants who wish to supplement mastery in one field by developing competence in a related field.

In addition to the fellowships for graduate students, RCA undergraduate scholarships have been established at various colleges and universities since 1945 and are now available to students in the following institutions: California Institute of Technology, Columbia University, Harvard University, University of Minnesota, Princeton University, Purdue University, Rutgers University, University of Washington, University of Wisconsin, Yale University.

Students approved by the RCA Education Committee to receive these scholarships are:

Frank G. Adams, 24 years old, of Palisade, N. J., majoring in electrical engineering at Rutgers University; Francis F. Chen, 20, New York City, who will continue work in astronomy at Harvard University; John E. Immel, 22, Maywood, Ill., a student of electrical engineering at Purdue University; Lawrence E. Mertens, 20, New York City,

majoring in electrical engineering at Columbia University; Edward J. Novack, 23, Ravensdale, Wash., will continue work in electrical engineering at the University of Washington; Emery I. Reeves, 20, Chillicothe, Ohio, who is studying electrical engineering at Yale University; Curtis M. Stendahl, 21, Minneapolis, Minn., majoring in chemical engineering at the University of Minnesota; John T. Warner, 23, Verona, N. J., who will continue work in electrical engineering at Princeton University; Maurice B. Webb, 23, Neenah, Wis., engaged in the study of physics at the University of Wisconsin; William M. Whitney, 20, Spokane, Wash., who is majoring in physics at the California Institute of Technology.

Undergraduates in the field of pure sciences, or in various branches of engineering, especially electrical, radio and electronic engineering, are eligible as appointees to RCA Scholarships. Under the terms of the plan, the dean or an academic officer of the college or university, recommends the student to the RCA Education Committee for consideration and approval. Each student so selected and approved is designated as the "RCA Scholar" by the educational institution where he is enrolled and as such he receives a grant amounting to \$600, payable in two equal installments, at the opening of the fall and spring terms. The RCA Scholar is eligible for reappointment upon suitable recommendation.

ALAN D. SUTHERLAND OF RCA LABORATORIES IS AN APPOINTED FELLOW AT THE UNIVERSITY OF ILLINOIS, WHERE HE WILL STUDY FOR A DOCTORATE.





TELEVISION SERVICE HAS DEVELOPED AS A TRIBUTARY OF TELEVISION SET SALES.

## Television Moves Ahead

*Fast Pace of Industry Revealed in Production Figures and in Increased Sales Effectiveness of TV Programs.*



By J. B. Elliott

*Vice President in charge of Consumer Products RCA Victor Division*

*Excerpts from an address before the Philadelphia Chapter of the American Institute of Banking.*

**T**HE fast-moving pace of television is such that it is almost impossible to maintain familiarity with current statistics and developments of this field unless considerable time is devoted to keeping abreast of it.

Dramatic and brilliant as television's accomplishments have been to date, they will be dwarfed and overshadowed by its accomplishments of tomorrow. And just what are these accomplishments? Let's run through a few figures:

The retail value of television receivers produced by the industry

up to December 31 reached approximately \$1,113,500,000. The television industry in 1949 produced more than 2,300,000 receivers. This year it should produce 3,100,000. There are 70 television receiver manufacturers, 9 kit-makers and 29 major manufacturers of miscellaneous television equipment. The value of fixed assets of television producers has been estimated at \$315,000,000. Thirteen television producers have their securities listed on the New York Stock Exchange.

Furthermore, there are stations, advertising, service, retailing, network facilities, and other giant industries all thriving on the support of the TV audience which this vast receiver business creates.

At the beginning of 1950, 98 television stations were in operation. The average cost of a television station is somewhere around \$400,000. This figure represents only investments in equipment and facilities. Add to it the considerable payrolls for artists, engineers, administrative personnel, and others, and you can see that the total investment in 98 television stations far exceeds the \$38,000,000 estimate for equipment.

In 1948, when there were fewer than a million receivers in use, advertisers paid \$10 million for station time. In 1949, as the audience

grew, advertisers paid \$30 million. This year's audience should be approximately doubled in 1950.

Quietly, another important business has been developing as a tributary of television receiver sales. This is television service, a business far different from radio service. The estimated 1949 dollar investment in television servicing and service facilities was \$90 million in installation and service charges; \$22,500,000 in antenna sales, and \$20,750,000 in accessory sales.

### *Has Far-Reaching Effect*

This activity has a far-reaching effect in stimulating the general economic pattern. Let's see just how wide and diverse are the economic regions stimulated by television:

That television will eventually hit an annual going rate of 5,000,000 units is an estimate which nobody knowing this field would challenge. This means a great deal to the mines and mills and factories of our country. It means a vigorous, growing market for industries as far apart as New England textile mills, weaving intricate cabinet grille cloths, and Southwestern silver mines, whose product is used for television tuner contracts. The 1,100 parts in each television receiver bolster hundreds of component and sub-assembly manufacturers directly, and thousands of suppliers indirectly.

Television thrives through advertising. By this means it is able to finance its social contributions to society. How well does it perform this task?

For a really tough assignment, try introducing a new candy bar in New York. Mason's managed to get its cocoanut bar into only a handful of New York outlets before the company hit upon television. Then, through its TV show, children were offered a self-liquidating premium, a humming lariat for two candy wrappers and a nickel. The first week, when only a few dealers had the product, a trickle of 307 requests came in. By the tenth week, the sponsor had sent out more

than 25,000 humming lariats—and 95 percent of New York's candy retailers were carrying the product.

Or, more recently, an enterprising young fellow named Martin L. Henry offered a book titled "So You Want to Write a Song", on WFIL-TV. Within five minutes after his 15-minute program was over, he had received orders for more than four dozen books at \$1.98 each, and orders for it have been pouring in ever since.

When an industry can stimulate supplier industries as television does, when it can attain phenomenal stature in as short a time as television has, when it can bolster our entire national economy through the sale of products and services of almost every type of consumer supplier, as television is doing—that industry becomes a basic part of the bankers' working program.

#### Sound Investments to be Made

There are sound investments to be made with retail dealers and, in some cases, distributors, as well as parts suppliers, who are continuing to expand as business increases to unprecedented volume. In 1948, when cash sales represented 71 percent of all retail sales, charge accounts 20 percent, and installment sales 9 percent, the pattern was different in household appliance stores. Here only 29 percent of the sales made were on a cash basis; 29 percent were on charge accounts, and 42 percent were installment sales. As of last April, approximately 26 percent of all television sales were on time. This leads to an estimate of \$181,220,000 for 1950. We can expect the percentage of time sales to increase appreciably.

Commenting on this phase of television John J. Barry, Vice President of the National Shawmut Bank of Boston, told the Financial Advertisers Association of New York a few months ago: "This infant of all advertising media already has demonstrated that the yield per advertising dollar will surpass anything man has ever devised for the distribution of his products or services. I am certain that the scramble for time franchises now going on—that is for spots in 5-, 10- and 15-minute time segments, half hours,

### Television: Its Costs and Its Profits

The average television receiver consumes approximately 270 watts per hour—far less than an electric iron, toaster or coffee maker. By comparison a radio consumes about 65 watts.

If a consumer pays two cents a kilowatt hour for his power, he can operate a television receiver for an hour for only 2 5th of a cent.

Yet due to the large number of receivers in use and the popularity of television programs, this small cost per set means \$18,500,000 additional revenue to the nation's electrical utilities.

—by J. B. Elliott at Conference of International Association of Electrical Leagues.

hours, even hours and a half—will result shortly in a sell-out for the stations in operation."

Mr. Barry went on to state that the television audience is being subjected to a form of advertising which, he believes, will wean viewers away from products and services being sold only through other media and limit their purchases and investments to those things which have been illustrated and demonstrated right in their own living rooms.

Quoting Mr. Barry still further:

"COMING OVER THE HORIZON WE SEE THEATRE TELEVISION; THE FIRST FEW INSTALLMENTS ALREADY HAVE BEEN MADE."



"In the service field, with the leveling of income which has taken place since 1939, the large middle-income group that is the bulk of television's audience is an audience for insurance, banking, investment, for the utilities, for the railroads, the airlines, for recreations, all the intangibles that go to make for better living. . ."

#### Theatre Television on Horizon

Today we have television in its broadcasting form, fully realized, rendering service, delighting millions. Coming over the horizon we see theatre television, the first few installments of which already have been made—industrial television, hospital television, department store television—new broadcasting services, some of which have never been discussed outside the laboratories.

Television broadcasting service stands today, securely established in the economy of the country, the life of many American communities and the homes of our people. It has attained this status because the team of industry and finance brought it there.

Now, even as this service grows to ever greater stature, new services, developing from the pioneer work of broadcast television, are emerging from the laboratories and finding their myriad places in the American economy, our industries and our lives.

Study them closely. They indicate that television has yet to be circumscribed by any predictable economic horizon.

# Activities of Speaker's Bureau

**T**WELVE hundred G.I.'s comprised a particularly attentive audience at Fort Belvoir. All sat well forward on the edges of their chairs, alert, watching the speaker intently. Inspired by this audience reaction, the man on the platform became even more eloquent and impassioned in his delivery. But in the midst of a sentence a gong sounded. There was a sudden surge of khaki. An officer was pumping the bewildered speaker's arm and congratulating him. In 30 seconds, the vast auditorium was empty. Not until some time later did the orator whose address was interrupted learn that the gong was the camp's mess call!

The foregoing incident is just one of many experiences reported by members of the Speaker's Bureau of the RCA Victor Public Relations Department, a group which, in the past two years, has faced audiences totalling more than 100,000 with addresses on RCA Victor products and services.

## *Staffed by Volunteers*

The Bureau is staffed by approximately 30 selected volunteers, ranging from high-ranking executives of RCA Victor to specialists in topics of interest to professional organizations. All have been carefully screened for (1) ability to present information with ease, clarity and authority; (2) knowledge of company policies; and (3) authority on the subjects about which they speak.

Engagements to speak may stem from requests received by RCA Victor from various organizations, or they may be initiated as part of the Division's own activities when there is a particular story to tell. Sponsoring groups range from small church, civic, service and luncheon clubs to large conventions or national meetings of major commercial or social organizations. The requests come all parts of the country. When the audience is a very important one, a speaker may be sent thousands of miles to address a group. Fre-

quently the cooperation of the organization's field personnel and its distributors is enlisted by the bureau to fill a desirable engagement.

After an engagement has been approved, all necessary information is assembled. This includes the name of the organization, its location, the date and time of the meeting, name of program chairman, topic, length of talk expected, type and size of audience. Where the expense is warranted, steps are also taken to assemble demonstration equipment, slides, films, or charts which may be needed to present RCA Victor's story effectively. This information is supplied to the speaker well in advance of his talk and charted by the Promotion Department to prevent conflicting engagements and assure orderly scheduling of speakers.

Every month, from 20 to 40 talks are given by representatives of RCA Victor, in churches and hotels, at veterans' meeting halls, and before Kiwanis, Rotary, Lions, Exchange and other clubs and service organizations. These activities represent a basic part of the Division's community relations program in regions where our factories and other commercial activities are located, and are proving to be a valuable element in building good will for RCA Victor and the products bearing its brand name.

## RCA COMMUNICATIONS SPEEDS INVENTORIES

Installation by RCA Communications, Inc., of an intercommunicating system between its central storeroom and stock record office, has reduced the time required for taking inventory from four to two months. This time-saving system for checking the Company's 11,000 different stock items was adopted at the suggestion of an employee.

A private wire line connects the central storeroom with the office where the stock record cards are on file. By a system of jacks, located along the bins in the storeroom, a

storekeeper can talk with the office from almost any location in the room.

When taking inventory the storekeeper or "counter" moves along the rows of bins, describes each item, counts the quantity on hand, and then, by means of a hand microphone, passes the information to the "recorder" at the master file where it is checked against the cards. This simple process eliminates the labor involved in recording each item on inventory sheets and the subsequent transfer of the information to cards.

Keeping a complete record of the 11,000 items stocked in the Central Radio Office storeroom, at 66 Broad Street, is not a "solo" job. It requires a staff of competent personnel with the ability and experience to identify immediately any one of the thousands of items required for the Company's operations. The daily routine of receiving materials and issuing supplies continues even during the two-month inventory period.

Although there are many methods of taking inventory, the staff at CRO declares the new system to be the most efficient yet devised.



INVENTORIES ARE SPEEDED UP AT RCA COMMUNICATIONS IN NEW YORK THROUGH THE USE OF AN INTERCOMMUNICATING SYSTEM FROM STOREROOM TO STOCK-RECORD OFFICE.



JOSEPH J. FLYNN, ACTING SURVEYOR OF U. S. CUSTOMS, NEW YORK, HANDS ORDERS TO CAPT. C. A. O'HARA, OF THE PORT PATROL DIVISION WHICH OPERATES THE RCA SYSTEM OF FM COMMUNICATIONS.

## Customs Bureau Adopts FM System

*(Continued from page 14)*

to this modern age of high-speed motor and air transportation.

No place, it was learned from Joseph J. Flynn, acting surveyor of the port, could be better for a practical demonstration of any communications system than New York, with its extremely long waterfront, its multitude of bridges and high structures. To safeguard the health of American citizens and to protect the government against the loss of millions of dollars through smuggling of contraband, Flynn pointed out, his mobile force must patrol 771 miles of waterfront on a 24-hour basis, several busy airfields and keep a keen eye on a constantly changing fleet of ships in the harbor and adjacent streams. In addition, urgent calls are likely to come in at any time from "trouble spots", requiring the fast dispatching of officers to the area indicated.

To perform this function, a sizable force is needed. Without radio, the difficulty of the task would be materially increased since govern-

mental economies have reduced the staff from 841 in 1947 to 542 today. But, fortunately, FM radio has stepped in to prove itself a positive deterrent to would-be smugglers, organized gangs of law breakers, and violators of the peace.

The focal points of New York's Port radio system are the patrol service headquarters at 54 Stone Street, in downtown Manhattan, and at 64 Hudson Street, in Hoboken. The 28 prowler cars, comprising the fleet, are in constant contact with these headquarters and with each other. Each radio equipped car is manned by two armed officers who can swoop down on any pier on either side of the Hudson and East Rivers and for some distance along Long Island Sound. Recently, at one of the City's east side piers, a near riot of French crew members was brought under control almost as soon as it started when a hurry call went out to the fleet and brought five fully-manned cars to the scene in a matter of minutes.

The Enforcement Division of the Collector's Office, which is charged with intercepting the smuggling of "dope" and all other undeclared merchandise into the country through intensive inspection by its searching squads has found in the RCA FM System a very effective ally. The Customs Agency Service, the investigative arm of the Bureau, frequently calls upon the radio network when operating out in the field.

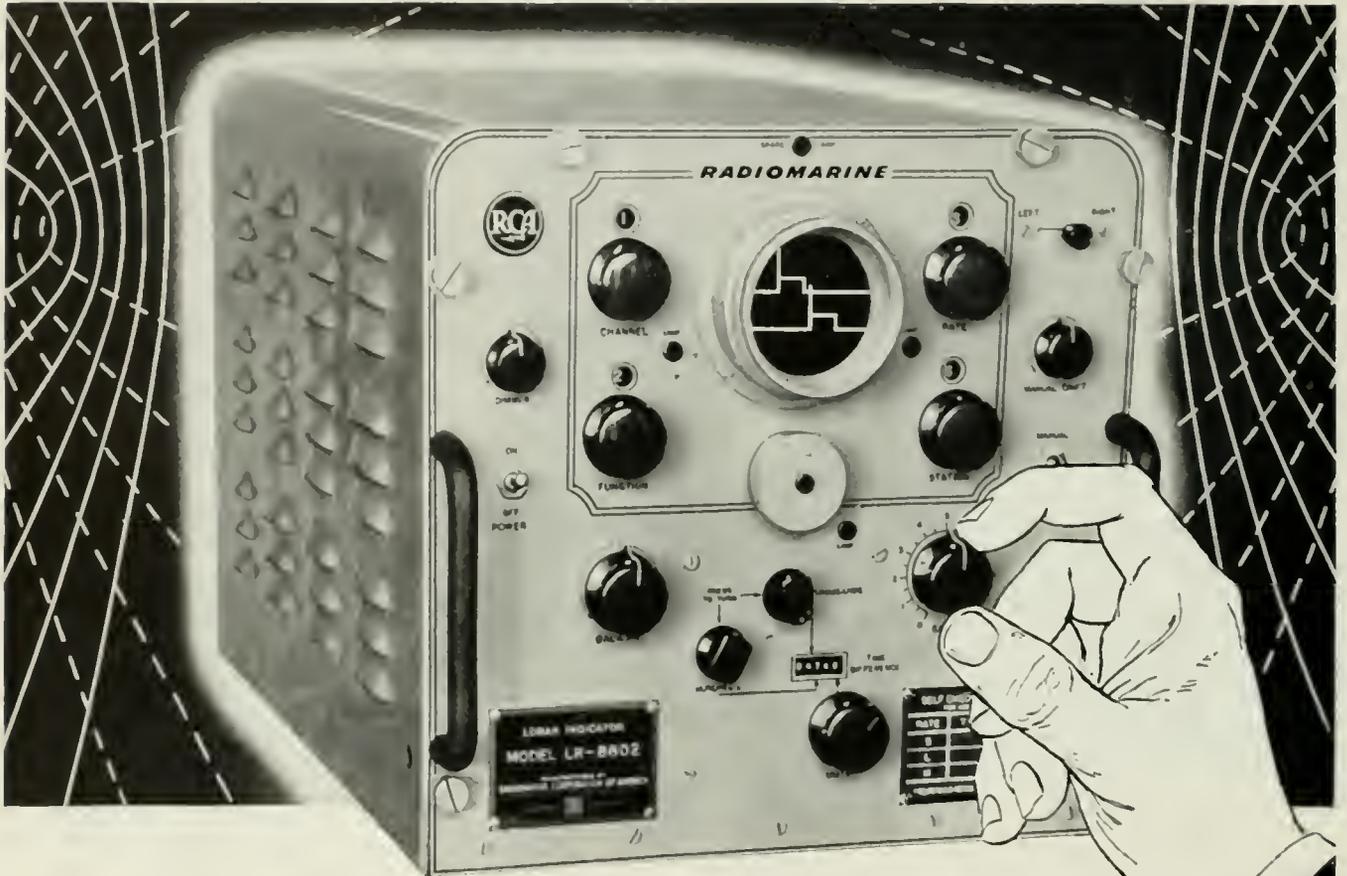
In addition to the New York system, the new FM communications units have been installed at Boston, Philadelphia, New Orleans, San Francisco and Long Beach. Plans are under way to extend these flexible radiotelephone links to Norfolk; Houston; Portland, Oregon; Seattle; Mobile and Savannah.

The equipment carried by the patrol cars has an effective radius of 25 miles but this distance can be increased by using individual cars as links in a relay reaching from headquarters to the objective point.

## View Session of UN On Large Screen TV

A direct telecast of a morning session of the General Assembly of the United Nations, reproduced on the 15- by 20-foot TV screen of the Fabian-Fox Theatre in Brooklyn on November 22, provided a dramatic foretaste of the tremendous educational opportunities inherent in theatre television, newest of mass communication media. The audience consisted of 4,000 Brooklyn junior high school students, thereby making the Flatbush Avenue theatre temporarily the world's largest classroom.

Cooperating with Fabian Theatres in presenting the events as a public service, without admission charge, were the United Nations; the Radio Corporation of America, whose theatre TV equipment was used; the Columbia Broadcasting System, whose signal was picked up; the Ford Motor Co., sponsor of the telecast; the RCA Service Company, Inc., which provided service engineers; Local 306, Motion Picture Operators Union, and Local 4, International Alliance of Theatrical Stage Employees.



# NEW RADIOMARINE<sup>®</sup> DIRECT-READING LORAN

*Easier to read . . . gets accurate fixes more quickly*

Radiomarine *direct-reading* Loran is self-sufficient and independent of all other navigational equipment. It does not require the use of chronometers, mathematical formulas, or magnetic or gyro compasses for the determination of position. The equipment does provide accurate and dependable fixes regardless of weather conditions, day or night.

The receiver-indicator may be installed on the bridge or in the chartroom in a very small space. When installed aboard passenger or cargo ships, tankers, fishing craft and other vessels, it helps the navigator maintain the shortest possible route, thus assuring a saving in time and money in operation of the vessel.

designed and engineered ahead for years of dependable performance. Complete, fast and reliable Radiomarine Service is available in 29 Radiomarine Service Stations at principal ports of U. S. and through Radiomarine's world-wide affiliates.

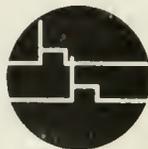
Radiomarine *direct-reading* Loran is

Write for FREE Bulletin that gives complete specifications!

**04749**

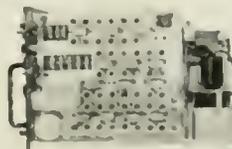
#### Direct-Reading Time Difference Meter

Complete reading of time difference appears on one meter, as shown above. Makes interpolation unnecessary. Avoids errors. Simplifies navigator's work. Helps get accurate fixes in a matter of seconds.



#### New AFC Circuits

Automatic frequency control holds signals on both the master and slave pulses even under severe fading conditions. Eliminates drift. Provides greater accuracy in matching of pulses.



#### Greater Circuit Stability

Longer useful tube life. Fewer service adjustments. Track-mounted chassis makes tubes easily accessible.



#### Convenient Mountings

Compact design and separate power supply permits mounting the indicator on a shelf or table, bulkhead or overhead. Fewer controls insure better readings.

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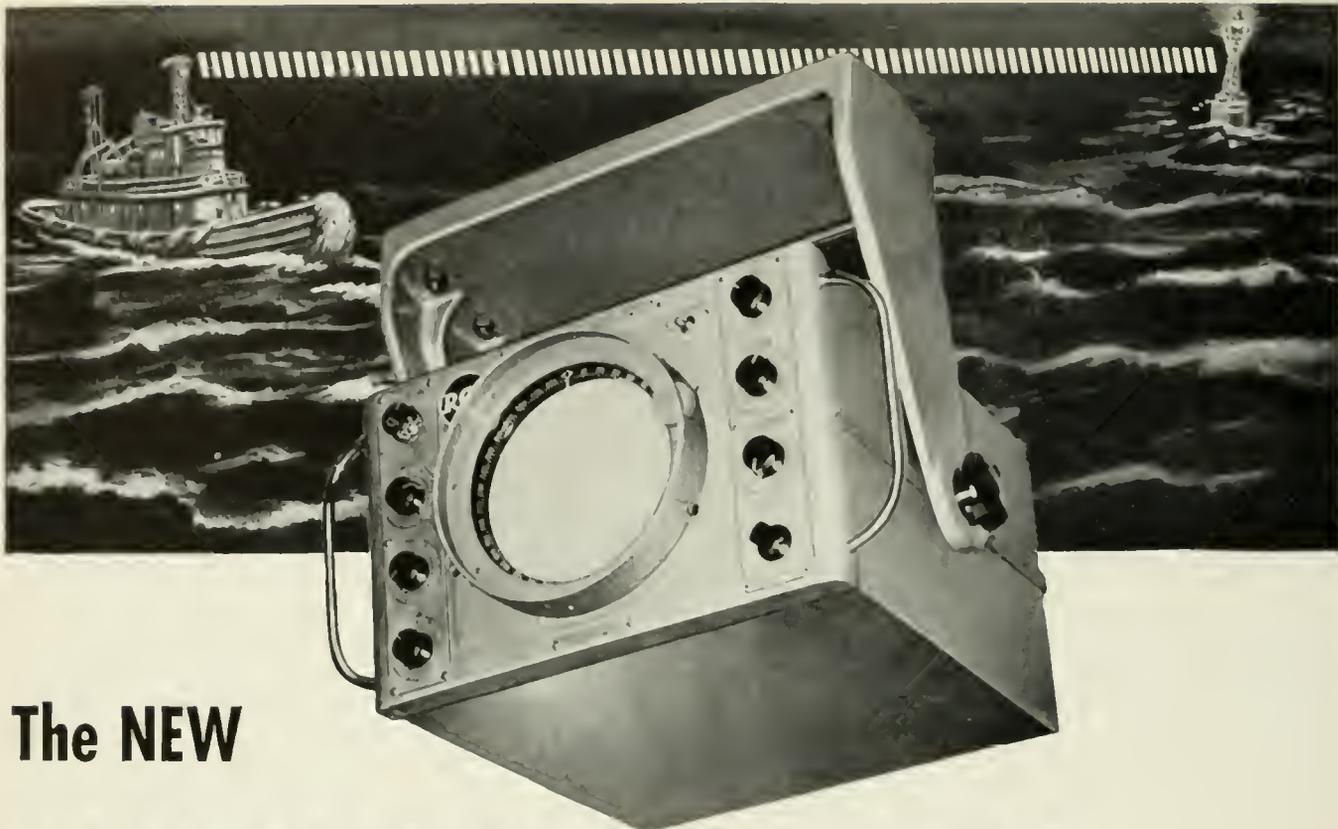


TOSCANINI



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The NEW

# RADIOMARINE® 3.2 cm RADAR...

for work boats, fishing craft and small vessels

Now, mariners aboard small craft also can enjoy the advantages of radar. This new, low-cost Radiomarine Model CR-103 offers all the advantages of modern radar. Use it for pilotage... for position finding... as an anti-collision aid... for detecting storms.

Despite its small size, it has a 30-kilowatt transmitter. Operating on a wave length of 3.2-centimeters, it

provides dependable and superior service.

Engineered and constructed to fit the small space limitations of tugs, harbor craft, trawlers, fishing craft, ferries and yachts, the CR-103 has these outstanding features:

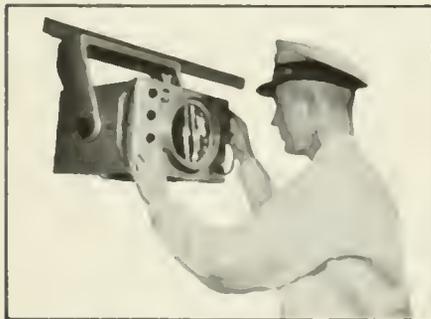
Clear images on a 7-inch scope. Operating ranges of 1, 3, 8 and 20 miles, with a close-in range of 75 yards from the antenna.

50-inch diameter low wind resistance antenna, weighs only 150 lbs.

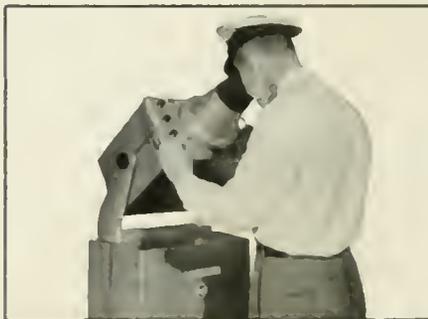
Operates from 24, 32, 115, 230 volts D. C. or 115/230 volts, 60 cycles.

Backed by Radiomarine's world-wide Service.

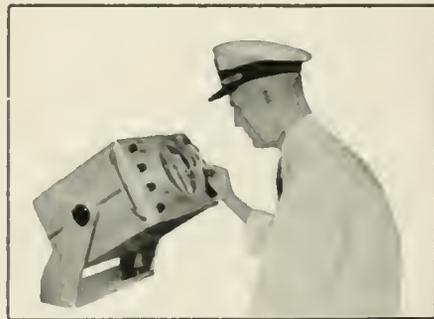
*Radiomarine CR-103 Radar will enable small vessels to operate on schedule, regardless of weather, in harbor, at sea or inland waters. Investigate its possibilities for safety and economy for your craft. Write for complete information.*



Mounted from the overhead



Mounted on Transmitter/Receiver Cabinet



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COVER

Toscanini and the NBC Symphony Orchestra are making their first nationwide tour during which the 3-year-old maestro and his 96 musicians will give concerts in 20 cities.

VOLUME 9 NUMBER 3

APRIL 1950

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- RCA Laboratories Division
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- RCA Victor Division
- 
- RCA Communications, Inc.
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- Radio Marine Corporation of America
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- Radio Central Broadcasting Company, Inc.
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- RCA Institutes, Inc.
- 
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RCA Building, New York 20, N. Y.

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FESTOONS OF RCA'S "CONES OF SILENCE" FORM ONE OF THE ACOUSTICS EXHIBITS IN THE HAYDEN GALLERY OF THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY.

# New Color Television Tube Seen Bringing Color Programs to the Home

*Sarnoff Acclaims New Development as Miracle of Science and Declares it a Key to a Practical Color Television System for Home Reception. He Sees Future of All-Electronic Color Television Assured for the Public*

A COLOR television picture tube, long recognized by scientists as vital for the complete development of a practical, simplified color television receiver, was demonstrated by the Radio Corporation of America in Washington, D.C., on March 29.

Performance of the electronic color tube in this first public demonstration, revealed beyond doubt that the scientists and engineers of RCA have succeeded in discovering and developing the only link that up to now had been missing in color television for the home. As a result, another major advance has been made in the RCA all-electronic, high-definition, fully compatible color television system.

The new picture tube, or kinescope, was shown in two direct-view types. The color picture is viewed directly on the face of the tube the same as black-and-white pictures are seen on the majority of the 5,000,000 television sets already in use. The high-definition color pictures are reproduced all-electronically. The receiver is unencumbered by any mechanical parts or revolving disks. Thus, there is no flicker, no color break-up and no whir of a disk such as characterizes any system utilizing a mechanical scanning disk.

## *Sarnoff Evaluates Color Tube*

Praising the scientists and engineers of RCA who developed the full-color tube, Brig. General David Sarnoff, Chairman of the Board of RCA, acclaimed the development as miraculous, both from a scientific and artistic standpoint.\*

\* Reprints of General Sarnoff's contemporaneous statement to newsmen at the press conference and demonstration of RCA color tube in Washington, D.C., March 29, may be obtained from the Department of Information, 30 Rockefeller Plaza, New York 20, N.Y.

"Measured in comparison with every major development in radio and television over the past fifty years," said General Sarnoff, "this color tube will take its place in the annals of television as a revolutionary and epoch-making invention. When historians at the close of the 20th Century evaluate the most important scientific developments, I will predict that this tube will be among the great inventions of the second half of this Century. As the master key to practical color television, it is an outstanding development of our time.

"We are on the threshold of a new era in television—the era of color," said General Sarnoff. "We can see ahead to the commercial development of practical and simplified color receivers. Our generation is assured of clear and natural color television programs. Generations yet to come will see around the world in color because this tube, which will go down in history as

the father of future color television picture tubes, is the key to greater achievements destined to come.

## *Scientists Congratulated*

"I congratulate the scientists, research men and engineers of RCA whose skills have achieved this great success," continued General Sarnoff. "They have made a tremendous contribution to the art and industry, and have greatly intensified television's effectiveness not only in entertainment, but in education. By learning to harness electrons to 'paint' with perfection in natural colors, these men of science and engineering have added to the preeminence of the United States in television.

"As Dr. V. K. Zworykin's invention of the iconoscope and development of the kinescope revealed to experimenters in the Twenties that the old mechanical scanning disk was a crude and impractical device for the sending and receiving of

RCA COLOR TELEVISION RECEIVERS ARE THE SAME AS THE COMPANY'S STANDARD TABLE-MODEL BLACK-AND-WHITE SETS IN SIZE AND APPEARANCE.



black-and-white television pictures, so this color tube reveals the superiority of electronics in color television," said General Sarnoff. "The mechanical scanning disk in television now belongs to the Ages. As an expedient, it merely gave laboratory technicians something to play with while the proponents of electronics applied the modern and practical methods to develop an all-electronic, high-definition, completely compatible system of color television for the American public."

Emphasizing the feature of compatibility as an engineering triumph, engineers explained that those who already own television sets, or contemplate purchase, need have no fear of obsolescence. Neither has the broadcaster any cause to fear obsolescence of his transmitter or loss of his black-and-white audience should he also broadcast color programs. Because of its compatibility, the engineers explained that the RCA color system operates at both the transmitter and receiver in complete harmony with the existing black-and-white system.

In fact, so close is its relationship with the present system that both color and monochrome are capable of existing, or operating, on the same channels, same transmitters and same receivers, except, of course, that present sets reproduce the color programs in monochrome. To see the programs in color, the present television receiver in the home can be adapted to use the new color tube, or a new receiver designed to operate with the color tube can be used.

#### *Compatibility Illustrated*

During the demonstration, the significant feature of compatibility of the RCA color system was impressively illustrated. A standard black-and-white receiver was placed between two sets equipped with the color tube. While they reproduced the color program in color, the black-and-white set reproduced the same program at the same time in black and white.

Thus, those present at the demonstration not only saw the show in color, but any one of the thousands of television set owners in the Washington area also could see it



HAROLD B. LAW, E. W. HEROLD AND RUSSELL LAW, RESEARCH SCIENTISTS OF RCA LABORATORIES, DISCUSS THE TECHNICAL FEATURES OF THE NEW RCA COLOR TELEVISION TUBE.

in black-and-white without modification of their sets and without having to change any adjustments or turn any knobs.

The engineers pointed out that such a result was impossible with a mechanical disk system, which lacks compatibility with existing receivers.

Prior to the demonstration, it was disclosed that members of the Federal Communications Commission and its engineering staff previously had been given the first — and unoffical — demonstration of the new color receivers in operation in a Washington studio of the National Broadcasting Company which had been converted into a temporary "laboratory". It was there, also, that the public demonstration was held. The programs were telecast from NBC's station WNBW, at the Wardman Park Hotel, where the television transmitter, studio and antenna are located.

The color receivers in the demonstration, in size and outward appearance, are the same as the standard RCA table-model television sets. The face of the tube appears to the observer exactly the same as in a black-and-white receiver, except that the picture is in natural colors. When color television is available for the home, the engineers declare that every tint will be clearly and faithfully

reproduced. Even the texture of the skin and delicate petals of a flower will be vividly seen true to life.

#### *Describes Color Tubes*

Dr. C. B. Jolliffe, Executive Vice President in Charge of RCA Laboratories, explained that while the general appearance of the receivers was the same as present black-and-white sets, there were modifications of circuits and additional radio tubes inside the cabinets to help the color tube perform its function.

Revealing that the RCA scientists are expanding their research to explore every possibility for further advances, Dr. Jolliffe pointed out that the two color receivers in the demonstration used different types of color picture tubes. One employed a single electron gun to "paint" the pictures. The other used three electron guns, each of which had an electron beam geared magnetically to actuate each of the three primary colors on the face of the tube and blend them true to the original scene being telecast.

"Already these two types of tubes have provided us with a vast store of new knowledge," said Dr. Jolliffe. "As is the case with the majority of inventions in the beginning, these tubes are hand-made. The next step will be to produce them commercially by mass production methods. As the human eye is

a delicate and wondrous organ of sight, so are television picture tubes. In fact, it is interesting to know that on the faces of these color picture tubes there are 351,000 color dots, and we expect to increase that number to improve the resolution for the most critical eye."

Calling attention to some of the major technical advances in the new color kinescopes, Dr. Elmer W. Engstrom, Vice President in Charge of Research, RCA Laboratories, explained that the elements that performed the color magic were built into standard metal-cone tubes. He pointed out that, while the pictures measured 9 x 12 inches on the face of the tube, still larger pictures can be achieved, in fact, the larger the tube, the easier it is to build them for high resolution.

#### *Explains Tube's Performance*

He said that the images are made to appear on the face of the tube by pencil-like beams of electrons that activate fluorescent materials representative of the three primary colors—red, green and blue. Although the trio of beams all operate simultaneously down the narrow glass neck of the same picture tube, they are ingeniously controlled so that their actions are masked from interfering with the operation of each other.

"The main difference between the two types of color tubes shown today," said Dr. Engstrom, "is that one is equipped with a single electron gun to generate the electron beam, and the other employs three guns. A duo-feature is that both tubes will reproduce color pictures when color signals are broadcast, or they will reproduce the pictures in black-and-white if the signals are in monochrome. The advantages to the owner of such a flexible receiver are obvious — he can see color broadcasts, or if the transmitter is broadcasting black-and-white pictures, the color tube will also see them that way with excellent clarity and sharp contrast.

"The electron guns which 'fire' narrow beams of electrons at the fluorescent-coated face of the tube are controlled by the video signals as intercepted by the receiving antenna," continued Dr. Engstrom. "The video signals contain the nec-

essary information regarding the color detail of the object or scene being televised. As a simple illustration, if a rose is being televised, the video signal will carry the red information as well as the green of the stem and leaves. At the receiver, the red electron beam will handle only the red, and the green beam will be influenced only by its color. With split-second precision the two beams will 'paint' the flower true to the original on the face of the tube, blending the 'fluorescent paints' in perfect harmony.

#### *Coated With Color Phosphors*

"To accomplish this," said Dr. Engstrom, "the face of each tube is coated on the inside with multiplicity of dots of color phosphors. These dots are arranged in triangular groups of three—one red, one green, and one blue. The total number of dots presently used on each tube face is 351,000 or 117,000 for each color. Behind the tube-face is a metal masking screen containing 117,000 holes of approximately the same size as the dots of color phosphor. The holes are so placed that they overlap equally each red, green, and blue dot of a triangular group.

"As the electron gun, or guns, scans the face of the tube, electrons pass through the masking screen and activate the color phosphor dots, causing them to give off visible light. When a video signal representing red passes through the electron gun, a red dot is activated. Green and blue dots are activated as signals representing those colors arrive. The amount of light in color given off by each dot varies in exact accordance with the information supplied from the video signals taken from the air. This action occurs so rapidly that the light from the activated color dots blends into the natural colors of the original scene."

Dr. Engstrom added that, in the RCA color television system, the tri-color tube operates on a standard of 525-line definition—the same as black-and-white television. This means, he explained, that images are built up with 525 lines of detail, resulting in a high level of clarity and sharpness.

Asked whether there was any one man responsible for the tube's

invention, Dr. Engstrom said that the development was the result of great teamwork among scientists, research men and engineers, all of whom marshalled their special skills and knowledge to solve the problem. Experts in the science of electronics, specialists in electron tube design, in broadcasting, in receiving sets, in fluorescent materials, electron guns and engineering, in fact, all phases of television, contributed to the achievement. Dr. Engstrom described it as "an outstanding example of what can be accomplished in the complex and ever-widening science of electronics in which no one man could possibly find all the answers to a problem." As a result, he said, the color tubes were developed by a corp of scientists and development engineers on the staffs of RCA Laboratories at Princeton, N. J., and at the RCA tube plants at Harrison, N. J., and Lancaster, Pa.

#### *Sarnoff Pointed Way to Success*

"I would like to point out, however," said Dr. Engstrom, "that, while no one individual invented the color tube, or developed the RCA color system, this is an appropriate occasion to reveal that the several hundred of us who contributed to the accomplishment were spurred on by the enthusiastic leadership and vision of General Sarnoff. When things looked dark at times, as we faced impasses, it was his support and encouragement that drove us onward. One of the dramatic stories yet to be told is that of his drive and determination that a color system and a color tube be developed on an all-electronic basis, fully compatible with the present television system to avoid any loss to the public through obsolescence. Without his indefatigable leadership and faith in our ability, we would not have reached this goal at least for many years to come. He saw what was needed, and applying wartime techniques, directed us at forced draft. Such tactics are not always productive of speed in achievement when applied to creative effort dependent for success on new knowledge and new scientific principles. But General Sarnoff has taught us that the

*(Continued on page 21)*



ON A COAST-TO-COAST TOUR, MAESTRO TOSCANINI WILL CONDUCT THE NBC SYMPHONY ORCHESTRA IN 19 CITIES.

## SCHEDULE OF CONCERTS BY TOSCANINI AND THE NBC SYMPHONY

April 14 New York	May 9 Portland
April 17 Baltimore	May 10 Seattle
April 19 Richmond	May 13 Denver
April 22 Atlanta	May 15 St. Louis
April 25 New Orleans	May 17 Chicago
April 27 Houston	May 19 Detroit
April 29 Austin	May 21 Cleveland
May 1 Dallas	May 23 Pittsburgh
May 3-5 Pasadena	May 25 Washington
May 7 San Francisco	May 27 Philadelphia



# Toscanini on Nationwide Tour

*Noted Maestro and NBC Symphony Orchestra Left April 17 for Concerts in 19 Cities from Coast-to-Coast*

**E**NTRAINING on one of the most extensive musical grand tours of all time, Arturo Toscanini and the NBC Symphony Orchestra left New York on April 17 on a transcontinental journey that will cover more than 8,000 miles during which concerts will be presented in 19 cities. None of the concerts will be broadcast.

The six-weeks trip which will be under the auspices of the RCA Victor Division of the Radio Corporation of America, has been planned in observance of the musical achievements made in America during the past 50 years. The opening concert was held in Carnegie Hall, New York, on April 14 and the final one will be on May 27 in Philadelphia.

In announcing the tour, Frank M. Folsom, RCA president said:

"The RCA Victor Division of Radio Corporation of America welcomes the opportunity to make pos-

sible this first coast-to-coast tour of Maestro Toscanini and the NBC Symphony, which today, thirteen years after its founding, is recognized as one of the greatest orchestras in the world.

"This Corporation, which has pioneered in bringing out great music to millions of music lovers through phonograph records, radio and television, is particularly happy to arrange for Maestro Toscanini and his men to visit cities where they have never been seen or heard in live concert.

"This tour serves as fitting recognition of the musical achievements of our country during the first fifty years of the Twentieth Century, a period during which the United States attained world leadership in the art of making great music and bringing it into the American home. This nation-wide tour by Maestro Toscanini underscores this accomplishment. It is also an impressive

portent for the second half of the century and our future musical culture, which will continue to develop and expand through the media of live concerts, records, radio broadcasts and television."

The Toscanini Tour Special is a veritable "hotel on wheels" accommodating 125 persons. Twelve cars, including a private car for the Maestro make up the caravan.

Toscanini's private car houses not only bedroom, bath and lounging facilities, but also a complete kitchen and an observation platform. Every effort has been made to give the 83-year-old conductor complete comfort on the 8,593-mile trip.

No less effort has been put into making the quarters of the 106 musicians and score of additional personnel comfortable. The best sleeping accommodations plus lounging and dining cars have been provided. Extra lounge and dining cars will be added to the 12-car train along the route of the trip.

The \$250,000 worth of valuable musical instruments will be transported in special baggage cars.

*(Continued on page 32)*

# 4800 FIRMS SPEED PRODUCTION

*Majority of RCA Suppliers Are Small Businesses Spread Over the Nation,  
Contributing Goods and Services in the Amount of \$125,000,000*



By Vincent de P. Goubeau

*Vice President in charge of Materials,  
RCA Victor Division.*

**T**HE electronics industry which has expanded ten times in the last two decades is like a magic wand weaving a pattern of industrial interdependence among thousands of small and large businesses.

Growing faster than any other industry and receiving tremendous impetus from television, the electronics industry has stimulated business and strengthened the nation's economy as much as any new development since the birth of the automotive industry.

Every day more and more small, independent businesses rise out of the dreams of enterprising Americans to share in the success, in the profits of this fast growing industry. There are thousands of these independent business firms, each adding its share, some in a small way, some in large and impressive proportions, to the success of an enterprise which has received universal acceptance by the American public.

Rapidly approaching a \$2 billion-a-year enterprise, television gives us a good picture of how one business affects and depends upon others. At the end of 1946 there were six television receiver manufacturers—today there are 105. In 1946 there were 6,500 television sets produced—this year it is estimated that over 4,000,000 will be

produced. One clear result of the expansion of this industry is the increased volume of business for vendors and suppliers of raw materials, components and parts to television manufacturers.

## *Television Employment Increasing*

It is estimated that there are more than 500,000 people directly engaged in the television industry. This number is growing every day. Add the thousands of others in the mills, shops, stores, factories and offices supplying raw materials, parts and services for this industry and one has a picture of American interdependence that is of a tremendous economic scope.

To bring this point home, we need only consider the contributions of RCA in the spectacular growth of the electronics industry and of television in particular. RCA's achievements have been made possible in a large measure by the support and cooperation of

independent suppliers furnishing RCA with necessary materials, parts and services. The self-contained efforts of RCA or any similar company alone could not have harvested the magnificent accomplishments in electronics which we are all aware of today.

The scope of relationship between RCA Victor, the manufacturing Division of Radio Corporation of America, and its suppliers is graphically illustrated by the fact that last year 4,800 firms supplied RCA Victor with goods and services in the amount of \$125,000,000. These 4,800 independent businesses represent a cross-section of American enterprise. About four-fifths of them have less than 500 employees; almost half have less than a hundred.

Many of these businesses were born out of the requirements of television alone. Others have their roots in earlier radio and electronic developments. Through many years of loyal and friendly associations



**79% OF RCA SUPPLIERS ARE 'SMALL BUSINESS' FIRMS**



A LARGE AND CONSTANT SUPPLY OF PLASTIC MATERIAL IS REQUIRED IN THE PRODUCTION OF PHONOGRAPH RECORDS.

between them and RCA, an interdependence has grown into a relationship which is far beyond the cold, matter-of-fact business dealings of buyer and seller. Each takes pride in the achievements of the other.

Scores of these small businesses have been helped by RCA and similar firms, receiving assistance in organization and production problems and in engineering know-how, and some, through hard work, efficiency and quality performances, have grown from small beginnings to become leaders in their chosen field, graduating into the "big leagues" of industry. Indeed, RCA Victor itself is one of these graduates. Fifty years ago its predecessor was only a 17-foot machine shop in Camden, New Jersey.

#### *Scattered in 42 States*

Scattered as they are in 42 states, RCA Victor's suppliers, large and small, are solid community assets throughout the entire nation. They offer employment opportunities which might not have existed were it not for their rela-



THE MANUFACTURE OF CABINETS FOR TELEVISION AND RADIO SETS CONSUMES HUGE QUANTITIES OF CHOICE LUMBER SELECTED FROM MANY KINDS OF TIMBER.

MANY SUPPLIERS PROVIDE THE COMPONENTS THAT GO INTO THE ASSEMBLY OF KINESCOPE PICTURE TUBES FOR TV RECEIVERS.



tionship with RCA Victor and similar companies. They contribute to the steady growth and prosperity of many communities.

Maintaining production, servicing and distribution schedules at RCA Victor depends upon a continuous flow of services and materials in quantities of astronomical proportions. Thousands of outside suppliers are depended upon to keep the wheels rolling in RCA Victor's four product departments — Home Instrument, Engineering Products, Tube and Record.

Raw materials and component

parts must flow from all corners of the nation into the three Home Instrument assembly plants at Indianapolis and Bloomington, Indiana and Camden, New Jersey and into the Company's two cabinet plants at Pulaski, Virginia and Monticello, Indiana. A few examples of annual requirements of these plants are 20,000 feet of wire and cable, 57,000,000 capacitors, and 3,000 carloads of cabinets.

Another large business of RCA Victor is that of the Tube Department whose plants at Marion and Indianapolis, Indiana; Lancaster,

Pennsylvania and Harrison, New Jersey, require tremendous stock-piles of materials from hundreds of independent businesses. As one example, these plants use three car-loads of glass bulbs for radio and television tube production every working day—more than a million pounds of glass a month.

#### *Requires Material in Steady Flow*

RCA Victor's phonograph and record production also requires a steady flow of materials into two major plants at Canonsburg, Pennsylvania and at Indianapolis, Indiana. Record label paper is used at the rate of 40,000 pounds a month and resin, compounds and packing materials are needed in equally huge proportions to keep the shelves of the nation's record dealers stocked with the favorite tunes of music lovers.

In the Engineering Products Department, a wide variety of raw materials, components and parts, is utilized reflecting the diversity of products manufactured by this Department for government an' com-



THIS "SMALL BUSINESS" MACHINE SHOP WAS THE PREDECESSOR OF THE FAR-FLUNG RCA VICTOR ORGANIZATION OF TODAY.

mercial uses. Items furnished to this Department range from tiny test gauges of delicate, watch-like precision to 30,000 pounds of steel and other material used in making a 175-foot super-gain antenna for a television station.

These few examples of essential requirements which RCA Victor

obtains from the outside give some indication of the mutual dependence of RCA Victor and its 4,800 suppliers. This relationship of mutual dependence, which is frequently taken for granted in our country, is typical of American business enterprise. It is an essential ingredient of its success.

SOME OF THE HUNDREDS OF PARTS AND SUB-ASSEMBLIES THAT GO INTO THE MAKING OF A 12½-INCH TELEVISION RECEIVER.





# First "Satellite" TV Station

*New Station at Bridgeport, Conn., is Being Used By NBC to Study Effectiveness of Microwaves in Providing Metropolitan Video Program Service to Outlying Communities*



By Raymond F. Guy

*Manager, Radio and Allocations Engineering, National Broadcasting Company.*

AMERICA'S first custom-built ultra-high-frequency television station to be licensed by the Federal Communications Commission for the specific purpose of studying the availability of microwaves in providing full-scale video program service is now in regular operation on a hilltop near Bridgeport, Connecticut. The station equipment was designed by the Radio Corporation of America and was installed and is operated by the National Broadcasting Company under the call letters of KC2XAK.

Intended to function solely as a "satellite" station, KC2XAK does not originate programs but picks up video signals telecast by WNBC, New York, and retransmits them on the frequencies of 529-535 mc. Results of field tests now being conducted are expected to be an important factor in determining the feasibility of opening the uhf band from 475 to 890 megacycles for the extension of commercial television program service to cover the entire country.

Bordering Long Island Sound approximately 55 miles from New York City, Bridgeport was chosen for the site of the experiment for two reasons. First the city is on the fringe of the area served by New York television stations and therefore is not adequately served by metropolitan transmitters. Sec-

ondly, this particular Connecticut community is situated on rolling or hilly country which provides an opportunity to study the effects of this type of terrain on the transmission and reception of uhf waves. An estimated population of 350,000 would be reached by the station's signals. A site for the station and tower was selected on Success Hill, 200 feet above sea-level and slightly more than two miles northeast of the center of Bridgeport.

Once preliminary details had been settled, the project moved ahead rapidly. The transmitter

building was completed on November 15, 1949, and 35 days later the 40-foot, specially-designed slot antenna was in place atop the 210-foot tower. Regular program operations began on December 29.

Program material for the satellite operation is picked up direct from Empire State tower by a six-foot parabolic antenna attached to the tower's 180-foot level. The signals are led downward to receiving equipment in the transmitter building, processed there and then retransmitted on the station's assigned uhf frequency. The com-



ENGINEER TUNES SLOT-TYPE ANTENNA BEFORE IT IS LIFTED TO TOP OF 210-FOOT TOWER OF BRIDGEPORT STATION.



PARABOLIC RECEIVING ANTENNA BEING TESTED BEFORE INSTALLATION ON THE STATION'S TOWER.

[RADIO AGE II]

A WINDING ROAD CLIMBS UPHILL THE TRANSMITTER BUILDING AND TOWER OF RCA-NBC'S NEW EXPERIMENTAL UHF TELEVISION STATION ON SUCCESS HILL, NEAR BRIDGEPORT, CONN.

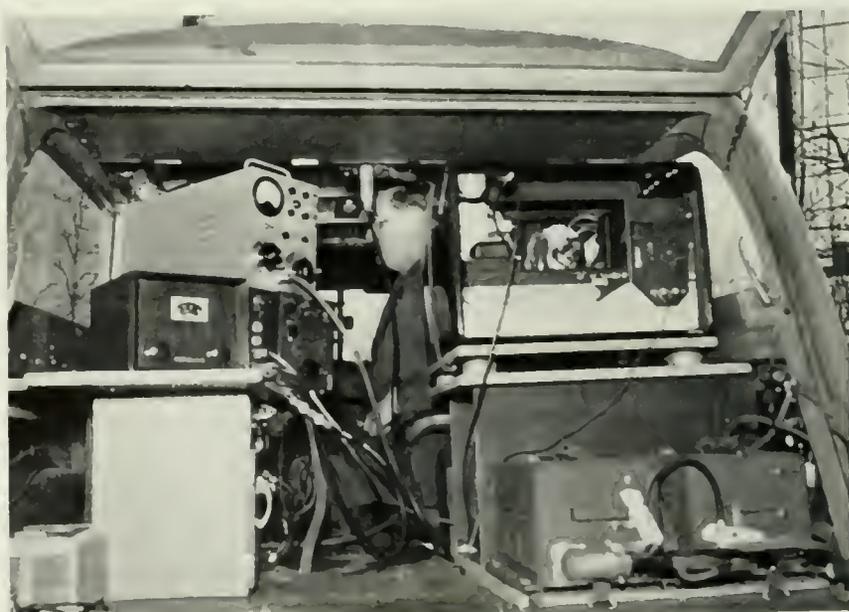


"BOW-TIE" ANTENNA (IN CIRCLE) IS ONE OF SEVERAL TYPES OF UHF RECEIVING ANTENNAS UNDERGOING TESTS IN THE BRIDGEPORT AREA.

combination of transmitter output and a high-gain antenna radiate the picture signals with a power of approximately 14,000 watts.

Special uhf tuners and converters were designed for installation in 100 homes and check-points throughout KC2XAK's service area. These instruments are located at distances in excess of 30 miles from the transmitter. Observers at these points make frequent reports of the quality of reception to the station where the data are recorded on a chart representing the service area. In addition, a station wagon, carrying sensitive measuring instruments, roams the surrounding countryside recording the strength of signals at varying distances from Success Hill. Several types of receiving antennas are being tried out to determine the one most suitable for conditions that are likely to be encountered in similar typical communities throughout the country.

Despite the numerous investigations of uhf propagation that have been carried out during past years, many more exact studies are to be continued at Bridgeport. In particular, engineers need more data



EXTERIOR AND INTERIOR VIEWS OF THE STATION WAGON WHICH IS BEING USED THROUGHOUT THE NORMAL SERVICE AREA OF THE BRIDGEPORT UHF "SATELLITE" TO MEASURE THE STRENGTH OF THE TRANSMITTED SIGNALS AT DIFFERENT DISTANCES FROM SUCCESS HILL.

on the effect on reception of intervening buildings and hills. Because of the lack of satisfactory means for measuring the strength of TV signals in locations where hills lie between the receiving antenna and the station, NBC is proposing to utilize a helium-filled balloon carry-

ing a small antenna and a detecting device which is connected to measuring instruments at ground level. The information to be obtained will provide a pattern showing the travel of waves in the vertical plane.

Engineers also want to know  
(Continued on page 24)



CONTAINING FOUR MINIATURE TUBES AND ALL BATTERIES, THE RECEIVER IS SMALL ENOUGH TO FIT EASILY INTO A POCKET OR MILADY'S HANDBAG. BELOW: COMPARISON OF PREVIOUS "PERSONAL" RADIO AND THE LATEST MODEL.

## Very Much in Very Little

*Research Develops World's Smallest Superheterodyne Radio Receiver with Highly Efficient Loud-Speaker*

RESEARCH in acoustics, conducted by engineers at RCA Laboratories, Princeton, N. J., has resulted in the development of a pocket-size laboratory model superheterodyne radio receiver smaller than any previously designed with a loudspeaker. Dimensions of the complete instrument are  $5\frac{1}{8}$  inches by 3 inches by  $1\frac{5}{8}$  inches, and the total weight, including batteries is only three pounds.

In addition to a more efficient loudspeaker and horn system, smaller components and better positioning of the loop antenna were combined to give improved performance in a set one-third the size and half the weight of receivers now available, according to Dr. Harry F. Olson, Director of the Acoustical Research Laboratory.

"To develop a set of this size with performance equal—or in this case, superior—to larger portable radios, meant that an increase in loudspeaker efficiency had to be achieved to compensate for the reduction in power output," Dr. Olson

explained. "The most significant step in this direction was realized by using the movable lid of the receiver case as a horn for the loudspeaker. With this single innovation the set's performance was increased four-fold over existing models."

When the lid of the case is raised, a tapered horn approximately five by three by one and a half inches is formed, he continued. This provides much more effective amplification than any horn which could be incorporated in the case and wastes no space when it is closed.

"The speaker itself is only the diameter of a silver dollar, but, by using better materials in the magnet itself and in the surrounding structure, higher flux density in the air gap is achieved," Dr. Olson said. "This improves the loudspeaker's efficiency by two to one."

The electrical input to the speaker of the new receiver is only one-sixth that produced in current models, but the eight-to-one gain in



loudspeaker overall efficiency enables the miniature set to provide better performance, it was pointed out.

The RCA development employs four sub-miniature tubes in its superheterodyne chassis—one radio frequency amplifier, one intermediate frequency amplifier, one combination audio amplifier and diode, and one power output tube. This is the first time these tubes—one-third the size of their predecessors—have been used in this type of receiver.

The power supply consists of two  $22\frac{1}{2}$ -volt hearing aid batteries and a single  $1\frac{1}{2}$ -volt flashlight cell to provide filament current.

By placing the antenna loop in the false lid of the case it is able to operate with greater efficiency than if it were in close proximity to the receiver.

# Industrial Television Demonstrated

*Using New Vidicon Camera Tube, the New, Simple, Compact System Extends Sight for Aid to Science, Industry and Education — Can Be Adapted for Color Pictures*



By P. B. Reed

*Manager, Industrial Equipment,  
RCA Engineering Products Dept.*

TELEVISION'S expansion beyond the field of entertainment has begun. Within the past few weeks, the Radio Corporation of America has presented dramatic evidence of how it can be used to extend human sight for benefits to industry, science, education, security and other non-broadcast endeavors. Behind the advance is the development by RCA Laboratories of the smallest and simplest television equipment ever devised.

This system, first revealed to the public at the 1950 Convention of the Institute of Radio Engineers in New York City, March 6 to 9, was demonstrated the following week for the New York City Department of Correction to show its effectiveness in prison security.

The demonstration, presented in the City Prison of Manhattan, revealed the usefulness of RCA's experimental industrial television system for observing prisoners during relaxation and exercise periods, as well as at work.

For the demonstration, RCA utilized three television camera chains operating in a closed circuit with monitors in the warden's office. One of the monitors was connected to a camera covering the fourth floor tier of prison cells and showed the guard patrolling the catwalk

while prisoners took their morning relaxation and exercise.

Another camera chain, linked to the prison laundry, picked up prisoners at work with machines and clothing. The demonstration ended with the camera on the fourth floor monitoring prisoners as they returned to their cells.

Development of the system involved two separate phases. First came the design of the remarkably small and sensitive pickup tube known as the Vidicon. The second phase involved the engineering and designing of the camera and monitor-control unit. All of this work was under the direction of Dr. V. K. Zworykin, Vice President and Technical Consultant of RCA Laboratories. Details were described in technical papers presented at the I.R.E. Convention by Dr. Paul K. Weimer and Richard C. Webb of the Laboratories staff. Stanley V. Forgue and Robert R. Goodrich assisted Dr. Weimer in developing the Vidicon, and J. M. Morgan aided Mr. Webb in the development of the over-all system.

## *Future Uses of System*

Future possibilities of industrial television include the monitoring of operations from a distance, especially where nearness would mean danger; the enabling of many per-

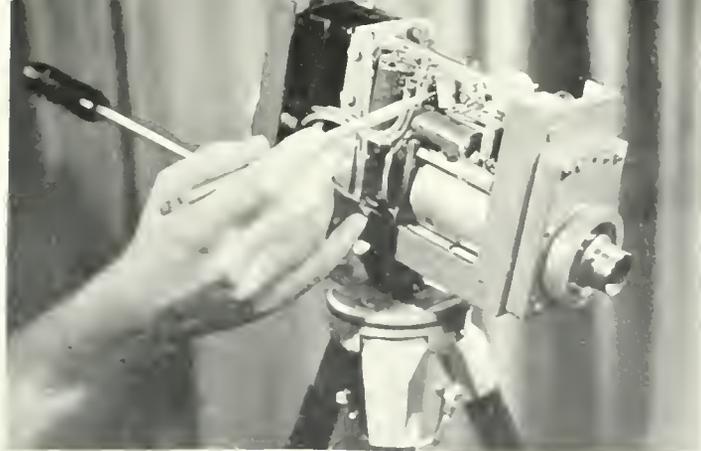
sons to view a given procedure or activity, and the supervising or coordinating of a number of operations from a central position.

Installation of the equipment in prisons, banks, and other restricted areas could prevent episodes such as the recent robbery of the Brink vaults in Boston. By television, it is possible to monitor all personnel and visitors and literally see a thief in the act. Furthermore, the equipment would be valuable for identification and verification purposes. It could scrutinize passes, security papers, and similar documents from a remote point. A number of restricted areas could be guarded by a single officer stationed at guard headquarters or some other central point.

The closed circuit television system is also expected to become a powerful instrument in education, bringing great teachers into the presence of hundreds or thousands of students simultaneously. Medical students, for example, need no longer be relegated to distant seats in the amphitheatre. Instead, through the new medium, they may be brought directly to the operating table. In colleges, close-up views of experiments, demonstrations, and microscopic studies may be enlarged and projected instantaneously for convenience in teaching large

SMALLER TELEVISION CAMERAS, IDEAL FOR INDUSTRIAL AND EDUCATIONAL USES, ARE MADE POSSIBLE BY A DIMINUTIVE PICKUP TUBE CALLED THE VIDICON.





LEFT: INTERIOR OF SMALL CAMERA SHOWING THE VIDICON TUBE AT THE LOWER RIGHT CORNER OF THE CASE. BELOW: A COMPARISON OF THE RELATIVE SIZES OF THE STANDARD IMAGE ORTHICON CAMERA TUBE AND THE NEWLY DEVELOPED VIDICON.



groups of students. The armed forces are experimenting with a television hook-up between classrooms to make more effective use of topnotch instructors for mass training of personnel.

The new RCA television chain may become the expendable eye that can watch dangerous industrial and scientific processes where it would be unsafe for a human observer. The progress of multiple, long-time tests at different places may conveniently be followed from one central point. Phenomena associated with nuclear reactions can now be observed from a safe position. Diverse operations may be studied directly in a central office. Enlargement of subjects on the television screen also reduces eye fatigue and promotes greater efficiency.

#### *Will Facilitate Inspection*

For inspecting the underside of industrial products and materials, and for exploring the interior of products such as cylinders, cannon bores, and tanks, the camera will have numerous applications. It will also facilitate inspection of the insides of oil well casings, factory chimneys, grain elevators, and many other relatively inaccessible industrial areas.

Possibilities of industrial television also include such applications as comparison of the television image with a standard, either optically or electrically, for purposes of product inspection, registration of materials with respect to each other, or location of objects on some pattern such as a map. Since visual details can be represented by wave shapes, television could pro-

vide signals that would motivate automatic controls or indicators.

Still photography may be employed to make permanent records from the screen of the monitor, while motion picture photography may be used to record high-speed data for later examination or study. The ability of television to detect infrared and ultraviolet radiations, associated with some industrial and scientific processes but invisible to the human eye, offers still further possibilities for future applications.

These various services eventually will be available in color, as well as in black and white. While surveys have indicated that black-and-white coverage will meet the requirements of most industrial users, engineers at the RCA Laboratories now are working on color equipment to fill needs that may arise.

The Vidicon tube, which measures only one inch in diameter and six inches in length, represents a departure in pickup tube design, in that it operates on the principle of

photoconductivity, while the image orthicon and other current pickup tubes in general use employ photoemissive cells. Ordinary 16mm motion picture lenses, which are comparatively reasonable in cost, work satisfactorily with the one-inch Vidicon.

The system is capable of transmitting a signal 500 feet over a coaxial cable closed circuit, giving it enormous flexibility for a wide range of industrial applications. It has a scanning frequency of 525 lines, 60 frames interlaced, and is almost compatible with standard television broadcasting techniques. Home television receivers can be adapted for use as monitors by the addition of a single tube, with accompanying resistors and capacitors, at a very modest cost.

The master control unit of the system is 24 inches long, 15 inches high, and 8 $\frac{1}{2}$  inches wide, and weighs 58 pounds. It contains a regulated power supply, small synchronizing signal generator, a video amplifier strip, and all the scanning

*(Continued on page 30)*

# NBC's Saturday Night Revue

**YOUR SHOW OF SHOWS**  
FROM NEW YORK

**JACK CARTER SHOW**  
FROM CHICAGO



Comedion Sid Caesar and supporting cast in one of the many acts that comprise a performance of NBC's 150-minute television variety shows on Saturday nights, from 8:00 to 10:30 EST.



Jack Carter, emcee, handles the Chicago portion of the Revue from 8.0 to 9.00 p.m. EST.



Marguerite Piazza, who has been featured often as an operatic soprano on the Saturday TV show.



Imogene Coca has been featured regularly in vocal satires and, with others, in comedy routines.



Bill Hayes, boritone, and the team of Nell Fisher and Jerry Ross, interpret dance novelities for the television audience.



Robert Merrill, RCA Victor recording star, has appeared on the Revue in operatic scenes.



Burgess Meredith, stage and screen star, acted as guest emcee from New York on the first two shows.



Gertrude Lawrence, noted stage actress, was featured in one of the high spots of the opening program.



Marguerite Piazza, operatic soprano, and a member of the Revue's dancing company in a ballet number.



Screen star Don Ameche, songstress Dorothy Claire and master-of-ceremonies Jack Carter in a comedy skit.



Mischa Elman, distinguished violinist, made his television debut on one of the early NBC variety programs.



Anita Alvarez, dancer, joins with Robert Merrill, tenor, in a modernized scene from "Carmen."



Comedienne Imogene Coca and Choreographer James Starbuck in a comedy skit based on the romantic fairy tale of "Cinderella."



The three Hamilton Dancers present "The Story of Dangerous Dan McGrew" as an innovation in modern ballet.



IN THE EARLY DAYS, MUSICIANS HAD TO SIT ON CROWDED TIERED BENCHES SO THAT ALL INSTRUMENTS WOULD BE IN RANGE OF THE RECORDING HORN.

THE FIRST TALKING MACHINE TO FEATURE A CONCEALED HORN WAS PRODUCED BY VICTOR TALKING MACHINE COMPANY IN 1906.

## The Phonograph Comes of Age

*Seventy-two years of Progress in Music Reproduction have Resulted in the Introduction of the 45-rpm System with its High-Quality Discs and Fast, Automatic Record Changer*

**B**y curious coincidence the nursery rhyme "Mary Had a Little Lamb" has been the Alpha and Omega in the evolution of the phonograph. For it was a verse to this tune which Thomas Alva Edison recited into the funnel-shaped opening of a strange-looking contraption one summer day in 1877, and seventy-two years later RCA Victor included the same melody in the first selections recorded for the introduction of its new 45-rpm system of high quality records and fast automatic reproducing instrument.

In the more than three-score-and-ten years that have elapsed since the Wizard of Menlo Park succeeded in making a machine "talk," the phonograph has passed through many evolutionary stages. Each advance was a notable one yet none has done more to further the enjoyment of the world's best music than the remarkable new combination of 15-rpm records and the fast automatic record changer introduced by RCA in 1949. But to appreciate to the fullest extent the impact of this newcomer on the field of home entertainment, a review of the history of recorded music is desirable.

Basically, Edison's original model of the "talking machine" consisted of a brass cylinder wrapped with a

sleeve of tinfoil. Mounted on each side of the cylinder were two instruments, the sound recorder and reproducer. Similar in construction, each contained a mica diaphragm connected to a short chisel-like stylus or needle. Vocal sounds introduced into the recorder caused the diaphragm to vibrate. This, in turn, forced the needle to make indentations on the tinfoil as the cylinder was rotated by a hand crank. Then by inserting the needle of the reproducer at the beginning of the grooved record and again turning the cylinder, the indentations in the tinfoil caused the stylus and diaphragm to vibrate, thus reproducing the sound.

### *Early Machine Only a Novelty*

For a brief period, the economic value of the crude phonograph lay solely in its exhibition qualities. Many skeptics went so far as to dismiss the instrument as merely a feat of clever ventriloquism, but its inventor was not discouraged. Edison made larger and more refined models which he displayed before President Hayes, members of Congress and in cities throughout the country. However, when the coming of the electric light impelled the inventor to shift his



major efforts to this new field, others soon arrived on the scene to continue along the lines he had started.

Early in the 1880's, the Volta Laboratory, headed by Dr. Alexander Graham Bell, developed a wax cylinder on which sound grooves could be cut spirally. A reproducing machine, which Bell dubbed the graphophone, was used to play the records. Spurred by the accomplishments of his rival, Edison resumed his work in this field and devised a similar wax cylinder record as well as an instrument for reproducing the sound.

In making the recordings, both Edison and Volta adopted the "hill and dale" method, whereby the variations in sound were translated into elevations and depressions in the bottom of the record groove. Although the reproduction quality

and articulation were adequate, the volume was so low that listeners were required to use ear tubes. In appearance these early talking machines closely resembled a dictating machine and despite their acoustical deficiencies, were used as such in business offices for a limited period during the nineties.

Following close in Edison's footsteps was Emile Berliner, who patented the "gramophone" in 1887. The Berliner machine used a cylinder coated with lampblack. However, the German-born inventor's greatest contribution to the advancement of the phonograph came a short time later, while trying to solve the recording problem from a new approach.

Berliner's system featured a flat disc record with a groove that not only vibrated the stylus of the phonograph to reproduce sound but also piloted the sound box and the horn across the record. Opposing the hill-and-dale method, his record vibrated the stylus laterally by means of modulations in the side walls of the groove. Although the reproduction quality of this record was inferior to that obtained by his rivals, the volume was loud enough to eliminate the need for ear tubes. A manufacturing technique also was developed by Berliner for producing duplicate copies from a master record.

Well aware that his phonograph needed the touch of a mechanical expert, Berliner in August 1896 took his instrument to the Camden, N. J., shop of Eldridge R. Johnson, a recognized genius of machines. As a result of Johnson's success in eliminating defects in this model,

he was given a contract to produce instruments for the Berliner Gramophone Company. At the same time, Johnson continued with his own experiments and devised a spring motor with a governor which would insure a constant turntable speed. Johnson also developed a new disc type record, superior to any then on the market.

For the next few years, the flat disc record competed with the wax cylinder. When Berliner was forced out of business by his competitors, Johnson bought up many of the company's patents to supplement his own and in 1901 formed the Victor Talking Machine Company.

#### *Critics Finally Convinced*

Prior to the establishment of the Victor Company, the phonograph had not yet emerged from the toy or novelty class. One of its most common uses was as a nickelodeon in hotel lobbies, barrooms and railroad stations. But through Johnson's persistent efforts, the talking machine gradually won over its critics and gained recognition as an instrument for home entertainment.

It was about the same time that Johnson made another of his master moves. He succeeded in signing Caruso to record for Victor in this country. The great tenor's action encouraged other artists who theretofore had been reluctant to risk their reputations on the "new-fangled contraption." Victor's first catalog of Red Seal records, issued in 1901, created the impetus that aided the phonograph in becoming a dignified instrument for musical appreciation.

In those years, talking machines were sold in bicycle shops, hardware stores and sewing machines shops. Johnson, familiar with the tricks of merchandising, convinced the Lyon & Healy Company of Chicago, then the largest musical house in the world, to handle his company's phonographs and records. Opening of such important sales outlets for Victor products doomed to obsolescence the old cylinder records still being produced by Johnson's competitors.

To obtain better reproduction, larger horns came into use. However, because they finally became too heavy to rest on the record without damaging the grooves, the horn was attached to the cabinet, an arrangement that continued for only a short time. With the introduction of the Victrola phonograph in 1906, the era of the phonograph with the external horn was brought to a close. To improve the acoustical quality and appearance of the phonograph, the horn of this model was housed within the cabinet.

All recording and reproducing during the early days of the talking machine were accomplished by acoustical methods. Artists spoke or sang into a large recording horn which caused a vibrating diaphragm to actuate the recording stylus. Disadvantages of this method were numerous. For one thing, it was necessary to seat the members of a full-sized orchestra on tiered benches to bring all instruments within the limited range of the recording horn. Instruments themselves sometimes presented problems. Veterans recollect that

*(Continued on page 32)*

THE BERLINER GRAMAPHONE, PATENTED IN 1887, FEATURED A FLAT DISC AND A HORN, IN CONTRAST TO THE CYLINDRICAL RECORDS THEN IN COMMON USE.



THOMAS ALVA EDISON, INVENTOR OF THE "TALKING MACHINE" IS SHOWN HERE EXAMINING THE WAX CYLINDRICAL RECORD OF HIS 1907 MODEL PHONOGRAPH.



## New Transmitting Tube is Powerhouse of Energy

**A**FTER several years of development, a transmitting power tube, believed to be the most powerful ever produced, with a continuous output of 500,000 watts and a tested input of twice that wattage, has been announced by the RCA Tube Department. Despite its enormous power input capabilities—at least four times that of any previous RCA tube—the new product, called a “super-power beam triode” is unusually compact, measuring less than 39 inches in length and weighing only 135 pounds.

Immediate applications of this super-tube are in high-power continuous wave applications and international broadcast service. In addition, the tube is expected to open the way to new developments in the high-power field hitherto considered economically unfeasible or impractical because of the banks of tubes and size of associated equipment required.

The tube can be operated with maximum ratings at frequencies throughout the “Standard Broadcast Band” and much higher. Limitations of the tube for operation at higher frequencies and at higher power have not yet been determined.

Radically new features have resulted in a structure unique in electron-tube design. The “electron heart” of the tube is an array of 48 independent unit electron-optical systems arranged cylindrically in the tube. The great power capabilities of the new tube are due largely to the successful achievement of this design, which, in effect, concentrates 48 triodes in relatively small space.

In detail, each of the independent electron-optical systems consists of a filament in a slot in the beam-forming cylinder, grid rods, and the copper anode. Electrons leaving the emitting surface of the filament are beamed between two grid rods to the anode by the focusing action of the beam-forming cylinder.

The mechanical structure embodied in the electron-optical system permits close spacing and accurate alignment of the electrodes to a degree unusual in high-power tubes.

**super  
power  
beam  
triode**



DR. L. P. GARNER OF THE LANCASTER, PA., PLANT EXAMINES ONE OF THE REMARKABLE 500-KILOWATT TUBES WHICH HE AND HIS ASSOCIATES DEVELOPED.



BRAZIL'S FIRST TELEVISION STATION WILL BE LOCATED ATOP THE STATE BANK BUILDING, HIGHEST EDIFICE IN SÃO PAULO.

## Brazil to Have Television

*Most Modern Equipment for Studio, Transmitter and Remote Pickups to be Ready for Use this Summer at Sao Paulo*

**B**RAZIL'S largest radio network — Emissoras Associadas — is proceeding with its plans to introduce television in the fast-growing business center of São Paulo. Equipment for the project is being supplied by the Radio Corporation of America. The station is expected to be on the air this summer.

Arrangements for the installation of the television transmitter, as well as associated studio and mobile pickup equipment, were begun in 1948 and concluded during a recent visit to the United States by Dr. Assis Chateaubriand, Director General of the Brazilian network, according to Meade Brunet, a Vice President of RCA and Managing Director of the RCA International Division. The transmitter and antenna will be located atop the State Bank Building, highest structure in São Paulo.

"The installation," added Mr. Brunet, "will include what is known as a three-bay super-turnstile antenna, erected 520 feet above street level and capable of radiating 20 kilowatts of power. New studios

are under construction in Sumare, a São Paulo suburb. Since the city utilizes a 60-cycle power supply, it will be possible to adopt the U. S. television standard of 525 lines and 60 fields. The station will operate on 60-66 megacycles, equivalent of channel 3 in this country.

Provisions are being made for the use of RCA microwave transmitting equipment between the studio, out-

door mobile pickup units and the main transmitter.

The contract providing for the installation was arranged through RCA Victor Radio, S. A., the Brazilian associated company of RCA.

Mr. Brunet also revealed that since 1946 the Brazilian network has purchased from RCA 11 radio broadcasting transmitters, which have been erected in that country's principal cities. He said the network this year has purchased two 50-kw transmitters for installation at the strategic ports of Bahia and Porto Alegre. At the same time, a 10-kw transmitter was acquired for installation at Recife.

### New Color TV Tube

*(Continued from page 5)*

word 'impossible' has no place in our vocabulary."

"Now, having demonstrated the practicability of the color kinescope," concluded Dr. Engstrom, "our objective is to continue its development aggressively. We are confident that we shall achieve steady improvement and refinement in design and performance for we know from experience in radio and television that the science of electronics offers unlimited opportunity for continued progress. We have lifted the opening curtain on color television, and it will be our purpose to have color tubes ready for commercial production at the earliest possible date, so that the show can go on in color—as well as in black-and-white—for the pleasure of the public."

FRANK M. FOLSOM (RIGHT), PRESIDENT OF THE RADIO CORPORATION OF AMERICA, PRESENTS THE NOTED CONDUCTOR-PIANIST JOSE ITURBI WITH A GOLD-PLATED 45-RPM RECORD OF CHOPIN'S "POLONAISE", COMMEMORATING THE MILLIONTH PRESSING OF THE RECORDING MADE BY ITURBI.



# Empire State Tower to Undergo Antenna Change for Better Television Service

*Present Array — the Sixth in Video History — to be Replaced by 199-Foot Column which will Support Antennas of Five Television Stations*

THE pinnacle of the Empire State Building, now 1250 feet above New York's streets, soon will lift its already lofty head 199 feet farther into the clouds. The move is to be made to improve the video program service provided by television broadcasters in the metropolitan area. The National Broadcasting Company, which, since 1931, has been beaming TV signals from its perch atop the world's tallest skyscraper, recently signed an agreement with Empire State, Inc., owners of the structure, whereby it will share this exceptional location with the American Broadcasting Company, Inc. (WJZ-TV), Columbia Broadcasting System, Inc. (WCBS-TV), Allen B. DuMont Laboratories Inc. (WABD), and WPIX Incorporated. Plans are under way for construction of a tower high enough to support individual antennas for the building's new television tenants.

Centralization of TV transmitters at the Empire State Building—highest point from which television broadcasts are made on the Atlantic Seaboard—will make it possible for the antennas of most

local video receivers to be oriented to this single location. It is expected that signals of some of the newcomers not only will travel beyond their present limit of service, but will provide better images generally. The new arrangement should be especially helpful to viewers in Manhattan's more congested sections where reception now is often marred by "ghosts" and other distortions due to the location of transmitters.

## *Present Mast to be Dismantled*

In order to make room for the new installation, the present 61-foot, 4½-ton mast will be dismantled. However, NBC's scheduled transmissions will not be affected during the change. Temporary antennas at the sides of the building will be used until the replacement is completed. At that time, WNBT will have priority for top position on the television totem pole.

Veteran engineers at WNBT regard erection of a new television antenna, with its temporary inconveniences, as a somewhat commonplace occurrence. Since NBC's pioneer station, W2XBS, took up

its abode atop the skyscraper, nineteen years ago, six different antennas have been constructed to meet the needs of the new industry. These technicians have watched television progress from mechanical systems producing peep-hole size pictures to all-electronic equipment capable of reproducing theatre-size images.

A few Company pioneers can remember the infant days, back in 1927, when RCA began work on television at its Van Cortlandt Park laboratory in New York. When the first permanent TV broadcasting license was issued for W2XBS in December, 1928, the station's equipment included a circular aluminum scanning disc with 48 holes located in a spiral near its outer edge, capable of scanning 15 complete pictures per second, feeding a transmitter of a few hundred watts output.

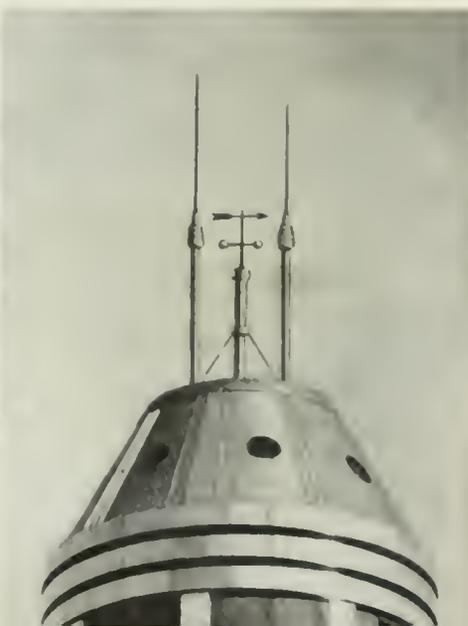
Later, this pioneer experimental station was moved to the RCA Photophone Building at 411 Fifth Avenue with virtually the same operating equipment, except for a 60-line rotating disc which scanned 20 pictures per second. Experiments con-

1931—THIS "DIAMOND" ANTENNA WAS INSTALLED ON THE 105TH FLOOR PARAPET OF THE EMPIRE STATE BUILDING.

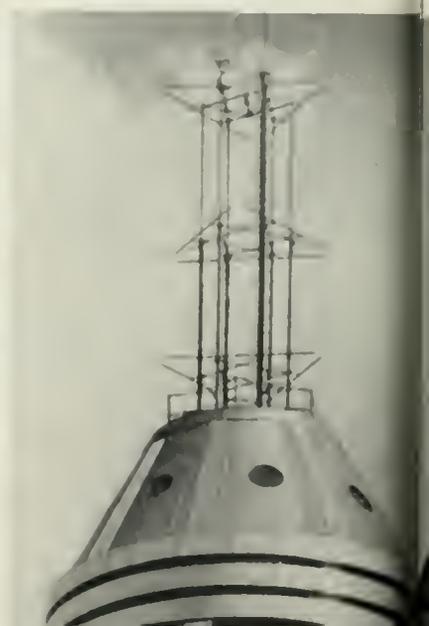


[22 RADIO AGE]

1931—FIRST PERMANENT TELEVISION ANTENNAS WERE ERECTED ON TWELVE-FOOT POLES ON THE SKYSCRAPER TOWER.



1936—AN ARRANGEMENT OF POLES AND RODS SUPPORTED THE THREE TRIANGULAR ANTENNAS OF THE SECOND STRUCTURE TO BE BUILT.



ducted from this location included a demonstration of theatre-size television pictures at RKO's 58th Street Theatre.

In June, 1930, W2XBS was moved again, this time to NBC's Times Square Studio in the New Amsterdam Theatre Building. A month later NBC took over management of the RCA station, and both companies intensified their research and broadcasting experiments. A new one-kilowatt crystal-controlled transmitter replaced the original model, and late in the year an 80-line mechanical scanning system was demonstrated.

Although W2XBS was operated primarily for experiments, a definite broadcasting schedule was maintained, consisting mainly of posters, photographs and moving objects, such as Felix the Cat and Mickey Mouse revolving on a phonograph turntable.

Among the tests made by RCA-NBC in a survey of TV transmitting locations were those conducted from the roof of the General Electric building in the summer of 1931. As a result of its findings, NBC selected the Empire State Building—the highest, most difficult and most expensive location in the world—as its permanent transmitting site. By November of that year, equipment was installed which would transmit 120-line pictures scanned mechanically at 24 frames per second on a frequency of 50-56 megacycles.

The original Empire State an-



ENGINEERS ERECT THE FIRST TV ANTENNA ON THE EMPIRE STATE BUILDING, 1250 FEET ABOVE THE STREET.

tenna was mounted on two 12-foot poles. This simple construction was used by RCA-NBC for the first ultra-high-frequency television tests ever made in the world. In 1933, station W2XBS transmitted signals between New York City and Camden, N. J., comprising the first radio relay of any length in the world, the predecessor of present-day radio relay systems.

In those days, television was "just around the corner" but as it turned out, the new art still had a long way to go. During succeeding

years television research was intensified; the iconoscope, television's electronic "eye", was perfected; the all-electronic experimental system transmitting pictures based on 240 scanning lines at 24 frames per second was followed by 313 lines at 30 frames per second. To accommodate each of these improvements, it was necessary to modify transmitting equipment and receivers.

NBC began frequency modulation experiments from the Empire State station in March, 1934, and

38—THE THIRD MAST STOOD 35-  
ET HIGH WITH RING-SHAPED DI-  
ES AS UPPER ELEMENTS AND A  
VIDEO TURNSTILE BELOW.

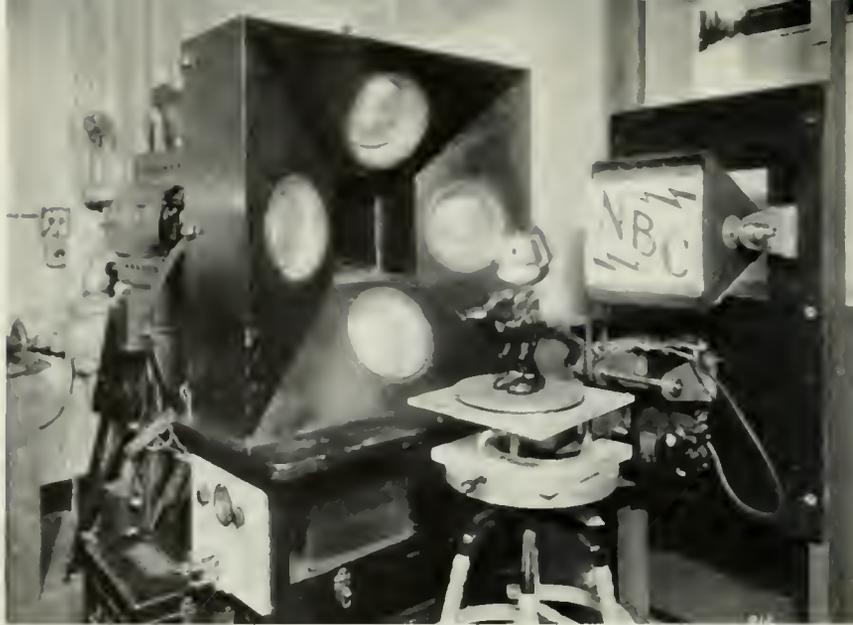


1939—THE RADIATOR PICTURED BE-  
LOW WAS ONE OF THE UHF UNITS  
ADDED TO THE MAIN ANTENNA  
STRUCTURE FOR EXPERIMENTAL USE.



1946—THE PRESENT 61-FOOT SUPER-  
TURNSTILE ANTENNA WAS ERECTED  
WHEN NBC COMMENCED TELEVISION  
TRANSMISSIONS ON CHANNEL 4.





A PLASTIC "FELIX THE CAT" WAS THE PRINCIPAL "PERFORMER" IN NBC'S EARLY EXPERIMENTAL TELEVISION TRANSMISSIONS FROM ITS TIMES SQUARE STUDIO.

continued the tests until space was needed for a much-extended video program.

When, in 1936, the Radio Manufacturers Association set television scanning standards at 441 lines, 30 frames per second, the Empire State video equipment again was modified to meet the new requirements. This time a triangular antenna, 37½ feet high, was erected. In the two years that this second structure was in service, television's progress was highlighted by coaxial cable transmissions, successful outdoor pickups, and improved 10-inch picture tubes.

To make further field tests in the New York metropolitan area, and to study problems involved in taking TV to higher frequencies, NBC in 1938, replaced its triangular antenna with a third installation. The new signal radiator consisted of a single mast 35 feet high carrying a ring-shaped arrangement of dipoles at the top for sound broadcasts and a video turnstile at the bottom. This antenna was capable of handling any one of six television channels in the low-frequency region.

One of the most significant dates in television history is April 30, 1939, when RCA-NBC started regular commercial TV program service, coincident with the opening of the World's Fair. Late that same year an additional transmitter was

installed at the Empire State Station to service NBC's FM station, W2XWG, which began regularly scheduled transmissions in January, 1940.

A year later the Federal Communications Commission set up definite television standards, calling for 525-line pictures at 30 frames per second. At this point the pattern of the future was taking form. On July 1, 1941, NBC received a license for full commercialization of its Empire State video station and call letters were changed to WNBT.

World War II interrupted television's progress as all research, manufacturing and broadcasting facilities were concentrated on national defense.

#### *Industry Resumed in 1945*

When hostilities came to an end in 1945 the struggling young industry resumed activities with unbelievable speed. The image orthicon camera tube, developed at RCA Laboratories, reduced lighting requirements both indoors and out; Eye-Witness Synchronization locked receivers in tune with the transmitting station; mechanical and later all-electronic color television were demonstrated; receivers began to roll off production lines, and transmitting and studio equipment was put on sale by RCA Victor.

Necessary alterations caused WNBT's first shut-down in the spring of 1946. The FCC had re-allocated television channels and WNBT was assigned to the 66-72 megacycle band in place of the 44-50 mc band which it had occupied previously. Four modern transmitters—including one each for sight and sound, one for frequency modulation and one for uhf experimental broadcasts—were installed during the interval, and a 61-foot superturnstile television antenna took its place on the building tower. After two months of silence on the air, WNBT was able to commence full-scale operations on its new Channel 4. In 1948, when completely new 5-kilowatt equipment was installed, the existing transmitters were retained as auxiliary units.

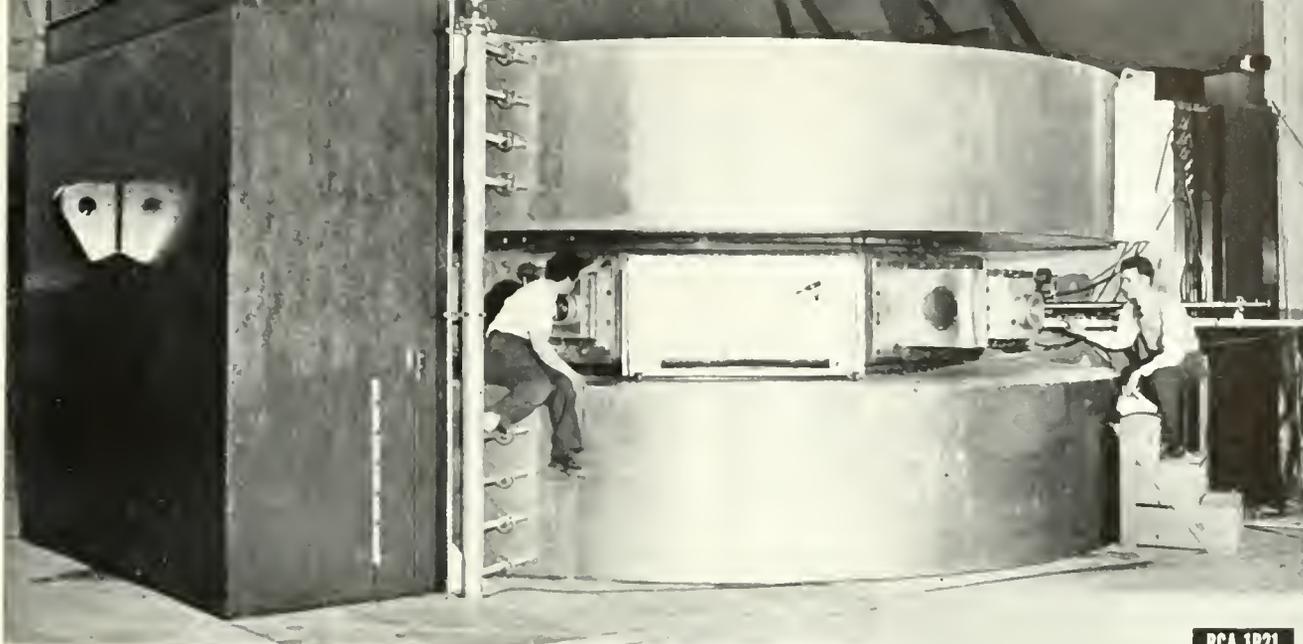
Because the new TV tower will lift New York's skyline into a higher altitude than ever before, aircraft traffic regulations will have to be altered accordingly. But far more significant than the incidental changes involved in the erection of the new mast is the better and more dependable program service which the multi-antenna facilities will make available to televisioners in metropolitan communities.

## NBC UHF TV Station

*(Continued from page 12)*

more about the paths of signals reaching the receiving antenna from more than one direction. Further tests are desired to show how the strength of TV signals varies at different times of the day and season. But what is perhaps as important as any detail is exact information about the ultimate distances over which uhf television signals travel. Knowledge of the latter will have a direct bearing on the distances which must separate stations if they are to operate without interference on the same channel and on adjacent channels.

The Bridgeport project was initiated by Dr. C. B. Jolliffe, Executive Vice President in charge of RCA Laboratories. The NBC work is under the supervision of O. B. Hanson, NBC Vice President and Chief Engineer.



THE 130-INCH CYCLOTRON INSTALLED AT THE UNIVERSITY OF ROCHESTER USES THE ULTRA-SENSITIVE RCA MULTIPLIER PHOTOTUBE (RIGHT) TO MEASURE THE RADIATIONS PRODUCED WITHIN THE HUGE DEVICE.

## Phototube Aids Atomic Research

*Improved Tube with Built-in Electron Multiplier Provides Ultra-sensitive "Eye" in the Study of Radioactive Particles*

**I**MPORTANT advances in nuclear research, astronomy, photoelectric spectrometry, and other fields involving work with light at extremely low levels are foreseen with the announcement of a greatly improved multiplier phototube by the RCA Tube Department.

Multiplier phototubes are extraordinary photoelectric "eyes" capable of picking up the feeblest illumination, converting it into electrical current, and "multiplying" or amplifying the current as much as several million times.

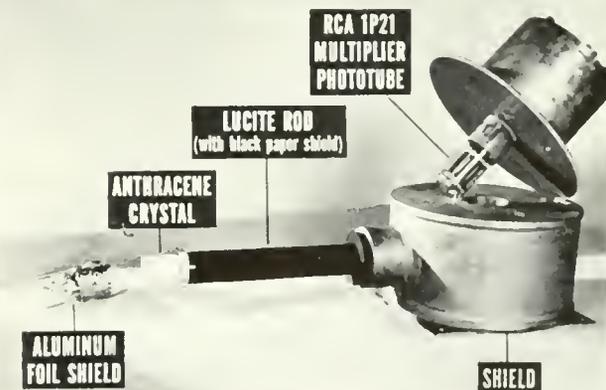
The new tube, labelled the 1P21, already established as outstanding in its field, has been made more useful as the result of a development program carried out at the Company's plant in Lancaster, Pa. One of the notable improvements embodied in the 1P21 is the six-fold reduction in operational "noise." This saving permits a corresponding reduction in the lower limit of measurable light intensities. Similarly, this extension in range makes the tube even more valuable as an aid to astronomers studying light from distant stars, to nuclear scien-

tists studying atomic radiation, and for other laboratory research work requiring measurement of light of extremely low intensity.

One interesting application of the tube has been made at the University of Rochester where operation of the institution's 250,000,000 volt cyclotron depends in great degree on the phototube. The Rochester atom-smasher, believed to be the largest built and which has been in full operation since the war, already has produced new knowledge of high energy particles and has been the means of producing mesons for nuclear study.

### *Involves New Technique*

Typical application of the new tube in atomic research involves the use of a "light-piping" technique to measure radiation generated by a cyclotron. To overcome the problem of introducing a test instrument into the cyclotron itself, this technique utilizes a long light-conductive rod of quartz or clear plastic with a phosphor on the end of it. Flashes of light or "scintillations", produced when radiations from



radioactive particles strike the phosphor, are conducted down the rod to the phototube, which is housed in a light-tight box outside the cyclotron. In this way, radioactivity caused by the cyclotron beam can be measured accurately and conveniently.

The 1P21 is particularly useful where light is to be picked up from a small area.

The 1P21 utilizes the phenomenon of "secondary emission" to achieve its enormous amplification. Feeble illumination striking the photocathode of the multiplier tubes releases a number of electrons. These electrons are swept electrically through a series of amplifying stages within the tube, snowballing into an avalanche as additional electrons are released at each stage. The greatly magnified electrical current which emerges provides a highly useful signal for research work.

# Crystals Police the Ether

*Thin Wafers of Quartz Make it Possible for All Types of Radio Stations to Operate without Chaotic Interference*



SAMPLE OF NATURAL QUARTZ CRYSTAL AS MINED IN BRAZIL'S MOUNTAINS AND RIVER BEDS.

CIRCULAR SAWS EDGED WITH DIAMOND DUST SLICE THE MOTHER CRYSTALS INTO THIN WAFERS.



QUARTZ SECTIONS ARE MOUNTED ON GLASS PLATES BEFORE SAWING THE CRYSTALS TO ROUGH DIMENSIONS.



MILLIONS of people operate their radio receivers and find each station precisely on its assigned frequency. The twist of a selector switch on a television set brings in the desired picture on its correct high-frequency channel. A fog-bound ship at sea obtains its bearings accurately from distant shore stations. An air liner makes a perfect landing in zero-zero weather. Police cars converge on an escaping criminal. A business man speeding along a highway reports to his home office by radio. Scattered groups of armed forces keep in constant radio touch with their commanding officer. Photographs are transmitted to distant points by radio signals. Much of the world's business is conducted through this modern miracle of radio communication which literally fills the radio frequency spectrum with a complex multiplicity of signals.

How is it possible, then, to avoid intolerable interference which would cause a Babel of meaningless dots-and-dashes and unintelligible voices? The answer is twofold. First, Government and international regulations assign each class of communication to specific portions of the frequency spectrum, like a certain group of keys on a piano. Second, each transmitting station is accurately controlled on its particular frequency by a truly remarkable little device called a "Crystal Unit". The heart of this unit is a small quartz plate, fashioned with great precision from a single crystal of silicon dioxide. This material, in its raw form, looks much like a hexagonal prism of glass, with somewhat irregular, tapering sides which terminate in a pyramidal apex at each end.

Natural quartz crystals are found in many parts of the earth, but the largest and best quality specimens come from the high mountains of Brazil. There is much speculation as to the age of these crystals and



By E. M. Washburn

*Manager, Crystal Engineering,  
Industrial Products Section,  
RCA Victor Division.*

under what conditions they grew. Although they are found thousands of feet above sea level, it is believed that they must have been formed hundreds of thousands and perhaps millions of years ago, when that part of the earth was submerged deep in the ocean's bed. Modern scientists have verified Biblical references to a tremendous catastrophe which overtook this earth when it nearly or actually collided with a meteorological body, possibly the planet Mars. A terrific impact of this type could well account for the violent upheaval which must have transported large sections of the earth's crust from the bottom of the ocean to form the awe-inspiring mountain ranges as they exist today.

## *Possess Remarkable Property*

Whatever the true history of these crystals may be, it has been discovered that they possess a remarkable property called "piezoelectricity". This term means that when they are mechanically compressed along certain directions electrical charges are formed, and conversely, when electrical voltages are applied in a given manner mechanical distortion of the crystal takes place. This property is also found in many crystals other than quartz, but none of them have all

the desirable features of hardness, durability and economy of procurement which make quartz the outstanding material for stabilized control of radio frequencies.

How can small pieces of rock be used to control radio frequencies? The answer rests in another wonderful property of quartz crystals. When the raw material has been cut into thin wafers in certain directions by means of diamond saws, and rectangular or circular quartz plates fashioned from these wafers, each such crystal has the property of offering a very high resistance to all but certain critical frequencies. These are determined by the very precise orientation of the wafer from the mother quartz and the final, exact dimensions of the small crystal which is introduced to an electronic oscillator circuit. These critical frequencies or resonant points may be shifted to any desired position by slight changes in the crystal's boundary dimensions, and at each such resonant point the resistance or impedance of the quartz plate drops to a very low value. This behavior, combined with the piezo-electric property, permits the electronic circuit to function normally. Obviously, then, the only frequency at which that circuit can be employed is the exact value as determined by the resonant frequency of the crystal unit.

Now we begin to understand how the frequency of one radio transmitter can be controlled to a high degree of precision, and confusion in the radio spectrum avoided by controlling all transmissions in a similar manner. Since this was all

made possible more than a score of years ago, how can there be any justification for continued research by some of the world's best scientists and engineers? A little further logical reasoning will provide the answer to this question.

#### *Usable Spectrum Limited*

The presently usable radio spectrum is limited largely to frequencies below a few thousand megacycles, or a few billion cycles of alternating voltage per second of time. Actually, the vast majority of all radio communication takes place at much lower frequencies. The important consideration is that there exists a practical limitation to the width of the usable radio frequency spectrum, and already the demand for channel allocations is so great that there simply is not enough room for all unless the width of each channel can be greatly reduced.

The actual width required for each channel of communication depends upon two things, first, the type of transmission employed and second, the degree of frequency stability which can be maintained. Even though a frequency of transmission may be crystal controlled, the actual frequency may wander or drift away slightly from its assigned position. Changes in temperature, vibration or aging effects cause the crystal's properties to change slightly, with a corresponding variation in the exact position of its resonant frequency. It is quite common practice to avoid drifting effects due to temperature

variations by enclosing the crystal unit in an oven which is maintained at a constant temperature. This, alone, is highly beneficial in decreasing the channel width required in the frequency spectrum. However, there are very many applications where the weight, size or power requirements of such ovens can not be tolerated. For such use, then, the only remaining possibility is to so fashion the quartz plate that its tendency to drift is greatly reduced.

RCA engineers have determined to a high degree of precision the exact angles of orientation at which the finished quartz plates must be fabricated for lowest frequency drift. X-ray measurements of atomic planes within the quartz are used to an accuracy of less than one minute of arc. The optimum orientation is not a constant angle for all frequencies, and must be varied according to well defined orientation curves, depending upon frequency and crystal boundary dimensions.

#### *Aging of Crystals Important*

A second problem confronting the crystal engineer is to develop a crystal fabrication technique which will decrease frequency drift due to aging effects. This is a far more serious problem than normally suspected. RCA research has found that aging effects alone can cause gradual frequency deviations far outside permissible limits, and this in a comparatively short period of time. RCA was one of the first to minimize the causes for this behavior by recognizing the existence

EACH CRYSTAL IS SUBJECTED TO X-RAYS TO DETERMINE THE ACCURACY OF THE SAWING PROCESS TO VERY CLOSE TOLERANCES.



GROUPS OF WAFERS ARE POCKETED IN A FLAT PLATE AND LOPPED TO EXACT DIMENSIONS BY APPLYING ABRASIVE MIXTURES.



of damaged crystal surfaces, as caused by the abrasives employed in lapping to desired crystal thickness, and removing this faulty material by dissolution in a potent chemical such as hydrofluoric acid. It was also found beneficial to submit all crystals to a high temperature baking cycle, such as an annealing process, to remove any final traces of strained areas within the quartz plate, after the etching operation. This practice, which has been employed by RCA for the past ten years, is now becoming recognized as an effective anti-aging treatment and is mandatory for many types of units.

### *Frequencies Rise to High Values*

Usable radio frequencies extend to very high values, thousands of megacycles per second, but by far the major portion of crystal controlled frequencies lies below about 200 megacycles. Crystal units with natural resonant frequencies of this value are not yet commercially available, and unless employed in circuits specially designed to excite them at overtone or harmonic modes, the top practical frequency limit for high quality crystal units is about 20 megacycles. Obviously, then, it has been necessary to use frequency multiplier stages or special "overtone" crystals, to arrive at the desired carrier frequencies between 20 and 200 megacycles.

The early method of accomplishing this was to use a series of frequency doubling or frequency tripling stages in the transmitter design, between the crystal oscilla-

tor and final output stages. This system is still employed in many high power, fixed stations, but where space and weight are at a premium it is far more desirable to have the oscillator circuit itself operating at the carrier frequency, or as near that as may be feasible.

About 15 years ago, an RCA engineer discovered that a specially fabricated quartz plate could be excited to operate at three times its normal, fundamental value. This immediately had the effect of reducing the number of frequency multiplier stages required. Later developments showed that similar "overtone" crystals could be used reliably when operating at higher orders of odd harmonics, such as the 5th, 7th, 9th, etc. At present, there are but few practical uses of these units above the 5th overtone, but here RCA research is stepping in to show that the 7th and 9th modes also may be employed with dependability. Thus, this particular development is extending crystal oscillators to higher and yet higher frequencies.

### *Frequency Limit Raised*

Only five years ago the top frequency for a crystal unit of the overtone type was about 20 megacycles. Today that limit has been pushed upward to 150 megacycles or even higher. The top limit has by no means yet been reached, the limitations being not the oscillator circuits nor the crystals, but rather suitable measuring equipment to test the uniformity of crystal unit performance characteristics.

The modern trend in crystal unit size and weight is to make them smaller and still smaller, and as light as possible. One factor which has contributed most to reduction in size is the deposition of the two metal electrodes directly to the major faces of the quartz plate in the form of thin metallic films of silver or gold. More than 10 years ago RCA pioneered in the fabrication of plated crystals and during World War II was the major supplier of plated, high-frequency crystal units for the armed services. The original electrode material of evaporated aluminum was changed to silver for better electrical contact. Present research is advocating the use of gold, for improved stability characteristics. Whatever material is employed, the weight per unit is far less than the former designs which used thick, separate, metal electrodes.

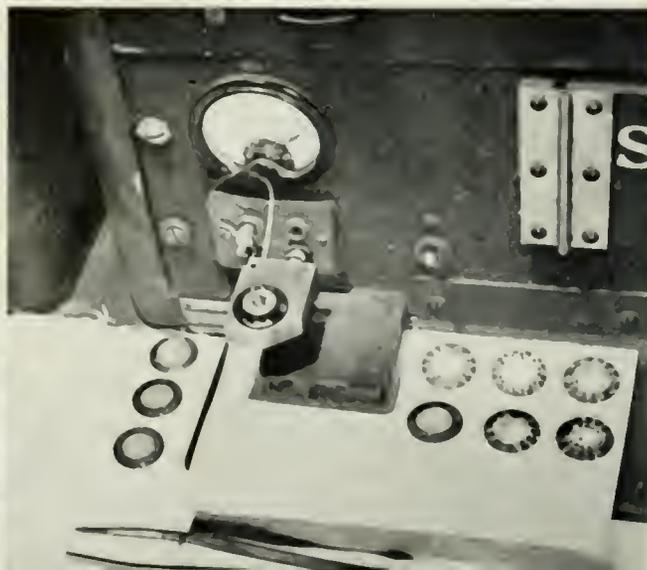
### *Weight Greatly Reduced*

A typical modern, hermetically sealed unit with plated electrodes weighs but one-ninth of an ounce, as compared to a pre-war unit of the same frequency, weighing almost five ounces. An equally startling comparison is to note that a typical pre-war unit occupied a space of more than 2½ cubic inches, whereas the modern equivalent has a volume less than two-tenths of one cubic inch. Obviously, then, continued research has paid-off handsomely in both reduced size and decreased weight, and RCA is justly proud of its own contribution to this development.

SOME OF THE MANY TYPES OF QUARTZ CRYSTALS PRODUCED BY RCA FOR THE CONTROL OF RADIO FREQUENCIES.



INK PLACED ON VIBRATING CRYSTALS FORMS INTO PATTERNS WHICH INDICATE THE ACCURACY OF MANUFACTURE.



# Famous Chimes Now "Official"

*Familiar NBC Musical Station-Break Is Registered at U. S. Patent Office as First "Purely Audible" Service Mark*

THE NBC chimes—famous "bing-bong-bing" notes sounded during station breaks on the network's affiliated radio and television stations from coast to coast—have received the distinction of being the first "purely audible" service mark dealt with by the U.S. Patent Office. The government department's official *Gazette*, published on January 17, 1950, contained a notice of the allowance of NBC's application to register the three chime-like notes as a "service mark" of the National Broadcasting Company.

The precise legalistic terminology of the Patent Office describes the resonant tones as a "sequence of musical chime-like notes which in the key of C sound the notes, G, E, C, the G being the one just below Middle C; the E the one just above Middle C, the C being Middle C, thereby to identify the applicant's broadcasting service."

## "Service Mark" is New Term

"Service mark" is a relatively new term in the Trade Mark Division of the Patent Office. In 1946, a new federal trade mark law, sponsored by Representative Fritz Lanham of Texas, was enacted and gave recognition to trade symbols used in services as apart from trade marks applied directly to merchandise.

A "service mark" such as the NBC chimes—the first to be so officially labeled—is defined, in part, by the act as "a mark used in the sale or advertising of services to identify the services of one person and distinguished them from the services of others, and includes without limitation the marks, names, symbols, titles, designations, slogans, character names, and distinctive features of radio . . ."

The history of the NBC chimes goes back 23 years. It was in 1927 when NBC found the need for a signal—a "go-ahead" device—to put its programs on the air. Thus the



ORIGINAL NBC CHIMES WERE OPERATED MANUALLY NEAR STUDIO MICROPHONE.

three famous notes were linked into an audible mark readily identifiable by radio listeners as NBC's "signature". The NBC chimes have already been labeled as the best known sound sequence in the world.

Early days in NBC chime history were somewhat hectic, and many network old-timers recall the strange arrangements that sometimes went on the air. O. B. Hanson, Ernest La Prade and Philips Carlin each had a hand in the development of the present-day three-note signal, but not before experiments with seven-note, five-note and four-note signatures had been made.

## First Chimes Sounded by Hand

Originally, the chimes were worked by hand, much like ordinary dinner-table chimes, according to La Prade, now NBC director of music research. "When we used seven notes," he said, "it seemed no two announcers ever got them in their proper order."

Since the adoption of the familiar "G. E. C" notes, NBC engineers developed an automatic system. Each of the three notes is composed of

eight partial notes, and the 24 partials are then tuned to perfection by an oscilloscope and standard frequency oscillator.

Hence, in today's modern radio and television studios, the chimes are put on the air by the push of a button. This trips an electrical relay in the master equipment room, setting rows of fingers on a revolving drum to plucking the eight separate metal reeds. The combined tones resulting are the three famous notes, each in perfect and automatic pitch. No microphone is used, as each of the metal reeds and a parallel strip of metal form a small condenser. The vibrations of the reed vary the capacity of the condenser, and these vibrations are amplified directly onto the NBC network circuit.

To keep NBC programs "on the nose," the chimes sound automatically at 30 seconds before the hour and 30 seconds before the half hour. They are preceded by an announcer saying "This is NBC, the National Broadcasting Company." This rule is not ironbound. An address by the President or one of his Cabinet members will not be thus interrupted, nor will various special events and programs ending with the national anthem or a prayer.

O. B. HANSON, NBC VICE PRESIDENT AND CHIEF ENGINEER, POINTS TO VIBRATING REEDS WHICH PRODUCE CHIMES AUTOMATICALLY WHEN AN ANNOUNCER PUSHES A BUTTON.



# HONORS TO PERSONNEL

Scientists and Engineers of RCA Receive Recognition of Accomplishments in Electronic Field



MEDAL OF THE SWEDISH ROYAL ACADEMY OF ENGINEERING AWARDED TO DR. E. W. ENGSTROM, VICE PRESIDENT IN CHARGE OF RESEARCH OF RCA LABORATORIES. THE MEDAL ALSO WAS AWARDED TO DR. V. K. ZWORYKIN.



POTTS MEMORIAL AWARD RECEIVED BY DR. HARRY F. OLSON OF RCA LABORATORIES DIVISION FROM "AUDIO ENGINEERING" MAGAZINE FOR "OUTSTANDING ACCOMPLISHMENTS IN THE FIELD OF AUDIO ENGINEERING."



KEY OF ETA KAPPA NU ASSOCIATION WAS AWARDED TO DR. V. K. ZWORYKIN OF RCA LABORATORIES FOR HIS "TECHNICAL ATTAINMENTS AND CONTRIBUTIONS TO SOCIETY . . ."

THE 1950 MERIT AWARD OF THE AMERICAN SOCIETY OF INDUSTRIAL ENGINEERS IS RECEIVED FOR THE RCA VICTOR DIVISION BY D. F. SCHMIT, VICE PRESIDENT IN CHARGE OF ENGINEERING (CENTER) AND BENJAMIN R. CARSON, RCA DESIGNER-INVENTOR. THE AWARD WAS PRESENTED BY B. L. CHINNIAN (LEFT), NATIONAL PRESIDENT OF THE SOCIETY, FOR RCA'S DEVELOPMENT OF THE 45-RPM SYSTEM OF MUSIC REPRODUCTION.



## Industrial TV Tube

(Continued from page 15)

deflection equipment for both the camera and its own 7-inch monitoring kinescope. It contains 44 tubes—about 50 per cent more than the average home television receiver and operates on 110-volt, 60-cycle power lines. The entire power consumed by the system is less than one-third of that required by an electric toaster.

The camera is 10 inches long, 3 $\frac{1}{4}$  inches wide, and 5 inches high. It has a remote focusing mount, which permits the operator to adjust optical focus by remote control from the master unit.

It is the aim of the RCA Engineering Products Department to prepare this new industrial television system for marketing, and during the next few months equipment will undergo rigid field tests.

## Long-Play Record Catalog Made Available to Public

RCA Victor's inaugural catalog of 33 $\frac{1}{3}$ -rpm phonograph records, comprising 33 classical compositions specially suited for uninterrupted, long-play reproduction, was made available to the public during March. The same selections are obtainable on 45-rpm disks.

In reviewing the current status of the record situation, Paul Barkmeier, Vice President in charge of the RCA Victor Record Department said:

"RCA Victor will continue to produce the conventional 78-rpm records so long as there is a reasonable demand for them. However, public acceptance of the 45-rpm system, as reflected in constantly increasing sales of 45-rpm instruments and records, makes it inevitable that this system eventually will replace the 50-year-old 78-rpm system. Almost one million 45-rpm turntables are now in use in homes, and 45-rpm records are selling at the rate of almost 30 million a year.

"We are now releasing our initial catalog of improved 33 $\frac{1}{3}$  long play records for those music lovers who wish to hear the distinguished artists in the RCA Victor catalog in selections that are suited to long-play reproduction."

# Radio System for Hospitals

*Newly Introduced Equipment Provides AM and FM Program Service for Patients Confined to Beds and for Entertainment in Wards and Personnel Quarters*

A NEW line of equipment designed primarily to afford entertainment and relaxation for patients in hospitals of 50 to 500 beds has been introduced by the RCA Engineering Products Department. As developed by the Sound Equipment Section of the Department, each installation consists of an FM-AM antenna, a basic four-channel central station and special hospital reproducer units.

The central station apparatus includes four radio tuners and accompanying amplifiers, control panels, wiring system, and a special time switch and clock which automatically controls the daily program schedule. No operating personnel is required.

Several methods are available for distributing both radio and re-

corded music programs to various locations in the hospital. Beds may be equipped with pillow speaker and plug selector switch assembly, allowing the patient to select his own program and enjoy the music without disturbing others in the room or ward. Individual monoset earphones provide the same individual reception for patients who are able to sit up or be out of bed.

### *Installation is Economical*

The new system may be installed in any hospital at costs ranging from considerably less than \$5,000 for hospitals of approximately 100 beds to about \$17,000 for institutions of 500 beds.

The four-channel equipment permits selection of major network programs at any of the bedside out-



NEW HOSPITAL ENTERTAINMENT SYSTEM PROVIDES HANDY HEADPHONE OUTLETS FOR CONVALESCENTS, AND LOUD-SPEAKER DISTRIBUTION OF PROGRAMS IN RECREATION ROOMS AND PERSONNEL QUARTERS.

SAFETY OF WORKERS IN RADIOACTIVE MATERIALS IS ASSURED BY THE USE OF THIS MONITOR, DEVELOPED BY RCA. THE DEVICE INDICATES BY COLORED LAMPS THE PRESENCE AND INTENSITY OF DANGEROUS CONTAMINATIONS ON HAND AND FEET.



lets. Additional channels can be provided for local stations, wired music or recorded programs originating in the hospital. Loudspeakers may be installed to provide entertainment in recreation rooms, dining rooms, doctors' and nurses' quarters, or solariums. Flexibility of the system permits its use as a service for therapeutic treatment during convalescence and for morale building purposes.

The core of the central station equipment consists of four RCA radio tuners which provide complete AM and FM station coverage in the 535- to 1620-kilocycle AM band and 88- to 108-megacycle FM bands. The equipment operates from a 115-volt, 60-cycle, a-c power supply and has a power consumption of 1000 watts.

The new system, which in many instances may be incorporated in present hospital distribution systems, rounds out a complete line of RCA hospital sound equipment including such facilities as doctor and public area paging, intercommunication systems, television antenna distribution systems, and projection television for entertainment of convalescent groups.



THE RCA VICTOR 45-RPM AUTOMATIC RECORD PLAYER FEATURES THE FASTEST PHONOGRAPH RECORD-CHANGING MECHANISM EVER DEvised.

## Phonograph History

*(Continued from page 19)*

the conventional violin did not record well and a special "Stroh violin", equipped with a horn, was required to direct the sound in the one desired direction.

Most of these difficulties came to an end in 1925 with the introduction of electrical recording, developed by the engineers of the Western Electric Company. Out went the bulky, inflexible recording horn and in its place came the microphone. The recording stylus was no longer actuated by sound waves but by electrical impulses from a vacuum-tube amplifier. The new system made it possible to record frequencies higher and lower than ever before etched into wax discs. A short time later, the companion piece to the microphone, the Orthophonic Victrola phonograph was introduced by the Victor Talking Machine Company. Within two weeks after Victor announced this model with its impressive life-like reproduction, orders totalling more than 20 million dollars at factory prices poured into the home office. To the public, the Orthophonic Victrola was another miracle in the field of sound.

Several important changes were made in phonographs during the

following years. The automatic record changer made its appearance on the Victrola in 1927. Needles were replaced by more efficient and durable jewel pickups. These developments and many others improved the phonograph, but engineers were not satisfied.

In 1939, ten years after the Radio Corporation of America acquired the Victor Talking Machine Company, RCA engineers began work on "Project X." The ambitious goal of this task was to break with the past, not by refining the instruments and methods, but to start again with fundamentals and incorporate the advantages of increased knowledge of electronics, recording techniques and instrument engineering. After a decade of research and development, RCA Victor announced the 45-rpm record and record player system in 1949.

The rest is history! As more and more people became acquainted with the superior quality, convenience, and economy of the "45", its public acceptance soared. Before the end of 1949, the new records were being manufactured at the rate of more than 25,000,000 annually and turntables capable of playing the "45" records were being produced at a rate in excess of 1,000,000 a year. Based on past experience, as well as on the overwhelming acceptance of "45", RCA Victor believes this will be the system preferred by the great majority of music lovers; and that eventually it will replace "78" as the standard system.

## Luxury Liners to Carry Antenaplex System

When new luxury liners of the American President Lines and the American Export Lines go into service, passengers will be able for the first time to plug their portable radios into built-in antenna outlets and get clear AM and shortwave reception in cabins and staterooms. The two lines have signed contracts with RCA and the Commercial Radio-Sound Corporation for installation of the new marine RCA Antenaplex systems; each of which will feed more than 200 individual outlets from a single 25-foot whip antenna mounted above decks.

## Toscanini on Tour

*(Continued from page 6)*

The smaller instruments rarely leave the sides of their owners. But the string basses, the harps and celli must be cared for. Two carpenters will go along for the entire tour, to crate and uncrate the instruments.

Toscanini and the orchestra will appear before audiences in their usual impeccability. Three huge wardrobe trunks, each the size of a closet, will be used to store the musicians' dress clothes, so that they will be fresh for each performance.

For the additional ease of the travelling musicians, special arrangements are being made to accommodate them at local athletic clubs, where they may exercise and refresh themselves.

Four railroads have cooperated in working this special train into their own schedules so that there would be no slip-up in the three-concert-a-week schedule of the NBC Symphony Orchestra.

Maestro Toscanini views the tour as an unparalleled opportunity to see more of this country, which he greatly loves and admires. For this reason, his private car, which is the last one in the train, has a full observation lounge to afford him an unobstructed view of the countryside.

Toscanini conducted the first NBC Symphony broadcast on Christmas night, 1937, and has been the regular conductor of the orchestra since that time. The famous maestro made a personal appearance tour in the Spring of 1940, when he and the NBC Symphony gave a series of sixteen concerts throughout South America. This will be Toscanini's first coast-to-coast tour with orchestra in the United States, although he has conducted both the NBC Symphony and other major orchestras in principal cities of the East and Mid-West. His last appearance in Carnegie Hall, April 26, 1949, established an all-time box-office for the house, a performance of Verdi's "Requiem" for the benefit of the New York Infirmary grossing more than \$50,000 for the Building Fund of the institution.

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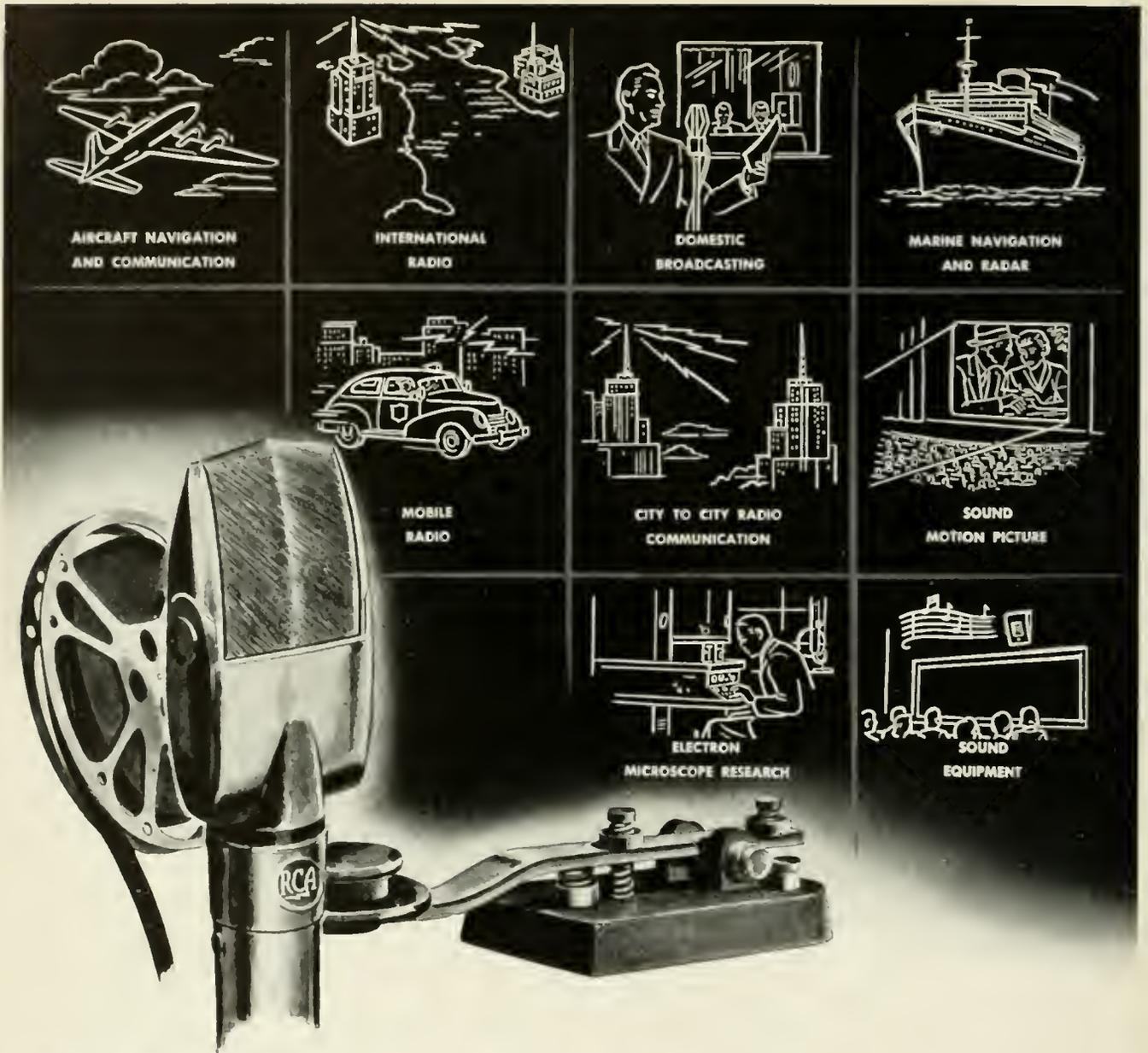


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## COVER

Compactness, simplicity, and the lower cost of the new Table Model Electron Microscope are factors which are expected to appeal to many colleges, hospitals and industrial laboratories.

VOLUME 9 NUMBER 4

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John G. Wilson

*John G. Wilson, Executive Vice President in Charge of the RCA Victor Division since 1948, died June 1, 1950 at his home in Wynnewood, Pa.*

**J**OHAN G. WILSON, or "Joe" as he liked to be called, revealed throughout his life the real significance of friendship. When he passed from our midst in June there was a deep feeling of loss and sorrow by all who knew him. One of the great human experiences is to know a man of Joe Wilson's calibre, and I had that privilege for twenty years. During that time, we worked together and no one could have had a better teammate.

Joe was never one to seek the limelight; he liked to be in the background, and he gained great pleasure in watching others advance through his ability to help them. Personal glory had no appeal for him, for his own requirements were modest. His capacity for work was enormous. He put long hours on any job he undertook, and toiled unceasingly to reach the objectives which would add to the stature of the company and the success of everyone in it. As a leader he was a master organizer. Yet, in every move he made he never lost the human touch. In creative effort he was demanding; in achievement he was quick to give full credit to all who contributed to the results. Loyalty was an outstanding attribute of his character.

Joe Wilson had a great heart that pulsed with friendship for people in all walks of life. He had an uncanny way of sensing when someone needed help—the shoe-shine boy who required expensive dental treatment . . . the college professor for whom he made possible a year of advanced study in California . . . the deserving girl he put through four years of college. These and many other acts of kindness characterized Joe Wilson. He sought no personal plaudits; in fact, it was difficult for anyone to express appreciation or to thank him for a kind deed because he would turn away almost as if to hide the fact that he had anything to do with it. Quietly and without fanfare, Joe Wilson moved among his fellowmen accomplishing much good in the world and making the lives of others more pleasant. He made the world a brighter place for those who knew him.

*Lauren Fessom*

# Color Television

*In Statement before the Federal Communications Commission, General Sarnoff Recommends that FCC Set Color Television Standards Based on RCA All-Electronic System*

APPEARING before the Federal Communications Commission in Washington, D. C., on May 3 Brig. General David Sarnoff, Chairman of the Board of the Radio Corporation of America, urged that the Commission, at the conclusion of the hearings then in session, set color television standards based on the RCA all-electronic completely compatible color system. If this be done, he said, color television receivers will be in factory production by June, 1951.

Adoption of color television standards based on the inferior and non-compatible method of the Columbia Broadcasting System, he said, would earn the scorn of the world and impose an extra cost of more than \$100,000,000 a year on the American public for adaptation of black-and-white receivers.

General Sarnoff condemned the CBS color method as "inferior" and "unsound."

"It is my purpose here today to urge you, as public officers, not to turn back the television clock, but to look ahead and take a long-range view," General Sarnoff testified. "The adoption of the CBS system, whose obsolescence is already foreshadowed in this fast developing electronic art, would earn the scorn of the world. At the very moment I am appearing before you, the United States delegates are at a meeting of the International Consultative Committee in London to advocate world television standards on a basis equivalent to present American black-and-white standards. For this Commission to degrade the standards of American television by adopting the inferior CBS system only would be to show the world that we do not have any faith in the standards which our State Department is recommending to the world.

"Adoption of the CBS system exclusively would also earn the dissatisfaction of American families.

They would be induced to buy CBS type sets by a decision of this Commission made at a time when it was evident that the CBS itself would shelve its mechanical system in favor of an all-electronic system."

## *Main Issue of the Case*

Emphasizing that there is no doubt about the desirability of color television, General Sarnoff said that the fundamental issue in this case is:

"Shall American television move forward or backward?"

He pointed out that CBS has asked the FCC to adopt standards based upon "a mechanical, non-compatible system, which gives a degraded picture and has additional defects," and added:

"On the other hand, the Commission is asked by the RCA to adopt color television standards which will permit the utilization of an all-electronic, compatible color television system which does not have those defects and which has picture quality at least equal to that provided by existing black-and-white standards.

"CBS has asked this Commission to adopt a system which would saddle an all-electronic art with a mechanical harness. You are being urged by CBS to build a highway to accommodate the horse and buggy when already the self-propelled vehicle is in existence and has been demonstrated.

"I know that CBS claims it can use electronic terminal equipment in its system. CBS, however, does not and cannot deny that its system has been designed for and is confined by the limitations of a mechanical disc. Therefore, it does not and never can have the performance capabilities of a true electronic system."

General Sarnoff said that "if the CBS color system, with all of its known defects, is now imposed

upon the public, great harm will be done to the growth of television and its public acceptance. The recession in the sale of sets which would result from the adoption of non-compatible color standards and degraded pictures tailored for the CBS mechanical apparatus would, in my opinion, cause the bankruptcy of many of the smaller television set manufacturers of today."

Pointing out that it had been established in the record that an all-electronic system "offers boundless possibilities for continued growth and improvement of the television industry," General Sarnoff continued:

"In my judgment, a compatible all-electronic system is the logical system for the Commission to approve. Were it not for the intensive promotional effort that has been put into this matter by CBS, the suggestion that the American public will use for the indefinite future a non-compatible system with a mechanical disc and degraded picture quality would be ridiculous.

"I would be untrue to my long experience in this business if I did not protest, as strongly as I can against the adoption of standards based on an inferior system. For the Commission to shackle an electronic art to the degraded standards of a CBS mechanical wheel would, in my opinion, be a fatal mistake."

## *RCA Color Developments*

Recalling that CBS had stated that the RCA system could never be improved and should not even be field tested, General Sarnoff went on to compare this statement with the facts.

"We have demonstrated," he testified, "that the RCA color system has the full geometric resolution of existing black-and-white standards.

"We have demonstrated that the RCA color system now has color

fidelity equal to that of any other system, and we expect this to be further improved.

"We have demonstrated that the RCA tri-color kinescopes make possible a receiver of a size about the same as existing black-and-white receivers. This means that RCA color receivers can be manufactured and sold for prices that will be competitive with any other color receiver that has been demonstrated or proposed.

"We have demonstrated that the RCA color system can be networked even over existing coaxial cable facilities.

"Our faith in the RCA all-electronic color television system already has been fully justified.

"Now let us look at the CBS folks who came before the Commission when these hearings began last Fall and said that they were ready then. They said their system needed no further testing and no further improvement.

"What have they done since that time? They have been trying desperately to improve the quality of their picture and to increase their picture size. They have borrowed horizontal dot interlace from the RCA system in their effort to increase the definition of their pictures. They testified that they look forward with anticipation to use of the RCA single tri-color kinescope in order to eliminate their mechanical disc. They say now that, with the use of dot interlace, the quality of the CBS pictures will be improved.

"These supposed improvements in the CBS system are based upon RCA achievements—to borrow a phrase from CBS, they have 'followed in the footsteps' of RCA. But CBS concedes that with these changes the CBS color television system must still be field tested.

"What has the CBS developed for itself? Last week, in New York City, CBS demonstrated its non-compatible, non-commercial laboratory model projection receiver which they call all-electronic. Practically no information has been given to anybody with respect to this laboratory model. There have been no detailed data describing the components and circuits.



DEMONSTRATION MODEL OF TELEVISION RECEIVER EMBODYING RCA'S ALL-ELECTRONIC COLOR SYSTEM AND RCA TRI-COLOR DIRECT-VIEW KINESCOPE TUBE.

"CBS claimed they had color apparatus that was simple, tested and ready for the home. Now they submit an untested, non-commercial model which they concede on the record is only a laboratory specimen and not ready for the home.

"Compare all this with the many and repeated demonstrations of the RCA all-electronic system and the many bulletins we have made available to this Commission and to the entire industry. RCA said that its color apparatus could be improved and made simple. We have done what we said."

#### *Color Standards Requirements*

General Sarnoff expressed the opinion that the demonstrations made and the testimony submitted in the hearings have proved that color television has advanced technically to a point that justifies the Commission in setting standards now on a regular commercial basis. "This would enable broadcasters and manufacturers," he said, "to proceed promptly with their plans for providing the public with programs and equipment to receive the benefits of color television."

In addition, General Sarnoff described three basic requirements, which he said RCA believed color television standards should meet. They are:

1. A channel width of 6 megacycles, as proposed by the Commission.
2. The color pictures, by whatever system transmitted or received, should not be inferior in quality and definition to present black-and-white pictures.
3. The color system should be compatible with existing black-and-white standards.

"Broad standards based upon these three requirements will enable color television," General Sarnoff asserted, "to move forward as a service to the public. In my judgment, a color television system that does not meet these broad standards will not be acceptable to the public and should not be approved by the Commission.

"That is why the RCA has devoted its energies to the development of a system which meets each of these three broad standards. We are confident that our system will

meet with full public acceptance and approval and it will enable the Commission and the industry to keep faith with the five or six million present owners of black-and-white receivers."

### *Reveals RCA Plans*

General Sarnoff outlined in some detail the plans RCA would follow under any one of five different decisions the FCC might make in settling the color television question.

"If the Commission were to adopt the CBS proposal only," he declared, "we would be confronted with a field-sequential color system which gives a degraded picture and is non-compatible. We would then find ourselves saddled with a system which we firmly believe is inadequate and inferior and which we seriously doubt would prove acceptable to the public."

Under these hypothetical circumstances, he said, RCA would act as follows:

1. We would make and sell transmitting equipment, on order, to anyone.
2. We would make and sell tubes, including our tri-color kinescopes, and parts, to anyone.
3. We would make and sell field-sequential color receivers, utilizing the tri-color tube, as the public demand for such receivers might exist.
4. We would make and sell tri-color tube converters on the same basis.
5. We would make and sell separate adapter units for television sets already in the hands of the public, as well as for new sets thereafter manufactured."

### *Cost of Adaptation Estimated*

"Building adapters into our sets at the factory presents an entirely different problem," General Sarnoff said. "This, we do not plan to do. It has been estimated that the present annual production of television receiving sets is at the rate of five million a year. With an estimated minimal figure of \$20 for built-in automatic adapters, the public would have to pay more than \$100,000,000 a year for an adaptation to a degraded system which is non-compatible.

"We do not believe that the public will want adaptation to a degraded CBS picture at this or at any other price. Nor do we believe that the public should be forced to pay this tax of \$100,000,000 a year in order to receive the CBS degraded picture.

### *Public Reactions Will Guide*

"If we are wrong, the public will prove us wrong. In all these plans we would necessarily be guided by public reactions and competitive conditions. We would have to modify or adjust our plans in accordance with such reactions and conditions. And we will have to make receivers with adapters, if future experience proves that this is what the public wants."

General Sarnoff said that RCA stands on its record of "energetically developing" those things in which it has confidence. "On the other hand," he continued, "I do not assume that we would be expected to be in the vanguard of promoting any system in which we have no confidence and which we believe is inferior and unsound; a system whose length of life commercially is open to serious question."

He told the Commission that he thought he had detected some intimation in the record that, unless all manufacturers were willing now to commit themselves to full scale

manufacture of a system that is "inferior and not in the public interest," then any decision the Commission might make in favor of the CBS system, "might in some way be frustrated."

General Sarnoff pointed out that if the Commission were to adopt "the best" system, "then no one in our competitive and free enterprise economy of today is going to be able to keep the public from getting it—if it really is 'the best.' Consequently, any inference that an advance commitment by manufacturers, or even compulsion, might be necessary to ensure that the public will be able to buy that which has been assumed to be 'the best' is unrealistic. . . . The best will sell itself on its own merits. Competition will see to that.

"Of course we do not think the Columbia proposal is 'the best.' If it were the best, the Commission would not be faced with the need to get a commitment, or to apply force, to sell it. The need to apply force would come only from the opposite premise—that Columbia's proposal could not be sold on its own merits.

"Now I wish to make it entirely clear," said General Sarnoff, "that in answering this hypothetical question I have not anticipated, and do not expect, that the Commission's decision will be to adopt standards based on the CBS system



PLANT OF THE RADIO CORPORATION OF AMERICA AT LANCASTER, PA., WHERE THE NEW RCA TRI-COLOR KINESCOPIES ARE BEING ASSEMBLED IN "PILOT RUNS". SOME OF THE IMPORTANT COMPONENTS OF THESE TUBES ARE BEING PRODUCED AT THE RCA PLANT IN HARRISON, N. J.

exclusively. We cannot believe that the Commission would outlaw the RCA system and all other systems.

"Should the Commission adopt the RCA system, or any other system which meets the three requirements of the broad standards I have discussed," General Sarnoff said, "the road ahead is clear."

#### *RCA Tube Inspires Confidence*

"Our confidence in the new RCA tri-color tubes, which have been demonstrated before this Commission and the industry, is so strong that we are already proceeding with plans for acquiring a new factory and the machinery necessary to produce these color tubes in quantity. These steps involve heavy financial commitments on the part of the RCA. By June of next year we expect to commence the manufacture of color tubes on a mass production basis. In the meanwhile we will have completed our commercial design and development of these color tubes. By that time also our pilot plant will have produced a sufficient number of color tubes, to meet not only our own needs for testing and design purposes, but also to supply those tubes to competitors in the set and tube industries for the same purposes.

"Within sixty to ninety days from now we expect to have about ten development model color receivers using the tri-color kinescopes available in the Washington area for field test purposes.

"During September of this year, we expect to build five or six receivers each week from a pilot assembly operation. This pilot operation will continue until a sufficient number of sets have been made to fulfill our testing requirements and to make color receivers available to other manufacturers for their testing and design purposes.

"If final standards are adopted and commercial operation in color is authorized soon, the RCA color and would be in factory production of color television receivers by June of next year. This would amount to a weekly production rate of 200 color receivers. By the end of that year, our color receiver rate of production will have reached over 1,000 per week. Thereafter, we expect



**Dr. Elmer W. Engstrom**

*Vice President in Charge of Research,  
RCA Laboratories Division.*

production quantities to rise substantially.

"We assume, of course, that competing manufacturers would likewise gear their facilities for production of color tubes and receiving sets once the Commission determines the standards.

"The question was asked as to what percentage of the 20,000,000 sets, which it was estimated will be in the hands of the public in 1954, will be black-and-white if the Commission should adopt the RCA system.

"I think the estimate of 20,000,000 sets by the end of 1954 is too low," said General Sarnoff. "If normal business conditions prevail and if more television stations go into operation reasonably soon, it will be much greater than 20,000,000. In my opinion, there will be 20,000,000 television receivers in the hands of the public by the end of 1952.

"We have faith in the RCA color system and we feel strongly that if it is approved by the Commission a large percentage of the sets outstanding in 1954 will be color sets."

#### *Plan Demonstration of Converter*

General Sarnoff revealed for the first time that, within the next six weeks, RCA will demonstrate an

RCA color converter employing an RCA tri-color kinescope. "This all-electronic converter," he explained, "will provide a method of converting existing black-and-white television receivers to color."

With regard to the third color system being considered by the FCC, General Sarnoff said:

"I am informed by our engineers that the CTI system has not been demonstrated to have satisfactory picture quality in color, nor to give a satisfactory picture on present sets. However, if the CTI system overcomes these defects, if it meets the three requirements of the broad standards I have discussed, and if the Commission should adopt the CTI system only, then in general our policies would be the same as if the RCA system had been adopted.

#### *Broad or Multiple Standards*

"If the three basic requirements—the 6-megacycle bandwidth, compatibility and picture quality equal to existing black-and-white—are adopted as broad standards, our policies would be the same as if the RCA system had been adopted.

"If the multiple standards are adopted by the Commission, and by that I mean standards that will permit not only the RCA system but also systems which do not meet the three basic requirements of the broad standards, we would do what I have outlined in the event the RCA system were adopted."

As to receivers capable of receiving and reproducing transmissions of all the various systems, General Sarnoff said that such receivers would necessarily be complex and more expensive. "However, we would manufacture and sell multiple receivers," he said, "to the extent of public demand."

In concluding his statement, General Sarnoff analyzed the RCA and the CBS systems in relation to his three basic requirements of color television standards.

"By the adoption of horizontal dot interlacing, CBS has conceded that its system ought to have improved picture quality. If CBS, in spite of its testimony that it cannot visualize the tri-color tube being

*(Continued on page 10)*

# RCA POLICY ON PATENTS

*Statement by Brig. General David Sarnoff before the Federal Communications Commission, Washington, D. C., on May 3.*

RCA has been licensing its own inventions in the radio and television industry for a great many years. It has also for many years been licensing the inventions of others in those instances where it has sub-licensing rights. The basic structure of this patent licensing was approved by the Department of Justice and the United States District Court for the District of Delaware in 1932.

At the time the 1932 consent decree was entered, the agreements with the American Telephone & Telegraph Co., the General Electric Co., and the Westinghouse Electric Corp., pursuant to which RCA received the non-exclusive right to grant licenses under the patents of these companies were described by the Department of Justice as being manifestly in the public interest.

From time to time since 1932 RCA has acquired licenses for itself under the patents of others and in some instances sub-licensing rights for the benefit of the rest of the industry as well.

## *Industry Aided by RCA Patents*

In 1942 the Department of Justice through the Assistant Attorney General, Mr. Thurman Arnold, sought to set the consent decree aside. After full argument, the decree was reaffirmed by the Courts. The Attorney General withdrew his appeal to the Supreme Court of the United States on this issue.

I believe that the beneficial nature of RCA's licensing policies are apparent from the assistance which the industry has received as a result of these policies.

As I have said, we have been in the patent licensing business for many years. No one can conceivably claim that the radio industry has been anything but helped by RCA's patent position or RCA's patent policies. The history of the whole radio industry has been one of rapid expansion and keen competition.

Coming to the television industry, I believe it will be conceded by all concerned that we would not have the highly competitive, highly successful television industry that we have today were it not for the affirmative assistance which the RCA has made available through its patent licenses and otherwise.

## *Other Manufacturers Benefit*

As a result of this, we now have a television industry of a billion dollars a year. RCA not only gave this industry the benefits of its television patents at no extra charge, but its licensees got blueprints and manufacturing assistance. Competing television manufacturers were invited to our plants and greatly helped to get into competition with RCA.

Our patent licenses contain no restrictive provisions whatever. There is no effort to fix prices, to limit production or to do anything but to further the industry to the fullest possible extent. We maintain an Industry Service Laboratory as a part of our licensing policy to help licensees. Our licenses are uniformly non-discriminatory and our royalty rate is low.

Now, I do not wish to be drawn into detail in this hearing. It is no secret that we are engaged in patent litigation of the greatest importance in AM, in FM and in television. We are either the defendant or the plaintiff in several litigations of far reaching importance to us and we believe to the entire industry.

In these litigations we have been called all the names which the ingenuity of opposing counsel can imagine. We have been accused of every nefarious practice which the fertile imaginations of these gentlemen could breed. We categorically deny all these characterizations and charges and we fully expect to prove them false in open court.

I believe it is sufficient for these proceedings that we stand on our record and I believe you will respect the situation in which we find ourselves with regard to these litigations.

So far as our agreements with others for obtaining licensing or sub-licensing rights are concerned, most of these agreements are on file with this Commission. They speak for themselves. The consideration paid for the value received was arrived at by the combined best judgment of many experts in our organization. As we have stated on other occasions, however, we can not indulge in the public evaluation of the significance of particular patents which belong to others.

We have also submitted to the Commission all patents which we own or under which we can grant licenses which we believe to read on the transmission standards already existing or which are proposed in these proceedings.

Further than this, however, I do not think we should be asked to go.

## Exhibition Hall Visitors Exceed 3 1/2 Million

IN its three years of operation since the official opening on May 14, 1947, the RCA Exhibition Hall in Radio City has attracted more than three and one-half million visitors, an accomplishment that places it among the leading tourist attractions in New York City.

The average daily attendance of the exhibit is approximately 3,000. The highest mark was set on January 8 of this year when 11,380 people thronged the Hall to inspect the new line of RCA Victor radio and television receivers. In the past three years, 580 school groups have been given special tours through the exhibit with added film and lecture programs in the Johnny Victor Theatre.

## Television In Mexico

Mexico's first television station, equipped with a 5-kilowatt transmitter and associated studio and mobile pickup units supplied by RCA, is scheduled to go on the air in Mexico City this summer. The station is owned and operated by Television de Mexico, S. A.

# Toscanini's Triumphant Tour

*Enthusiastic Response to 21 Concerts by the Maestro and the NBC Symphony Orchestra Sets New Records in American Musical Annals*

AMERICANS turned out in unprecedented numbers to see and hear Maestro Toscanini and his NBC Symphony Orchestra on their first transcontinental tour of the United States. Nearly one hundred thousand persons made up the record-breaking crowds in the twenty cities visited in the six weeks, ending on May, 27.

On June 5, with bravos of his great 1950 tour still ringing in his ears, Maestro Toscanini boarded the *S. S. Vulcania* for a summer in Italy during which he will make two appearances as guest conductor at the famed La Scala Opera in Milan. Upon his return to the United States next fall, he will conduct the NBC Symphony Orchestra in the 1950-51 radio concert season over station WNBC and the affiliated stations of the NBC network.

Results of the recent tour were highly gratifying. As the sponsor, the RCA Victor Division of the Radio Corporation of America received commendations from all over the nation. And the National Broadcasting Company received no less than five certificates of award for its contributions to musical culture through the formation of the NBC Symphony Orchestra and its perpetuation under the direction of Maestro Arturo Toscanini.

Brig. General David Sarnoff, Chairman of the Board of RCA, declared:

"Maestro Arturo Toscanini returned on May 28 from his first transcontinental concert tour, leaving behind him enthralled throngs of Americans who discovered his interpretations of the world's music masters to be an unforgettable experience, and who found Toscanini the man to be even greater than Toscanini the immortal legend.

"Coming at a time when uncertainty prevails in so many quarters and when people everywhere welcome a lift to their spirits, this triumphant journey of the Maestro and his NBC Symphony Orchestra throughout our land takes on added significance. It has been dramatic and inspiring.

"Through their weekly radio concerts over the NBC network and its affiliated stations, through their recordings of the world's greatest music, and through this epochal tour, Maestro Arturo Toscanini and his orchestra of superb musicians have enriched the lives of all of us and endeared themselves to a grateful nation. These efforts have brought to the fore America's love for fine music and the inherent appreciation of our people for beauty and sincerity."

Joseph H. McConnell, President of NBC, stated:

"We are proud to have been a part of this great cultural pilgrimage. We are proud that we were able to help bring Toscanini, the

great musician, to the people of America, who now know him also to be a great, warm human being.

"The reception of the public and press throughout the country has been most gratifying to us, and we feel confident that when Toscanini returns to the NBC podium in the fall for another season, he will bring the NBC Symphony to even greater heights of attainment and perfection, knowing that he is not only playing for great audiences of music lovers; he is also playing for friends."

The response of the audiences moved Maestro Toscanini and the members of the orchestra deeply. They had come to bring fine symphonic music to the people of America, and the people were grateful. In the halls after the concerts, cheers, applause and bravos were mingled with tears of joy. The audience and performers were equally stirred. Toscanini expressed himself over and over again on the wonderful, stimulating audiences.

Outside the concert halls, thousands waited just for a glimpse of Toscanini. They were not raucous, they didn't ask for autographs. Mostly they stood and watched. A voice would cry out of the crowd, "God bless you, Maestro", and a chorus of voices would echo the words, "God bless you, Maestro".

Little town, big town; North and South, East and West, the people came to hear music and to pay tribute to Toscanini, who brought them the greatest musical experience of their lifetime. Not only did they come to hear music, but to see the man, who at 83, is at the height of his artistic powers. They came to see the man who had defied dictators. They came to see a man as famous as anyone in our con-



TOSCANINI WAS ENTHRALLED BY HIS FIRST GLIMPSE OF THE GREAT BONNEVILLE DAM, ONE OF THE MANY SIGHTS HE WITNESSED DURING HIS TRIP.

temporary world, yet who remains modest and shy. They came and they were satisfied.

### *Met America Face to Face*

Maestro Toscanini met America face to face. He met a three-year-old boy at a railroad siding in Mobile, Ala. He met symphony conductors and opera singers. He met the man in the street. And he met the President of the United States.

In every city, not only was Toscanini sought after, but members of the orchestra, too, were asked for and feted. The NBC Symphony Orchestra is composed of virtuoso musicians. Their names are well known in musical circles around the country. They include concertmaster Mischa Mischakoff; Frank Miller, first cellist; Carlton Cooley, first violist; Edwin Bachman, principal of the second violins; Philip Sklar, principal bass; Arthur Lora, solo flute; Paolo Renzi, solo oboe; Karl Glassman, tympany; Harry Glantz, first trumpet; Alex Williams, first clarinet; Leonard Sharrow, first bassoon; Arthur Bery, solo French horn; Neal di Biase, solo trombone, and Edward Vito, harp.

At the train upon arrival in many cities, visitors came seeking them out, vying with one another for the prize of having one of the musicians as a guest. The musicians in the orchestra met many former pupils and former associates in the symphony orchestras of the nation.

### *Not Only a Tour but a Mission*

As the special tour train rolled on through city after city; as one concert after the other was finished, it was apparent to everyone on the trip that this was not just a tour, it was a mission. Each man in the orchestra, as well as Toscanini and the sponsoring RCA Victor officials on the train, felt a sense of responsibility toward the music lovers of America to make this tour a great and lasting monument to American culture. How far they succeeded was told in headlines and

news columns, on the radio, and in magazines throughout the land. It was written, also, in the lives of nearly one hundred thousand Americans, who had the good fortune to attend the concerts.

The cities in which the twenty-one concerts were performed, were New York, Baltimore, Richmond, Atlanta, New Orleans, Houston, Austin, Dallas, Pasadena (two concerts), San Francisco, Portland, Seattle, Denver, St. Louis, Chicago, Detroit, Cleveland, Pittsburgh, Washington, D.C., and Philadelphia. The tour started in New York on April 14 and was concluded in Philadelphia on May 27.

Toscanini, the orchestra and special personnel travelled on a private train assembled and managed by the Pennsylvania Railroad. It moved over the facilities of fourteen railroads during the 8,593-mile trip. In addition to stopping in the tour cities, stops were made at Mt. Shasta, at Bonneville Dam and Sun Valley.

The Sun Valley outing was one of the high spots of the trip for Toscanini and the orchestra. There they rode the ski lift and used the other recreational facilities of this fabulous playground. In the afternoon an outdoor barbecue was given by RCA Victor. An orchestra of toy instruments, called the "Sad Symphony", was made up of NBC musicians. Toscanini joined in the fun himself by riding the ski lift and later conducting the toy orchestra with a pencil as a baton. It was a memorable day for the musicians.

In most of the tour cities, where time permitted, Toscanini and the orchestra did a great deal of sight-seeing. He visited historic Williams-



AT MOBILE, ALABAMA, THE MAESTRO PAUSES TO GREET A YOUNG ADMIRER — ONE OF THE THOUSANDS WHO CAME TO SEE HIM.



TOSCANINI AND SON WALTER STROLL ALONG THE STREETS OF WILLIAMSBURG, VIRGINIA.

SPEEDING ALONG AT 80 MILES AN HOUR, THE TOSCANINI SPECIAL TRAIN IS PHOTOGRAPHED A FEW MILES OUTSIDE OF OMAHA, NEBRASKA.



burg, saw the Cyclorama in Atlanta, toured the French Quarter in New Orleans and saw the San Jacinto Monument and oil wells in Houston. In San Francisco he saw the harbor and, traveling North, viewed Mt. Shasta, where the train paused for half an hour. Toscanini was impressed with the scenic grandeur of the Northwest.

Seeing the great mountains, he recalled to his associates his youthful days when he was an avid mountain climber.

In Chicago he visited the Museum of Science and Industry and kept his guide busy answering questions. In Washington the highlight of his trip was his first meeting with President and Mrs. Truman. The President visited Toscanini backstage before the concert. They exchanged pleasantries about touring and music. Toscanini said he understood the President was also a musician. Mr. Truman replied, "I'm not a musician, but my daughter Margaret is."

#### *Audiences Typical of America*

The audiences were a cross section of America. Workers, students, housewives with their babies, political figures, musicians, and businessman turned out. Many people told of having given up other pleasures to be able to attend the Toscanini concerts.

Capacity audiences were the rule of the trip. In cases where fire laws permitted, standees were admitted. In one or two cities seats were put into the projection booths to accommodate music lovers. The orchestra pits in many theatres were

filled with seats. In some of the halls there were hundreds of seats from which the stage could not be seen at all or very little, but music lovers came nevertheless.

The consensus everywhere was that America at mid-century was far richer in spirit and musical appreciation because of the NBC Symphony concerts given over the radio during the past 13 years and because of a tour which Arturo Toscanini, at the age of 83, had undertaken with the orchestra to show his appreciation for America.

## Color Television

*(Continued from page 6)*

made in quantity, adopts a tri-color tube such as the RCA has developed and demonstrated, and throws away its mechanical disc, CBS may be able to overcome a few more of the defects in its system.

"Nevertheless, the CBS system will still have important limitations not found in the RCA system. The CBS picture will still have only 105 lines, will be non-compatible and will have other defects as well.

"One system—the RCA system—is compatible and the other—the CBS system—is non-compatible. It is the unanimous opinion of all parties to these proceedings that compatibility is of the utmost importance. In fact, the President of CBS himself has testified that he would 'love' to have a compatible system. In this statement, he is giving voice to the basic needs of

the entire television industry and of the viewing public.

"As I understand it, it is the field-sequential aspect of the CBS system which prevents compatibility. CBS already has adopted RCA's image orthicon camera tube. CBS already has embraced the RCA single tri-color kinescope in order to eliminate the mechanical disc with its limitations of viewing angle and picture size. CBS already has embraced horizontal dot interlace in order to obtain increased definition in its pictures.

#### *Would End Needless Arguments*

"All that remains is for CBS to adopt the dot sequential method of transmitting color. CBS would then be in a position to achieve that compatibility which its President so ardently desires. This would end needless argument and color television could go forward immediately.

"I have watched the developments of radio and electronics for more than forty years and never before have I seen compressed into a single effort so much ingenuity, so much brain power, and such phenomenal results as are represented in these new developments.

"We firmly believe that with the development of its all-electronic, high-definition, compatible color television system and its tri-color tubes, RCA has shown the way for the adoption of color standards now. We recommend that the Commission set color television standards based on the RCA color system."

AT SUN VALLEY, IDAHO, THE MAESTRO AND HIS MUSICIANS RELAX, AS HE CONDUCTS THEM IN THEIR "SAD SYMPHONY" (RIGHT) RCA VICTOR DEALER IN ST. LOUIS DISPLAYS ONE OF THE ATTRACTIVE TOSCANINI WINDOWS ENCOUNTERED ON THE TOUR.



[10 RADIO AGE]

# Yearly RCA Business Triples in 10 Years

*\$11,236,231 Earned in First Quarter of 1950 Against \$5,932,083 for First Three Months of 1949, Sarnoff Informed RCA Stockholders at Annual Meeting—Net Equaled 75.3 Cents a Share for First Quarter—Discussed Great Impact of Television and Reported It Now Accounts for Nearly 60 Per Cent of RCA Gross Income*

VOLUME of yearly business of the Radio Corporation of America has increased to more than three times what it was ten years ago; from a level of \$128,000,000 in prewar 1940 to \$397,000,000 in 1949. Brig. General David Sarnoff, Chairman of the Board, reported at the 31st annual meeting of RCA stockholders held on May 2, in a studio of the National Broadcasting Company in Radio City, New York.

General Sarnoff declared that television has become the most active front of the radio industry and added: "It already has achieved the stature of a billion-dollar-a-year industry. No American industrial enterprise ever moved ahead so rapidly in so short a time. It has wrought a revolution in research, manufacturing, sales, servicing, broadcasting and programming, and its expansion is being accelerated in 1950. In February, this year, RCA Victor produced its millionth television set."

## First Quarter Results

Net profit, after taxes, of RCA for the first quarter of 1950, he reported, was \$11,236,231, an increase of \$5,304,148, compared with the same period in 1949. Profit for the first quarter of 1950—before Federal Income Taxes—amounted to \$18,945,231, compared with \$9,804,083 in 1949.

Earnings per common share for the first quarter of this year amounted to 75.3 cents, as compared with 37.1 cents per common share for the first quarter in 1949.

Consolidated gross income of RCA during the first quarter of 1950 amounted to \$127,369,550, compared with \$92,327,827 for the

same period last year. This represents an increase of \$25,041,723 over the 1949 figure.

"Based on earnings and the prospects for this year," said General Sarnoff, "an extra dividend of 25 cents per share on the common stock of RCA was declared by the Board of Directors on April 7, 1950, payable on May 29."

General Sarnoff reported that, during the past ten years, RCA has paid \$69,164,000, or nearly 50 per cent of net profits, in dividends to its stockholders. This is a larger sum than has been paid in this period by any other company principally engaged in the radio business. Of this amount, \$31,752,000 was paid to holders of preferred stock and \$37,411,000 was paid on the common stock. He said that during the same ten-year period the capital funds of the Corporation were increased by \$110,000,000, and now amount to \$185,000,000.

Expressing the gratitude of the management to RCA's more than 40,000 employees, General Sarnoff congratulated them upon their accomplishments and splendid spirit of loyalty. He said that 45 unions now represent RCA workers.

"It is an interesting fact," he added, "that in 1949 RCA Victor Division placed more than 180,000 purchase orders totaling \$125,000,-

000 with 1,800 independent suppliers, the majority of whom are small business firms located in 42 states."

## Television

Reviewing the progress of RCA in 1949, General Sarnoff said that television had contributed substantially in making it the most successful year since RCA was founded in 1919. He said that television accounted for approximately 50 per cent of the Corporation's total gross income in 1949, and in the first quarter of 1950 it accounted for nearly 60 per cent.

The 1950 RCA Victor line of television receivers, as well as radio and Victrola phonograph home instruments, has met with high popular favor, he said, with surveys showing that a majority of prospective customers going to stores to purchase television sets ask for RCA. He asserted that, as a result, there is a shortage of RCA merchandise, despite "all the efforts we are making to supply the demand."

Based upon industry estimates, he said that approximately 5,000,000 television receivers will be added in 1950 to the 4,000,000 in use at the end of 1949.

"After the hearings now being conducted by the Federal Communications Commission are concluded," continued General Sarnoff, "it is

POPULAR 45-RPM PHONOGRAPH TURNABLES ARE TURNED OUT IN EVER-INCREASING QUANTITIES ON PRODUCTION LINES AT THE INDIANAPOLIS PLANT OF RCA VICTOR DIVISION.

[RADIO AGE 11]



hoped that the barrier known as the 'freeze' will be lifted in order that new television stations may be added to those now in operation. This action by the FCC would widen the market for receiving sets and increase television as a broadcasting service to the millions of Americans who now live in areas beyond the range of existing stations."

During the past year, RCA scientists and engineers have achieved remarkable results in the continued development of the RCA all-electronic, high-definition, completely compatible color television system, General Sarnoff recalled. Field tests and demonstrations have been conducted in Washington, D. C., since September, 1949, and major advances have been made.

"On March 29, 1950, in Washington, the new RCA electronic direct-view color picture tube was demonstrated publicly for the first time," he said. "It has been acclaimed in engineering circles and in the press as a miraculous development. In fact, it promises to be one of the first of the great inventions to be credited to the second half of the Century. It is an outstanding development of our time, and the master key to practical color television for the home. It provides a color television receiver unencumbered by any mechanical parts or revolving disks. As a result, there is no flicker, no color break-up, no whirl of disks in the RCA all-electronic color television receiver.

"I have watched the development of radio and electronics for more than 40 years. Never before have I witnessed a single device into which has been compressed so much ingenuity, so much research, so much development, and with such phenomenal results. It would be

difficult today to estimate fully the vital significance of the RCA color tube to the future of television."

A major feature of the RCA color system is its complete compatibility with the present black-and-white system, he pointed out, adding that owners of the present television receivers can continue to receive in black-and-white the programs that may be transmitted in RCA color. They can receive such programs, he said, without any modifications or adjustment, and without having to press a button or turn a switch.

Because of the feature of compatibility of the RCA system, he pointed out, those who already own television sets or contemplate their purchase, need have no fear of obsolescence if the RCA system is approved by the FCC. Neither has the broadcaster any need to fear obsolescence of his transmitter, nor the loss of his black-and-white audience when he broadcasts RCA color programs. The RCA color system functions at both transmitter and receiver in complete harmony with the existing black-and-white system.

Another electronic development was demonstrated by RCA to the Federal Communications Commission in Washington on April 6, 1950, General Sarnoff reported. At that time, RCA revealed a new method that makes possible the transmission of color television programs produced by the RCA color television system over existing coaxial cables. Special equipment makes it possible, at the very start of color television service, for all existing network facilities, whether coaxial cable or radio relays, to transmit RCA color television programs.

"We are proud of the magnificent work which our scientists and engineers have done in developing the

RCA all-electronic fully compatible television system and the direct-view color picture tube," declared General Sarnoff. "I am sure that, as stockholders, you will join with the management in congratulating the scientists of RCA Laboratories and the engineers of the RCA Victor Division on their achievement. As a result of their accomplishments, we can see ahead the continued commercial development of practical and simplified color receivers. Thus, our generation is assured of clear and natural color programs at home, and there is every reason to believe that the next generation will be able to see around the world in color television."

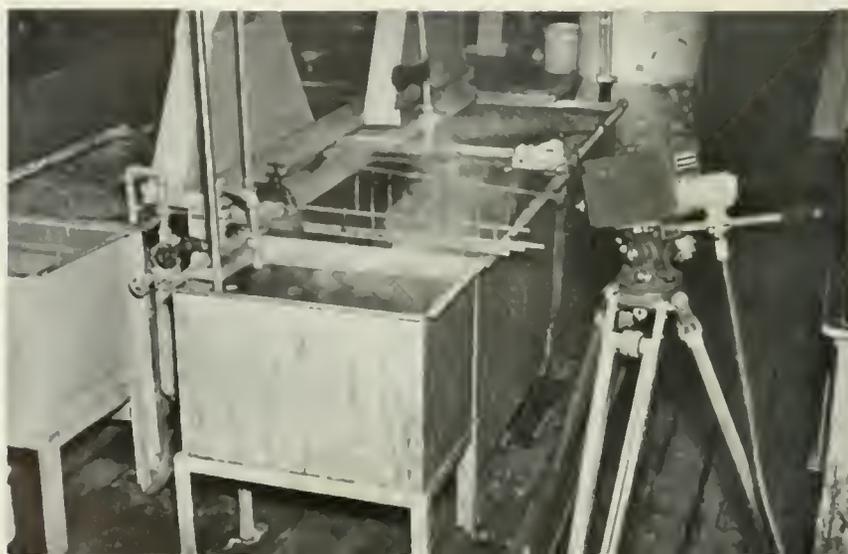
Many new fields of application for television are opening, he said. For example, industrial television is making important strides. RCA engineers are developing equipment for educational and industrial use in such fields as coal mining, chemical processes, medical and surgical instruction halls, classrooms and factories, as well as military applications. A new small television pick-up tube, called the "Vidicon", developed by the RCA Laboratories Division, makes possible the smaller television cameras which are ideal for industrial purposes.

#### *Recorded Music*

General Sarnoff recalled that, at last year's Annual Meeting, he reported that the new RCA 45-rpm system of recorded music, introduced in the Spring of 1949, marked "an achievement of great technical and commercial significance." Since then, he said, the "45" has won widespread public acceptance and is rapidly becoming the most popular type of phonograph record on the market.

"These records are being manufactured by RCA at the rate of more than 30,000,000 a year," he reported. "Turntables capable of playing the '45' records are being pro-

*(Continued on page 32)*



THE RCA INDUSTRIAL TELEVISION SYSTEM IS EXPECTED TO FIND WIDE ACCEPTANCE IN THE REMOTE-OBSERVATION OF MANUFACTURING PROCESSES. HERE A VIEW OF A CHEMICAL OPERATION IS TRANSMITTED BY THE VIDICON CAMERA TO A SCREEN SOME DISTANCE AWAY.



THOUSANDS OF "HAND-PROPS" RANGING FROM CAN OPENERS TO 18TH CENTURY PISTOLS LINE THESE SHELVES IN A SECTION OF NBC'S PROPERTY STOREROOM.

## Setting The Stage For TV

*NBC's Television Production Facilities Department, with Staff of 250, Designs and Builds Settings for Fifteen Programs Daily*

THE modern miracle of television continues to amaze the average viewer and impress the industrial leaders of America. Video's audience has grown from a few thousands in 1944 to today's unparalleled figure of 20,000,000. Yet few outside the industry realize the tremendous expansion of programming facilities and trained personnel, operating far behind the studio cameras, which was necessary to keep pace with TV's progress.

At NBC, the unit responsible for staging the video programs is called the Production Facilities Division. It was started in 1944 with an Art Director and five assistants, and today numbers nearly 250 persons. Every minute of their working day is devoted to plotting, planning, executing orders and meeting inflexible, and sometimes almost impossible, deadlines.

As the network's television schedule grew, demands on Production Facilities became proportionately greater. Producing scenery in the original cramped quarters in Radio

City soon developed into a major problem. There was only one solution. A new, spacious Central Shop at 533 West 56th Street, acquired early this spring, provided the answer. Now, television at NBC has room to breathe, to spread out, to expand as needed, and to experiment on a larger scale than was ever possible before.

The work of this Division starts as soon as the script for a program has been read and its "Staging Routine" indicated. From that point on, scenic designers and artists, carpenters, and property men work with lightning speed to turn out the finished products. Moreover, the staff is not fazed by any requirement. Whether a television script calls for a stuffed seagull, an Egyptian mummy case, or a Spanish market-place, NBC Production never fails to produce the goods.

The fastest-working crew in the TV industry, this unit of the Operations Department provides settings, artwork, titles, properties, costumes, special effects, and make-



By Robert J. Wade

*Manager, Television Production Facilities Division, National Broadcasting Company*

up for an average of 15 video presentations each day.

At the new 56th Street headquarters, three complete floors, totalling 75,000 square feet of floor space, have been leased from Sheffield Farms, Inc., to house the largest and most complete scenic design facilities in the television industry. This Central Shop serves five to six studios at Radio City; the International Theatre, at Columbus Circle; three studios at NBC's 106th Street Annex; two studios at 66th Street, and additional theatres or studios leased occasionally for special events.

IN PRODUCING SCENERY FOR "MADAME BUTTERFLY", SCENIC ARTISTS WORKED FROM SKETCHES LIKE THE ONE BELOW TO PRODUCE THE REALISTIC JAPANESE SETTING AT THE RIGHT.



The Property Section occupies the building's enormous basement, housing over 10,000 props, in addition to 700 pieces of stock furniture, 1,000 yards of drapery fabric, hundreds of costumes, and odd pieces of scenery. Additional items are being added at the rate of 200 a week.

Carpenter and Paint Shops are located on the street level, where approximately 1,800 basic scenery elements and 850 units of theatrical canvas scenery are stored in racks within easy access. These spacious facilities make it possible to turn out finished scenery on an assembly-line basis. The scenic designers' office and several "dry" rehearsal studios are located on the second floor. Additional working space is available here and is in constant use by scenic painters. Trucks may drive into the plant or up a ramp to the second floor — a highly attractive feature which expedites transportation of sets from shop to studio and back to storage.

Before the move to new quarters was made, NBC television scenery was built and painted in either the RCA Building sixth-floor shop, or at the 106th Street studios. Although these facilities were adequate for the program level in 1948, our staff, toward the end of 1949, was working day and night in both areas. It was often necessary to

build and paint scenery in broadcast studios, where the small floor area made it impossible to set up realistic scenery efficiently. Frequently scenic artists delayed the work of carpenters, and vice versa.

#### *Confusion Caused by Congestion*

At one point, during the preparation of a "Texaco" program, the shop was so crowded with scenery, props, personnel and lumber that a crewman, in attempting to remove a piece of scenery, fell behind it, bringing down with him an entire production of the "Phileo Playhouse" which other workmen were feverishly disassembling. The victim, who was extricated one hour later, miraculously escaped injury. At another time, a carpenter, attempting frantically to make additional space in a corner of the Shop, pushed a piece of scenery through a light plaster wall into the office of a startled executive producer.

There was an obvious need for a large central shop where all craftsmen could be formed into a pool, and where all lumber, paint and other supplies could be controlled from a central point. Considerable planning was necessary in order that the move to the new Shop could be made without impairing operations. How well this was done is seen in the fact that, during the

transition, more than 125 programs were staged without serious trouble.

To overcome the problem of mass-producing scenery economically, basic stock units were designed. The estimated cost of creating an average-sized dramatic setting (if executed by a commercial scenic studio) might range from \$3,000 to \$8,000. By exerting some mental gymnastics, the TV designer can generally plan a new set by choosing the proper units from the 50,000-odd items piled up in the stock room. These wall sections, pilasters, doorways, windows, arches, mantels, steps, fences, etc., can be redecorated and reassembled in hundreds of different ways to create the desired effect.

Often an entire production must be designed, down to its smallest detail, then built and painted in one day, with each piece titled and numbered so that studio crews can put scenery together accurately and quickly. The production of "Macbeth" provides a classic example of this speed and efficiency. The Facilities Division designed, assembled and set up a record eight sets, weighing a total of ten tons, and painted an area of 40,000 square feet plus the floor — in just two days! Theatrical producers, working against the clock, possibly could build such a show in two weeks.

As other examples, scenery for the video version of "Dinner at Eight" weighed over eight tons, not including set dressings and hand-props, while an audition of "The Women" at the 106th Street studio involved the use of 132 units of scenery, 12 doors, 5 mantels, and two truckloads of modern furniture.

Properties normally offer more difficulties than scenery, since scripts often call for unusual items. For example, the "Believe It or Not" program needed an authentic Egyptian mummy case; another program requested a 1907 drug-store soda fountain, and still another, a reproduction of the rear end of a San Francisco cable car.

A typical show uses from 80 to 100 props, and NBC retains a prop staff of eight men to track down the required items. Whether his list calls for a "serimshaw pie trimmer made of ivory by sailors in the 1850's", a 17th-century spinning wheel, a stuffed moose head or a railroad sleeping car, the prop man must locate the article. No substitute can take its place in the script.

#### *Versatile Craftsmanship*

No matter where a scene is set, NBC's versatile craftsmen can furnish background realistic enough to fool even the sensitive TV cameras. In response to demands for "more and better skies" these men recently

completed a dark grey-green cyclorama 80 feet long and 11 feet high, which is rigged between two pipes for maximum spread and tautness.

The Scenic Section of the Shop devours amazing quantities of materials. Approximately 15,000 gallons of casein paint and 20,000 gallons of thinners, etc. — a quantity sufficient to paint 1,042 small houses inside and out — are consumed each year. In the same period the Car-

entry Section handles over 1,000 pieces of white pine lumber.

Whether the assignment involves a 5-minute spot commercial or a three-hour full-scale extravaganza, Production Facilities is able to complete its task in time for the program's opening. This is possible because of the Division's highly versatile staff and the ample facilities and working space provided in its new quarters.

## Royalty Rates Reduced

A REDUCTION of up to fifty per cent in the patent royalty rates of the Radio Corporation of America was announced June 9 by Brig. General David Sarnoff, Chairman of the Board. The reduced rates apply to radio and television receivers, transmitters and tubes, as well as electrical phonographs.

"These reductions in RCA's standard royalty rates," said General Sarnoff, "are in accord with RCA's tradition of continuously reducing, so far as practicable, the cost of bringing inventions and new developments to the industry and the public. RCA's original royalty rate was 7½ per cent for radio broadcast receiving sets. In 1932, this was reduced to 5 per cent, and in 1940, it was further reduced to 2¼ per cent."

The latest reductions, he said, "are a further reflection of RCA's efforts to keep the radio and television industry fully abreast of the art at a minimum cost to the industry and the public." He concluded:

"RCA is particularly happy to be able to make these reductions at this time. The importance of the contributions it has made to the radio and television art and industry has been demonstrated by the widespread use of its inventions and by the successful development of television in which it has pioneered. Television has attained a growth and a public acceptance unparalleled in the history of American industry."

It was announced that the royalty rate for sound radio receiving sets and electrical phonographs was reduced by RCA from 2¼ per cent to 1½ per cent of the price received by the manufacturer. The rate for television receivers, including television combinations, was reduced from 2¼ per cent to 1¾ per cent.

#### *New Rates Effective on June 1*

The rate for receiving tubes, including cathode ray tubes used in television receiving sets, was reduced from 2½ per cent to 1¾ per cent. For transmitting and power tubes, the rates were reduced from 3 per cent and 2 per cent to 1¾ per cent. The transmitter and other commercial apparatus royalty rates were reduced from 3 per cent and 2½ per cent to 2 per cent.

These new rates became effective on sales and shipments made by RCA licensees on and after June 1, 1950.

THIS BACKGROUND FOR "MORNING'S AT SEVEN" WAS CREATED BY A PHOTO ENLARGEMENT; TITLES FOR THE PLAY WERE FLASHED AGAINST AN EXACT MINIATURE OF THE SET (FOREGROUND).



# Highlights of the Tour



# Toscanini with the

**April 14 New York—Carnegie Hall**  
More than 2,800 music lovers gather at New York's music center for the concert which launches the tour.

**April 17 Baltimore—Lyric Theatre**  
At this first stop, an audience of 2,600 fills the house where Toscanini had conducted "Gioconda" in 1908.

**April 18 Richmond—Mosque Theatre**  
Toscanini electrifies 1,000 Virginians with a thrilling interpretation of "Dixie," played as an encore.

**April 22 Atlanta—Auditorium**  
Attendance: 5,100. Again, playing "Dixie" as an encore, Toscanini is not permitted to leave the podium until the melody is played a second time.

**April 25 New Orleans—Auditorium**  
Not only the 5,200 persons in the music hall but the entire city pays tribute to the Maestro's magic.

**April 27 Houston—City Auditorium**  
Braving extreme heat, Toscanini and the orchestra present a program exceeding the expectations of the 4,300 persons present.

**April 29 Austin—Gregory Auditorium**  
Special trains bring hundreds of music devotees to the city to swell the audience to more than 6,000.

**April 30 Dallas—State Fair Auditorium**  
4,000 brave a torrential downpour to keep a date with the superlative music of the Maestro and his musicians.

**May 3-5 Pasadena—Civic Auditorium**  
On two successive nights, Hollywood stars join 3,000 local citizens to pay honor to the world's greatest interpreter of fine music.

**May 6 San Francisco—Opera House**  
Attendance: 3,200. NBC receives scroll for contributions to music.

**May 9 Portland—Auditorium**  
Approximately 5,000 hear first concert presented in Northwest.

**May 10 Seattle—Civic Auditorium**  
Attendance: 6,000.

**May 13 Denver—Municipal Auditorium**  
Largest attendance so far: 7,500. Univ. of Colorado presents scroll to NBC.

**May 15 St. Louis—Fox Theatre**  
Attendance: 5,100. "Toscanini Day" proclaimed by city's mayor.

**May 17 Chicago—Civic Opera House**  
Attendance: 3,800.

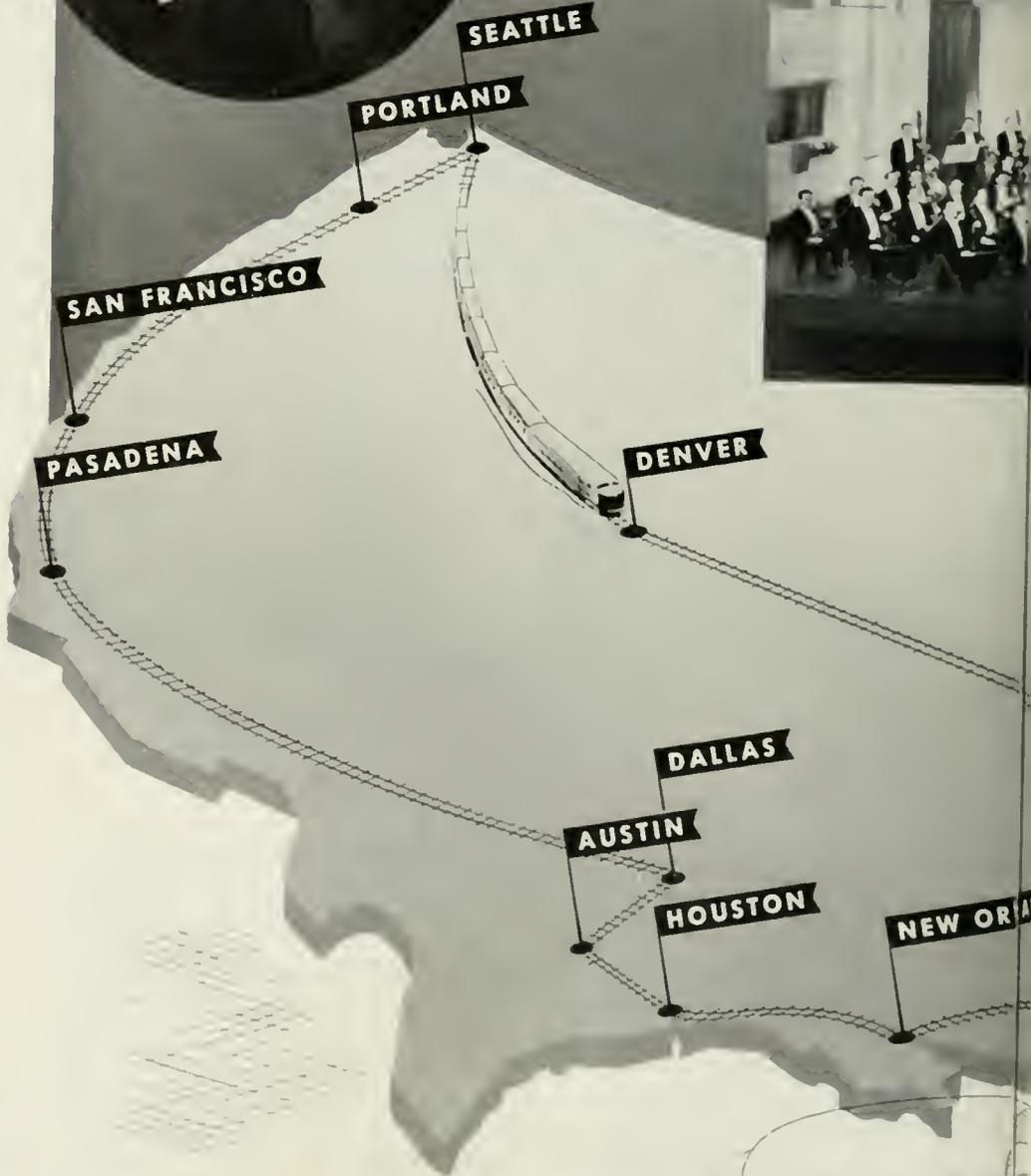
**May 19 Detroit—Masonic Auditorium**  
Attendance: 4,850.

**May 21 Cleveland—Public Auditorium**  
Record audience of entire tour: 9,500.

**May 23 Pittsburgh—Syria Mosque**  
Attendance: 3,700.

**May 25 Washington—Constitution Hall**  
President and Mrs. Truman and many government officials in an audience of 3,750.

**May 27 Phila.—Academy of Music**  
The 8,593-mile tour concludes before an audience of 3,000.



# tours the Nation

## the NBC Symphony

# *the Maestro and the Orchestra*



Almost from his birth in Parma, Italy, on March 25, 1867, Arturo Toscanini has been imbued with a dual passion for fine music and democratic ideals.

At the completion of his early schooling, the youthful Toscanini attended the Conservatory at Parma studying the cello and musical theory. As first cellist of an Italian opera company he journeyed to South America. As events were to develop, this journey to the western hemisphere was to be the turning point leading to long and busy years of constantly greater prestige and to a position of universal acclaim.

The episode which was to set the pattern for the young cellist's career took place in Rio de Janeiro during one of the opera performances in that country. The regular conductor of the orchestra had a disagreement with the musicians and refused to go on with a scheduled performance of "Aida". Toscanini, then only 19, but already recognized as an assiduous student of operatic scores, was prevailed upon to act as a substitute director.

Despite occasional appearances as a conductor, Toscanini remained essentially a cellist until 1892, when he was invited to conduct the world premiere of Leoncavallo's opera, "I Pagliacci". Later he introduced Wagner's "Gotterdammerung" in Italy, and was the first to conduct Puccini's "La Boheme".

Word of the great talents of this 25-year-old genius spread rapidly throughout Italy. Four years later he was invited to conduct at the great La Scala Opera House in Milan. Thereafter, for more than 30 years, Toscanini continued to be one of the leading lights of La Scala and was responsible for the introduction of many operas and symphonies.

In 1908, Toscanini came to America and joined the Metropolitan Opera. There he remained for seven seasons after which he returned to his homeland. In 1921, he came back to the United States and from 1926 to 1936 served as director of the New York Philharmonic Symphony Orchestra.

At the age of 69, at the peak of his fame, he decided to retire but Brig. General David Sarnoff and Samuel Chotzinoff, having in mind the formation of an outstanding symphony orchestra for radio broadcasting, induced the Maestro to assume the leadership of the new group. Toscanini accepted the offer and on Christmas night, 1937, directed the NBC Symphony Orchestra in its first coast-to-coast broadcast, an event which was heralded as an historic event in American musical annals. Since that time, the saga of Toscanini has grown along with the stature of the Orchestra.

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BRIG. GENERAL DAVID SARNOFF RECEIVES CITATION FOR GRAND MEDAL OF ASSOCIATION DES INGENIEURS-DOCTEURS DE FRANCE FROM PHILIP CORTNEY, FIRST VICE PRESIDENT OF THE FRENCH ENGINEERS OF THE UNITED STATES, INC. AT RIGHT: RENÉ DE MESSIERES, CONSEILLER CULTURAL, FRENCH EMBASSY, NEW YORK.

AT CEREMONIES in the French Embassy, New York City, on June 6, Brig. General David Sarnoff received the Grand Medal of the Association des Ingenieurs-Docteurs de France for services in war and peace that have in "great measure contributed to the development of public cultural relations on a world scale." Presentation of the award was made by Philip Cortney, First Vice President of the French Engineers of the United States, Inc.

General Sarnoff became the fourth American to receive the medal, others being former President Herbert Hoover; General Dwight D. Eisenhower, President of Columbia University, and Dr. Arthur H. Compton, Chancellor of Washington University.

The Citation noted that General Sarnoff carried out missions of "highest importance" in World War II. It stated that he had "rendered invaluable services to contemporary science and industry," and added: "The great progress now achieved in the field of tele-communications

is in large measure due to General Sarnoff's vision and leadership. Through these personal qualities he has inspired the development of the most advanced apparatus, meeting all exigencies of communication service."

*Great Expansion in Electronics*

In accepting the Grand Medal, General Sarnoff expressed deep gratitude, and declared:

"The growth of radio has carried with it a tremendous expansion in the science and art of electronics. We are now in an era of radio vision as well as sound, and the promise of the future in tele-communications is greater than ever before.

"International television is not far off. The scientific principles for linking the hemispheres by television already are known. The continued growth of this new art will some day make it possible to see as well as hear around the world.

"When this time comes, New York will look-in on Paris and Paris will look-in on New York. In fact,

the peoples of all nations — large and small — will be able to see and hear each other directly and to understand each other better.

"The Statue of Liberty, which the French people presented to the American people, has been a famous landmark in New York Harbor since 1886. Through international television it will become a worldwide symbol of liberty. The lighted torch held on high will shine around the globe reflecting the friendship that has so long existed between the French Republic and the United States."

**Master Antenna Installed In Philadelphia Hospital**

Hahnemann Hospital, Philadelphia, has become the first hospital in the world to install an RCA multiple-outlet master TV antenna system. The system provides clear and uniform television reception for patients and staff members in virtually any part of the 20-story building.

The installation consists of an array of rooftop antennas separately tuned for each TV channel in use in the Philadelphia area, a master signal amplifier, and a network of coaxial cable to carry the signals to built-in outlets throughout the building. It is designed to reduce the signal-shielding effects of the hospital building and interference presented by diathermy, X-ray, and other hospital equipment, as well as the problems involved in using a large number of separate rooftop antennas.

In expressing his gratification of the hospital's solution to the TV reception problem for hundreds of hospital convalescents, Frank E. Douglass, Jr., Business Manager of Hahnemann Medical College and Hospital, said:

"Television at the patient's bedside frees him from the bondage of loneliness by giving him the world's greatest entertainers for company. He can derive spiritual comfort from the excellent church programs that television presents, and maintain contact with the events and personalities that dominate the news."



SPECIMENS TO BE OBSERVED IN THE TABLE MODEL ELECTRON MICROSCOPE (SEE FRONT COVER) ARE INSERTED INTO THE INSTRUMENT THROUGH THE SMALL ROD SHOWN ABOVE.

## Compact Electron Microscope

*New Instrument Expected to Have Wide Usage in Colleges, Hospitals and Industrial Laboratories*

A NEW, advanced model of the electron microscope, much lower in cost, less complex and only 30 inches high, has been developed by RCA and will be placed on the market later this year.

Features of the new microscope—its reduction in bulk, complexity and cost—are expected to appeal particularly to many colleges, hospitals and industrial laboratories.

In announcing the instrument, Dr. John H. Reisner, its designer; Dr. James Hillier, research physicist of RCA Laboratories and co-developer of the original RCA electron microscope, and Dr. Richard G. Picard, manager of the RCA Scientific Instruments Engineering, described its structure and principles, and demonstrated its operation.

Of special significance, Dr. Hillier said, is the fact that the lower end of the magnification range of the new instrument overlaps that of the conventional light or optical microscope, permitting the student

to progress by stages from the known to the unknown. He may thus relate the particles and structural details he observes to those made familiar to him by the optical microscope, before advancing to higher magnifications which disclose a vast amount of new detail that he might otherwise be unable to identify.

Equally important, it was pointed out, is the simplicity of operation achieved in the new design, which makes the instrument safe for operation in the hands of a high school student or unskilled laboratory personnel. With no more than an hour of instruction, it was asserted, an operator generally familiar with the optical microscope should be able to insert specimens and produce well-focused pictures.

Dr. Reisner said that a unique advantage in time-saving and convenience is afforded by an engineering advance which for the first time permits insertion of specimens into the evacuated column,

and their removal, without breaking the vacuum. In addition, he said, photographic plates may be changed without admitting more than a small amount of air to the column. As a result, pumping time between plates is reduced to only 90 seconds, which is just about enough time for the photographic development normally carried out between exposures.

### *Marked Simplicity Achieved*

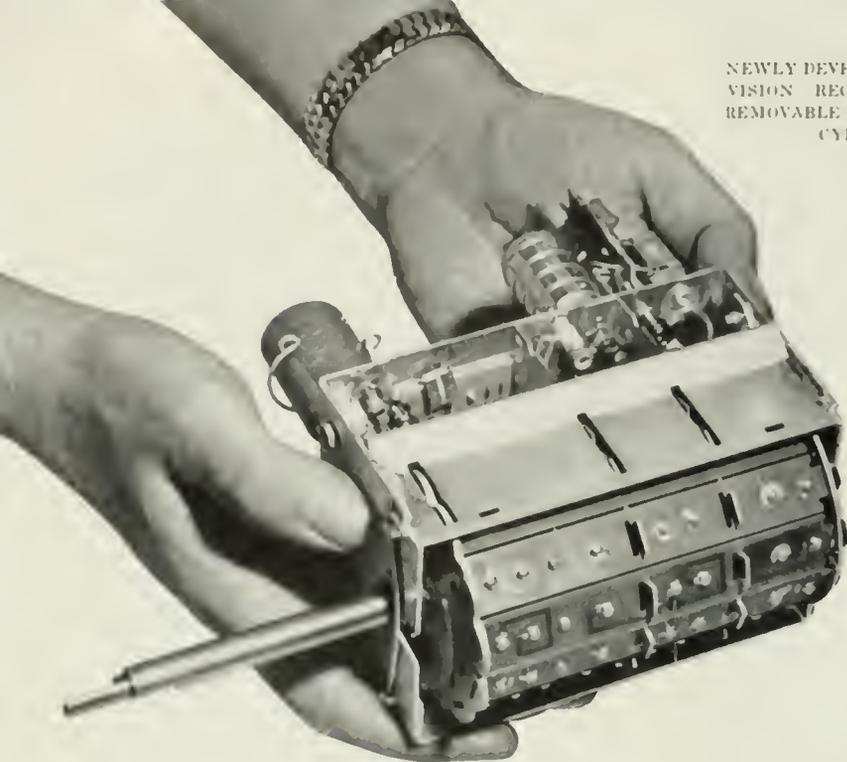
Marked simplicity, Dr. Picard said, is achieved without sacrifice of high-quality performance by means of a combination of design factors, including an entirely new electron optical system employing permanent magnet lenses instead of the conventional electromagnetic or electrostatic lenses. Through the use of permanent magnets, he explained, usual stability is permanently achieved and many controls and components are eliminated.

Incorporating "new approaches to the problem of energizing magnetic lenses, new means of introducing specimens and photographic plates into the vacuum enclosure, and a new means of alignment of optical components," he said, the instrument was developed specifically to meet "the microscope problems now clearly defined by experience, by simplifying constructional design to essentials, and by utilizing new materials in an integrated design".

By retaining the high voltage of the much larger Universal Model, Dr. Reisner explained that greater penetration of the specimen is achieved, thereby producing a more detailed image. Thick specimens such as replicas and tissue sections may be studied by means of the new microscope, he added.

Methods of mounting and introducing the specimen are simple and easily mastered. To change specimens the operator needs only to pull out of the column a sliding rod containing the specimen holder, make the change, and push the rod back in place. A new type of specimen holder facilitates pre-preparation of specimens, so that production-line procedures may be followed in running one specimen after another without any delay.

NEWLY DEVELOPED "PRINTED TUNER" FOR TELEVISION RECEIVERS SHOWING THE NARROW REMOVABLE STRIPS WHICH REPLACE THE USUAL CYLINDRICAL TUNING COILS.



TUNERS ARE QUICKLY ASSEMBLED BY INSERTING STRIPS CONTAINING THE PRINTED CIRCUITS FOR EACH OF THE 12 TV CHANNELS AROUND THE OUTSIDE OF THE TURRET.



**D**EVELOPMENT of a television tuning unit in which certain of the most important circuit elements are produced by a photo-etch "printing" process—in contrast to the usual wire-wound coils—has been announced by the RCA Tube Department. This unit, which is heralded as a major accomplishment in home-receiver design, provides greatly improved performance of television receivers installed in fringe areas, particularly when the instruments are operated from built-in antennas.

In design, the new RCA unit is a cylindrical turret-type tuner. The turret assembly employs individual coil strips or segments, each containing the printed circuit for a separate television channel. The strips are easily removed for service or replacement. All the tuned circuits are printed with the exception of the oscillator coils for channels two to six.

Tuning is accomplished by rotating the turret by means of a conventional channel-selector switch which connects with the proper coils for each channel. Special features have been incorporated in the tuner to insure durability and trouble-

## "Printed" Tuners for TV

*New Unit Developed by RCA Will Give Better Performance When Built-in Antennas Are Used*

free service. These include stator contact springs of solid hardspring silver, and turret contact rivets of solid coin silver. The unit is capable of withstanding well over 40,000 complete revolutions of the turret.

Initial designs of the new tuner are intended for use in picture systems of the type employed in the 630TS model television receiver. This receiver may be changed over to the new tuner with only two minor electrical changes and only minor mechanical modifications.

### *Provides Uniform Gain*

The new printed circuit tuner provides high and substantially uniform gain on all channels under typical operating conditions. Other features include an excellent noise factor, high rejection of spurious responses, very low radiation and a temperature-compensated, stable oscillator circuit. These character-

istics make the new RCA printed-circuit tuner especially suited to receivers using indoor antennas. The new RCA tuner is also the first to use a type 6CB6 tube as the RF amplifier. Characteristics of this tube include high gain, low noise, and low grid-plate capacitance.

Intensive research leading to the adaptation of printed circuits to television tuners was undertaken by RCA engineers shortly after the end of the war to meet the needs of the rapidly expanding television industry, faced with problems of mass manufacture of intricate units. In addition to eliminating the mechanical winding of multiple coils, printed circuits provide precision inductance and reproducibility in the oscillator circuits and the RF amplifier.

The photo-etch process developed for the RCA printed-circuit tuner begins with the photographing of

a circuit drawing. A contact print is then made from the negative in a copper-clad sheet of phenolic plastic which is coated with a light-sensitive material. The print of plastic sheet is next developed and placed in an etching solution. The solution etches away that part of the copper not covered by the pattern of the circuit, leaving the required copper circuit on the plastic sheet. The sheet is then placed in a die and cut into separate sections and pierced.

Especially suited to television-tuner production, the photo-etching

process is conducive to continued improvement and circuit development, since all that is necessary when a change is to be made in a circuit is to make a new photographic negative. Reproducibility is excellent, with detail and precision of the lines in the circuit approaching photographic accuracy.

The new RCA printed circuit tuner, which has already been subjected to extensive field tests, is now available to manufacturers of television receivers. It will also be available for replacement purposes through RCA parts distributors.



AN OPERATOR LOWERS A COPPER-CLAD SHEET OF PLASTIC, CONTAINING A PHOTOGRAPHIC PRINT OF THE TUNING CIRCUITS, INTO AN ETCHING VAT.

## NBC Cited for Program Quality

Eight citations for outstanding accomplishments in the radio and television fields were awarded to the National Broadcasting Company and its affiliates in *Variety* magazine's 17th Annual Showmanagement Awards.

Showmanager Awards went to heads of NBC affiliates; John Gillin, WOW, Omaha, and Clair R. Mc-

Cullough, WGAL (AM-TV), Lancaster, Pa.

NBC's "Saturday Night Revue", received a special citation, and the network's "Voices and Events" program was given special mention.

Three NBC affiliates received plaque awards: WWJ (AM-TV), Detroit; WBAL-TV, Baltimore, and KIST, Santa Barbara.

## Boston Jubilee Award Presented to Sarnoff

The Industrial Statesmanship Award of the Boston Chamber of Commerce was presented to Brig. General David Sarnoff, Chairman of the Board of the Radio Corporation of America, on May 18. The presentation of awards highlighted a dinner program of the Boston Jubilee, commemorating the 175th anniversary of the founding of American democracy, held in the Copley Plaza Hotel. In part, General Sarnoff's citation read:

"For your outstanding record of good business citizenship as marked by your many accomplishments which are materially contributing to the economic advance of America in this dynamic age."

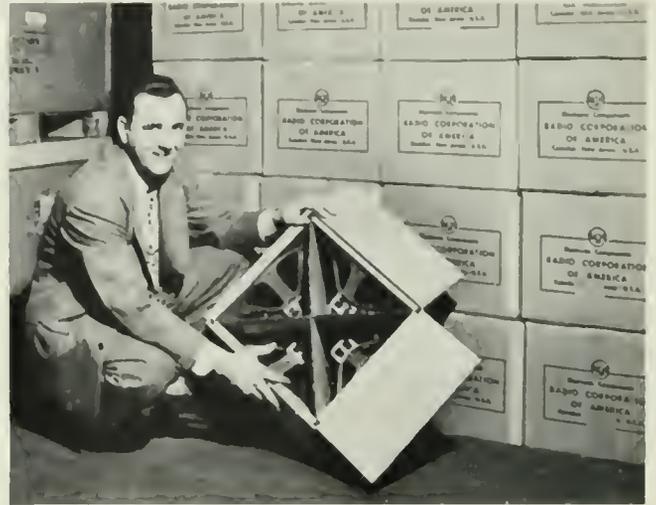
During a round-table discussion, held in conjunction with the Jubilee at historic Faneuil Hall, General Sarnoff made the following remarks:

"I think it is perhaps worthy of interest that in the discussions of the capitalistic system, those who stress sharing the wealth, forget the importance of creating the wealth. You can't share if you have not created. In this past fifty years, there has been a creation of wealth under the private enterprise system in America that has provided not only our own high standards of living, but also has made it possible for us to preserve the lives of many beyond our own borders. . . .

"It has seemed to me that in the preservation of the private enterprise system, there has recently grown up the philosophy of 'survival of the sickest' instead of 'survival of the fittest'. And that is a change from our former concept. It is also worthy of note that in the many investigations which take place in our country, and I doubt whether anyone here is free from those investigations, it is almost always true that a successful company and a successful enterprise is the subject of suspicion and investigation. I wish they would start investigating the failures instead of the successes. There might be some very interesting economic information developed as a result."



BY DEVISING A NEW METHOD OF CRATING LOUD-SPEAKERS, RCA'S TRAFFIC EXPERTS ARE ABLE TO PACK AND SHIP 80 UNITS IN ONE CARTON INSTEAD OF FOUR UNITS BY THE OLD METHOD.



**T**HE Traffic Division of RCA Victor is responsible for spending some \$6,000,000 annually for freight services and approximately \$450,000 a year for passenger services. Impressive as these figures may seem, they still do not consider the finished goods from Home Instrument and Engineering Products departments which are sold f.o.b. factory and therefore shipped collect. Yet through it all, Traffic must be able to perform these services while continually keeping in mind the required essential of Thrift.

Traffic uses all forms of transportation—shipping via parcel post, water, railroad, motor carrier, freight forwarder, Railway Express Agency, air freight and air express. Travel on company business calls for similar diversification. For example, the task of routing, scheduling and obtaining suitable equipment for the Toscanini Transcontinental Tour Train was handled by the Traffic Division. RCA's freight and passenger bill would be increased by about \$700,000 if it were not for the efforts of the Traffic Division.

It was not so very many years ago that industrial traffic activities were limited almost entirely to shipping by railroad from a freight

## Moving Products and People

*That is Function of Traffic Division Which Spends \$6,000,000 a Year Doing It*



By Richard C. Colton,  
*General Traffic Manager,  
RCA Victor Division*

station in one town to a freight station in another town. Now all this is changed and today traffic personnel think in terms of the best method of moving goods from the end of the assembly line in the factory to a position inside the premises of the consignee. Traffic responsibilities such as freight rates, economical routing, loss and damage claims, freight bill audit, rate quotations, legal considerations, etc.,

no longer form the limits of traffic interest. Today materials handling and packaging, as they overlap with transportation, are of serious concern. In fact, in RCA Victor, for the past two years, a Division Packaging, Materials Handling and Traffic Coordination Committee has been meeting every other month to discuss items of mutual interest. This Committee has standardized imprinting on cartons, worked out many Divisionwide purchase specifications for packing materials, acted as a clearing-house for publications and articles on packing and allied subjects, invited prominent speakers to address the Committee, and carried on extensive educational activities in the packaging, materials handling and traffic fields.

Of particular interest is the new bulk pack developed by the Packaging Engineer of Component Parts to handle speakers from Camden to Indianapolis. Packaging was assisted by Materials Handling and Traffic in working out a bulk pack that eventually reduced the packing

cost per speaker from 11c to 3c—a major accomplishment.

Traffic has worked with the Camden Trucking Section and other organizations in developing advantageous over-the-road private carriage operations. RCA Victor trucks are now operating on regular schedules between Camden on the one hand and Indianapolis, Lancaster and New York City locations on the other hand. These trucks provide good service and because they are fully loaded both ways, also provide most economical transportation.

### *Works to Minimize Costs*

Traffic works constantly with all organizations to keep premium transportation cost at a minimum. Premium transportation is defined as expense of service that is costlier than other cheaper and normally available service. Production Control, Purchasing and Sales people work closely with Traffic in scheduling shipments for release in economical quantities and with sufficient time in transit to permit routing via lowest-rated services. If the normal routing is not satisfac-

tory, traffic personnel is contacted for the fastest and yet cheapest emergency routing. Distributors of RCA Victor products have not been overlooked either. More than 2,000 copies of a comprehensive 40-page Traffic Guide for Distributors of RCA Victor Products have been released to distributors and dealers throughout the country.

During 1950 RCA Victor traffic personnel will expedite or trace over 20,000 urgently needed shipments. Some 12,000 passenger reservations

will be made by the Passenger Transportation Groups. Traffic analysts will audit about 250,000 transportation bills for correctness of freight rates and classification descriptions. Yes, company traffic is moving in thousands of tons of materials and products each month — that is the RCA traffic picture. It is a fast moving business, this keeping abreast of new ways to ship to assure the best and cheapest transportation commensurate with service requirements.

ONE OF THE FLEET OF COMPANY-OWNED TRUCKS LEAVES THE INDIANAPOLIS PLANT WITH AN EMERGENCY LOAD OF 45-RPM RECORDS DESTINED FOR OVERNIGHT DELIVERY TO A DISTRIBUTOR.



## Simple "Ruler" Measures Speed of TV Signals

An ingenious television "ruler", called a "Microstick", which can actually measure the millionths of a second it takes for a television signal to travel across the face of a kinescope, has been devised by the RCA Tube Department as an aid to servicemen in television picture analysis.

The Microstick is a transparent plastic ruler which in use is held flat against the safety glass of a television receiver to check a number of factors important to reception. The ruler is scaled for use with all picture tube sizes.

The Microstick may be used to measure the bandwidth of a television receiver, calibrate vertical wedges in test patterns, determine

the beat frequency of interference, and measure the air-path distance of "ghosts" or other reflected signals. In addition, the ruler is useful for determining the frequency of "ringing" in video circuits and for measuring the duration of sync pulses, horizontal blanking, and other types of video signals.

Conceived by John Meagher, RCA Tube Department television specialist, the Microstick is designed to aid technicians, students, and others in gaining a clearer understanding of the important time factors in television. Mr. Meagher is the author of the widely used TV "Pict-O-Guide" for television troubleshooting.

Design of the Microstick is based on the fact that the electron beam in a kinescope is deflected from the left to the right-hand edge of the picture in approximately 53.3 micro-

seconds, forming one horizontal scanning line. Because of this, a ruler made equal in length to the width of the picture and divided into approximately 53 equal divisions, each division representing one millionth of a second, is capable of measuring the duration of any signal present in picture. Knowing the duration of the signal or the number of cycles of signal that occur in a given time, it is easy to compute the frequency of the signal.

JOHN MEAGHER OF THE RCA TUBE DEPARTMENT, DEMONSTRATES THE "MICROSTICK", A TRANSPARENT PLASTIC RULER WHICH HE DEVELOPED TO SIMPLIFY TELEVISION PICTURE ANALYSIS.

[RADIO AGE 23]





THIS BUILDING, RECENTLY ACQUIRED AT HARRISON, N. J., WILL ADD FACILITIES FOR THE MANUFACTURE OF ELECTRON TUBES FOR RADIO AND TELEVISION.

SCENE IN PICTURE-TUBE PLANT, MARION, INDIANA, WHERE KINESCOPIES ARE BEING TURNED OUT BY THE THOUSANDS TO MEET THE INCREASING DEMAND.

## Plant Expansions Continue

*Additions at Canonsburg and Harrison Are Steps in Long-Range Program*

**T**WO additional steps in a long-range program of plant expansion, intended to meet the increasing requirements of the rapidly growing electronics industry, were announced recently by the RCA Victor Division. Manufacturing facilities at Canonsburg, Pa., and Harrison, N. J., are involved in these moves.

At Canonsburg, the Division has leased a modern one-story building which will be equipped for conveyor line assembly operations for the production of radio and Victrola radio-phonographs with an annual output of a million units. At Harrison, a new building with 126,000 square feet of floor space, has been purchased for the manufacture of electron tubes.

The addition to the Canonsburg plant, which adjoins the record factory opened by RCA Victor in 1917, will provide 90,000 square feet of manufacturing space and will employ approximately 700 men and women. Production is expected to start about August 1.

At first, these facilities will be used to augment the radio set production of the Bloomington, Ind., plant. Later, when added television manufacturing equipment is installed at Bloomington, Canonsburg will assume the Company's entire radio set production. This transfer of operations should be completed

in time to meet the fall demand for television receivers which is expected to exceed that of 1949.

Acquisition of the Harrison property highlights a program of expansion by the RCA Tube Department involving many millions of dollars. This addition will employ more than 500 persons.

### *Expansion Began at Lancaster*

Expansion of tube production facilities began shortly after the war, when RCA purchased a large, new plant at Lancaster, Pa., where mass-production machinery was installed for the manufacture of television picture tubes, television camera tubes, transmitting tubes and power tubes. Since then, additional

machinery has been installed in the original building and in a large, new structure for the production of television tubes.

During this same period, RCA installed much automatic machinery to increase the production of miniature-type electron tubes at its Indianapolis plant. Large numbers of these tubes are used in television receivers as well as in industrial and communications equipment.

A little over a year ago, RCA purchased a plant at Marion, Ind., which was expanded to provide more than 130,000 square feet of space for the manufacture of television picture tubes. At all of the Division's plants, machines which have been making older types of metal and glass tubes are being re-designed and modernized to provide additional production capacity.

Currently, all RCA Tube plants are running at full capacity and achieving new records in output. Employment is at an all-time peak.

EXTERIOR OF MARION, INDIANA, TUBE FACTORY OPENED A YEAR AGO AS ANOTHER STEP IN ENLARGING RCA FACILITIES FOR MAKING 16-INCH TELEVISION PICTURE TUBES.



# Suggests Ways To Wage Peace

*In Address to Naval Engineers, General Sarnoff Evaluates Perils Confronting the World*

**I**N a forthright evaluation of the perils confronting the world through the cold war, the spread of Communism and the creation of such formidable weapons as the H-bomb, Brig. General David Sarnoff, Chairman of the Board of the Radio Corporation of America, in an address before the American Society of Naval Engineers in Washington, D. C., on April 28, declared that if the cold war remains in deep freeze for the next decade, we may never see another world war.

General Sarnoff offered six ways to wage peace. The first way, he said, was "to make aggression on a global scale an act of suicide for the aggressor nation." President Truman, he added, was unerringly correct in ordering the vast machinery of research to be set in motion for the production of the H-bomb.

"The world crisis must be met on many fronts," he said. "There are no 'pink pills' for peace. There is no easy or speedy road to its attainment. It is a long, hard journey."

Pointing to the fact that the whole alphabet of Russia's cold war has been compressed into four C's of Confusion, Collapse, Chaos and Communism, General Sarnoff said that for every problem the cold war places at America's door, Russia faces five greater ones, gorged as she is by the conquests of her penetration in Europe and Asia. World peace, he asserted, must come from the hearts of men. We must lead from strength, not from weakness, he said, for power is the only language which the aggressor understands.

## *Six Ways to Peace*

The six ways to peace suggested by General Sarnoff were as follows:

1. Adequate military preparation that would enable us to hit back hard and at once with such power as would deter any but mad men from striking the first blow.

2. The removal as far as possible of the tensions arising from

mutual fears and suspicions, from miscalculations or misunderstandings now existing between the two great power groups, and thus keep the cold war from getting hot, before the stockpiles of horror weapons reach a critical mass.

3. A strong and positive policy against step-by-step aggression—a policy by which the world may know the limits of our toleration. The problems that now confront us, he said, will not solve themselves automatically.

4. An economically and industrially strong America. The greatest gift to global communism would be a serious recession in our own economy.

5. Our leadership and contribution in restoring the shattered economy of the free world and its full confidence in free institutions.

6. Spreading the message of America on both sides of the Iron Curtain, so that our investment in peace and the maintenance of a free world front will not be lost.

"Much of what I have said," continued General Sarnoff, "rests on the pillars of education. We cannot hope to win the cold war of Soviet Russia without an alert and informed public opinion in our own country."

Persuasion and menace, he pointed out, were the twin instruments of Russian propaganda, with rumors of peace talks always combined with threatened or actual acts of aggression.

"An informed and effective public opinion in a democracy like our own is not merely the responsibility of self-education," he continued. "It is also the responsibility of those who guide a free press and a free radio; of public leaders who influence our policy, and of those who control the agencies of Government.

"The predictions and contradictions of public leaders and scientists on the new and total danger to civilization threatened by the recently harnessed forces of nature

are not conducive to public confidence. There can be no denying the speculation of scientists that our physical discoveries have opened up the possibility of world annihilation; just as there can be no denying the philosophical implication that the same forces may prove a blessing in disguise. Out of the necessity of controlling, limiting or channeling such forces, from destructive into constructive energy, eventually may come the outlawry of war and world-wide peace."

## *Leaders' Responsibility at Peak*

At no time in our history, General Sarnoff declared, have the leaders of industry had a greater responsibility to our total economy. In these circumstances, it was ironic, he said, "that in our own country attacks continue on bigness in industry, solely because big industry is big. With something like 400,000 manufacturers in the United States, there are those who preach fragmentation here, as against the five and ten year plans and the vast installations which a ruthless power abroad is intent on building to effectuate its own plans."

General Sarnoff urged that "the Voice of America" be greatly strengthened. "It seems to me," he said, "that in addition to Marshall aid we need to find methods to export the purposes of the Marshall plan as well; for it includes ideas as well as goods and money.

"I emphasize this because I note from foreign reaction that our friends, as well as our potential enemies, have not taken too much trouble to make clear to their peoples our purposes and policies in straining our resources to give European aid. We should not allow the opinion to be built up abroad that Uncle Sam has limitless resources.

"We should make it clear that, in seeking agreements to remove exchange and other barriers, we are seeking that measure of unification which would make our help to European recovery truly effective. We should inform our friends abroad that, in our efforts to make greater the Voice of America, we would welcome its expansion to the voice

*(Continued on page 32)*



AT THE FIRST PUBLIC DEMONSTRATION OF TEX, THE AUDIENCE GETS A CLOSE-UP VIEW OF THE TELEPRINTER COPY ON A TELEVISION SCREEN SUPPLIED WITH SIGNALS PICKED UP BY THE VIDICON CAMERA AT RIGHT.

## “TEX” Demonstrated

*Two-way Customer-to-Customer Communications Link With Netherlands Opened to Public*

A NEW two-way, customer-to-customer overseas radio teleprinter exchange service, called TEX, was demonstrated May 10 for the first time by RCA Communications, Inc., in cooperation with The Netherlands Postal and Telecommunications Administration. The new service was made available to the public on May 15, its initial application providing direct connections between teleprinters in New York City and all parts of The Netherlands.

The demonstration consisted of an exchange of official messages, current news information and informal conversations between con-

sular officials and members of the press assembled in the RCA Exhibition Hall, 40 West 49th Street, and a similar group in The Hague.

“For the first time in communications’ history,” H. C. Ingles, President of RCA Communications, explained, “direct teleprinter contacts on an intercontinental scope will be available to the general public. RCA private-line teleprinter installations in customers’ offices in New York hereafter will be connected direct to teleprinters in Holland through the Telex network there. Telex corresponds to the domestic teleprinter network (TWX) in this country.”

For the use of firms not now equipped with teleprinters in New York City, the necessary equipment has been installed at RCA offices, 66 Broad Street.

Charges for TEX are made on a time basis rather than on the usual telegraph word-count basis. Rates are \$3.00 per minute with a \$9.00 minimum for each connection. Operating at a speed of approximately 60 words per minute, the new service provides facilities comparable to normal conversational speeds by transoceanic telephone,



USERS OF THE TEX SYSTEM OF TWO-WAY COMMUNICATIONS SEE BOTH OUTGOING AND INCOMING TEXT WHICH IS PERMANENTLY RECORDED BY THIS RCA COMMUNICATIONS TELEPRINTER.

and at a lower cost per minute. The regular telegraph charge is 30 cents per full-rate word.

“New techniques were required to develop this direct customer-to-customer service,” according to Sidney Sparks, Vice President in charge of Commercial Activities, RCA Communications, Inc. Mr. Sparks explained that the present method of handling the bulk of RCA’s regular overseas message traffic is based on a network of five-unit teleprinter machines. These machines operate electrically to convert individual letters and figures into code combinations of five-signal units. Because of the wide usage of such equipment, this system is particularly adaptable to the interchange of radio and land-line message traffic.

“However,” he added, “in order to make all the necessary letters, figures and signs required for telegraph traffic, almost all usable combinations of the five units are employed, which makes the system somewhat susceptible to mutilations due to static, interference and fading. Prior to the war, RCA developed a system which used seven-unit combinations and, for radio transmission, greater stability and reliability were achieved.”

To clarify the operation of TEX in the first public demonstration, use was made of RCA’s new industrial television system. A Vidicon camera, focused on a teleprinter, was connected to a battery of television receivers in the auditorium, and the incoming and outgoing texts appeared on the TV screens as they were transmitted across the ocean.

This combination of the latest developments in television and international communications, it was said, indicated the possible use of similar installations for military and commercial conference services. Such a service would provide an immediate written record of intercontinental conversations that could be observed simultaneously in numerous locations.



AN RCA-EQUIPPED SOUND TRUCK GIVES A MODERN TOUCH IN THIS ANCIENT SETTING IN FRENCH MOROCCO.

MODERN TOWERS ARE PART OF THE ANTENNA SYSTEM INSTALLED BY THE RADIO CLUB OF MOZAMBIQUE.



# Africa — Market of the Future

*Tour of 15 Cities of "Dark Continent" Reveals Possibilities of Great Electronic Developments when Economic Status of Countries Becomes Favorable to World Trade*

TO MOST of us, Africa has meant "The Dark Continent", land of jungles, deserts and naked savages. After visiting a number of the continent's growing cities, in a 25,000 mile trip planned specifically to survey sales possibilities of the Company's electronic products, the author prefers to think of Africa as one of the great markets of the future.

After taking off from La Guardia Airport, brief stops were made in England and France before dropping down on Tangier as the first of our objectives in Africa. Here the East and the West meet and the result is a rapidly growing, modern city, surrounding a teeming native section. The modern city is based on three things: trade in goods with Spain, Morocco and other parts of North Africa and Europe; the free exchange of all currencies; and a low tax rate which makes it attractive to European corporations as a registration point. The native city, or Casbah as it is sometimes



By B. F. Moore, Jr.,

*Regional Director for Europe, Africa and the Near East, RCA International Division*

called, adds the color and romance of the East.

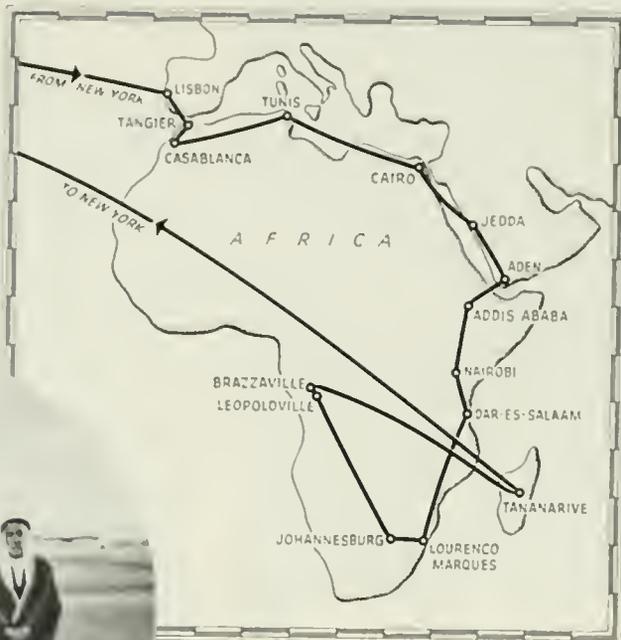
The effect of the three points mentioned above is that Tangier, site of RCA Communications' powerful station, is expanding rapidly. Office buildings, apartments, and homes are going up everywhere. Business is booming for everybody. As long as normal trade into many

countries is hampered by governmental restrictions of all sorts, Tangier will continue to prosper.

A short automobile ride took us to Casablanca, in French Morocco. Most of us first heard of Casablanca after Roosevelt and Churchill held their famous conference there, an epochal event which, incidentally, was completely unknown to the people in the city until after the leaders were on their return journey.

Immediately, after the war this city was a paradise for many ex-GI's who engaged in the import business which was thriving because of the peculiar status of the country. The United States Government has never recognized French sovereignty over French Morocco but instead continues to recognize the Sultan of Morocco. Under this arrangement the French Government was obliged to issue import permits freely to Americans in business. Although the legal status has not changed, permits are now greatly restricted and business

BELOW: THE AUTHOR AND TWO OF THE MANY RCA DISTRIBUTORS WHOM HE VISITED ON THE AFRICAN TOUR, WHICH COVERED THE ITINERARY AT RIGHT.



American products are unlikely to be admitted.

The only permanent American military cemetery in North Africa is located just outside Tunis, amid some of the ruins of ancient Carthage. When landscaping and building are completed, it will be an impressive and beautiful spot.

Cairo is only a short night flight from Tunis. Due to increased sales to the dollar area of the long staple cotton for which Egypt is famous, and to sales for dollars to areas like Japan, Egypt is in much better financial shape than in 1948, the year of our previous visit. Tourists have also increased greatly in numbers and provide another source of income.

The contrast with 1948 was even more striking because of the present atmosphere of normal living compared to the war conditions existing then.

#### *Egypt an Important Market*

As a result of all these factors Egypt has become an important market for American radios and certain electrical appliances. Broadcasting and communications equipment, which form part of the RCA line, are also finding an increasing market here. Now that Egypt is an independent country rather than a protectorate of Great Britain, it is

shopping in all the world markets and picking the best products, insofar as its currency situation permits.

In Cairo, we viewed the almost completed building where an RCA 50-kw broadcast transmitter will be installed. Located on the edge of the desert, it is a symbol of the progress taking place in modern Egypt. Although Egypt has a vast area, almost all of its 16,000,000 people are crowded into the narrow valley of the Nile, and all their food comes from the same valley. Intensive farming methods must be used and the government is attempting, by radio and in the schools, to educate the people and modernize their methods.

The next city was Jedda, in Saudi Arabia. Here the Westerner finds himself in a completely different world. There is practically no green anywhere; all is desert sand and rock. It was Sunday to me but not to the Moslem world. Their "Sunday" is our Friday.

The practicality of the Arab costume appeared immediately. While I was sweating in a suit and sand was blowing down my neck, our Arab friends were comfortable in their loose robes. Their burnooses kept the sand out.

#### *Major Income from Oil*

Before oil was discovered in this area, nearly all of Saudi Arabia's outside income came from the pilgrimages to Mecca. Today, this income is negligible compared to that derived from oil. But the sudden influx of wealth has brought problems as well as benefits. The impact of Western civilization introduced by the oil companies has also greatly affected the country.

After centuries of following the same customs, the people do not change their habits overnight; however, radios and some appliances are finding an ever increasing market. The erection, perhaps this year, of a power plant for Mecca and Jedda will hasten this trend.

For years RCA has supplied small communication transmitters and receivers to the Post and Telegraph Administration of the Saudi Arabian Government. The quality and ruggedness of these units have earned for RCA the respect and

admiration of the officials and operators in the Administration.

The British-controlled areas visited were Aden, Kenya, and Tanganyika. No dollar imports of consumer goods are permitted, and, in general, it is necessary to produce in the sterling area if one is to sell in these territories. Because of this the only present possibility for RCA lies in the sale of theatre equipment manufactured by RCA Photophone Limited in London. Nor can American-made engineering products be sold here. Virtually the only prospective customers are the Administrations, and they buy only British goods.

#### *Kenya a Huge Game Reserve*

If Kenya were not so distant, it would earn many dollars from tourists to the huge game reserve. Seeing all sorts of animals roaming in the wild, all about you, is a thrill.

Ethiopia is a rich country with many resources, but much time and capital will be required to develop them. Dollars are being earned, but import controls have recently been established which prohibit the import of American consumer goods.

Before an American operated airline started to function in this country of few roads and railroads, goods were transported almost entirely by donkey. Today combination cargo and bucket-seat planes pick up hides, coffee, and other products all over Ethiopia and bring them to a central point from whence they are ultimately exported. This is another illustration of the way the airplane is opening up territory. However, because Ethiopia is near the Equator, we were told that a ride in a plane with a cargo of raw hides is a sensory experience not to be forgotten.

Much communications equipment is needed but the finances of the country permit only a very slow expansion of facilities.

The Radio Club of Mozambique operates the largest commercial broadcasting station in Southern Africa, at Laurence Marques, in Portuguese East Africa. For RCA

MODERN TRANSMITTER BUILDING, ERRECTED BY THE EGYPTIAN STATE BROADCASTING SYSTEM, IS TYPICAL OF THE PROGRESS BEING MADE IN THAT COUNTRY.

people it is an inspiring sight to see this station with its five short-wave broadcast transmitters, four of which are RCA, 7½-kw units, model ET-1750. Programs are beamed to Portugal, to Portuguese West Africa, to the Union of South Africa and other points. The success of the station is shown by the constant expansion of its facilities, paid for solely out of earnings.

Johannesburg, in the Union of South Africa, presents a picture of bustling activity. In New York everyone seems to be in a hurry, but in Joburg, as it is called, the tempo seems even greater. Joburg is not the largest city in Africa, but more business and more enterprises of every sort are concentrated there than in any other city.

The foundation of all the country's wealth is gold. South Africa devotes great amounts of capital and much manpower to finding the gold and extracting it from the earth. Of course, after the precious metal is refined and sold to the United States, we carefully bury it again at Fort Knox.

#### *Has Other Mineral Resource*

South Africa has many other mineral resources, including diamonds, copper, coal, and manganese. It also exports citrus fruits and other agricultural products.

Notwithstanding the wealth, imports of American consumer goods have been prohibited, a situation that is not likely to change for some

time. Engineering products are being imported in considerable quantity, but the general trend on all imports is to favor the sterling area and soft currency countries.

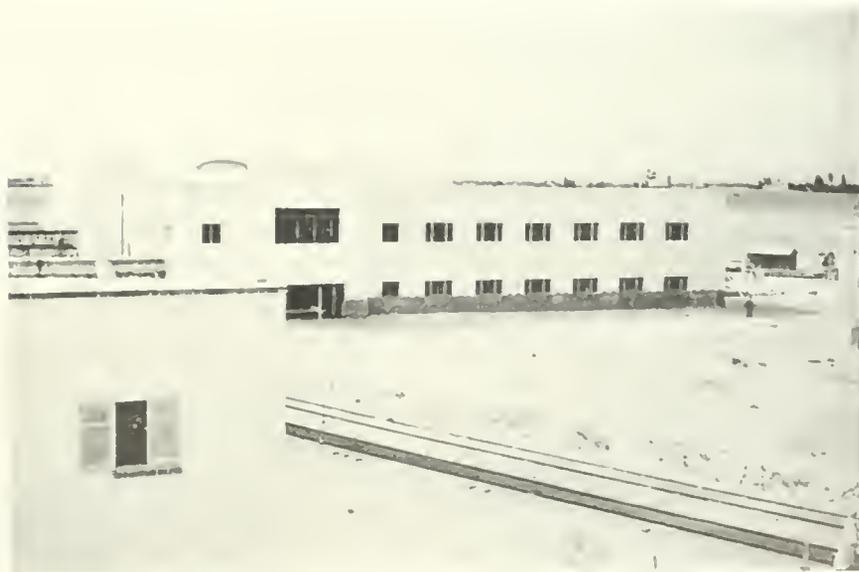
Of all the countries of Africa, the Union is probably the most advanced and ultimately will be the most industrialized. To a great extent this is due to the temperate climate. In the hot tropical countries, industrialization is difficult if not impossible.

Considerable quantities of RCA engineering products equipment are in use in the government services. Many units were sent on lend-lease during the war, and have operated so well that much more has been purchased since.

It was interesting to hear the announcer at the Johannesburg airport call out "All aboard for Leopoldville, Accra, Dakar, Lisbon and New York." It sounded like the 5:15 from Grand Central, but the distance is 8,000 miles.

We debarked at the first stop, Leopoldville. The Belgian Congo is a wealthy colony. It has many minerals including uranium as well as other resources. Here, as in Ethiopia, the greatest problem is transportation. A railroad runs from Matadi on the Atlantic Coast to Leopoldville, a distance of 200 miles, but because of the congestion in Matadi, it takes an average of two months for goods to cover the 200 miles to Leopoldville. From

*(Continued on page 32)*





LEFT: AN RCA TECHNICIAN, WORKING HIGH ON THE SUPERSTRUCTURE, ERECTS A TELEVISION ANTENNA FOR ONE OF THE TV RECEIVERS ABOARD A CANADIAN CARRIER.

CREW OF A CANADIAN WARSHIP WATCH PROGRAMS ON RCA TELEVISION RECEIVERS INSTALLED IN MESS-HALL.



WITHIN a few hours after three Canadian warships had tied up at Pier 26, North River in New York, in a courtesy visit to the city last April, crack crews of RCA Service Company had completed installation of nine RCA television receivers in the officers' and men's quarters aboard the vessels. Considering the unusual problems involved, the installation is believed to have set a speed record in carrying out an extensive installation of this kind.

Queen of the flotilla, the *Magnificent*, a 682-foot light fleet aircraft carrier was returning to its base at Halifax after participating with British and U. S. Navy units in joint exercises in the Caribbean. Her escorts, the *Micmac*, a 2748-ton destroyer and the *Swansea*, a 1440-ton frigate, had sailed from Halifax a few days earlier to accompany the carrier into New York.

Plans for "Operation TV" were worked out rapidly after the Canadian Consulate in New York had expressed a desire for the receivers. Elaborate arrangements already had been made for the city-wide entertainment of the crews during their five-day stay in port, but only part of the personnel could be given shore-leave at a time. Because of

## Television Entertains Visiting Canadian Naval Crews

*RCA Technicians Complete Extensive Installation of Receivers and Antennas in Record Time*

this, the Consulate believed that television would serve as a diversion for those remaining aboard ship.

The *Magnificent*, with its crew of 100 officers and 800 men, tied up at the pier at 11 o'clock on the morning of April 7. Waiting on the dock were six RCA Service Company trucks, fully manned with experts in antenna installation and set servicing. Earlier, trucks had unloaded 10 of the latest models of RCA television receivers in both table and console models. Within a few minutes after the gangplank had been placed against the side of the carrier, some of the RCA technicians were aboard and roaming through the big ship, seeking locations for receivers. Others climbed high into the upper rigging looking for suitable antenna supports among the maze of cables and signal lines.

After the two escort vessels were berthed, other Service Company crews boarded them and went

through the same procedure. So well organized was the work that by late afternoon nine television sets were in operation. The tenth was held in reserve, but was never used.

One of the real problems encountered in the project was the lack of an adequate power supply for the receivers. For technical reasons, the power generated aboard the ships could not be used. When the Naval Shipyard at Brooklyn learned about this difficulty, a special detachment, under command of Lt. G. A. Erickson of the Planning and Estimate Group at the Yard, laid temporary cables along the dock and to the receivers on each ship.

The interest of the ships' personnel in television programs proved greater than was anticipated. Ward rooms and mess halls often proved too small to accommodate the audiences attracted by the video programs, particularly pick-ups of sports events.

# America in The Electronic Age

*Scientific Marvels Will Open New Wealth in Sky, Earth and Sea, General Sarnoff Tells John Carroll University Graduates*

AMERICA is entering an amazing Electronics Age of "unlimited growth" in which television will have the most far-reaching immediate impact upon our national life, economy and politics, Brig. General David Sarnoff, Chairman of the Board of the Radio Corporation of America, declared at the commencement exercises of John Carroll University in Cleveland on June 12.

The scientific marvels of the Electronics Age will create new industries, open new wealth in sky, earth and sea, and help weld this planet into 'One World' at peace, General Sarnoff predicted. War with Russia is not inevitable, he said, and the United States now can use its courage, strength and scientific skill to promote "a world of progress" and "freedom of the individual."

General Sarnoff received an honorary degree of Doctor of Laws from the University for his pioneering leadership in radio, television and electronics.

The enormous development of television, General Sarnoff said, is fully as important as was the invention of the electric light, automobile, airplane and radio.

Not only will television be "one of the ten great industries of this country within the next ten years," he said, "but television also will be a potent force in shaping American history by influencing voters.

"By the time the presidential campaign of 1952 gets under way," he pointed out, "we should have coast-to-coast television and more than 20,000,000 sets in use. That will mean an audience of about 80,000,000.

"Indeed, television may well be a determining factor in choosing the next President of the United States.

"The eye, as well as the ear, will influence the vote. In choosing a candidate it may be that his television personality will be a deciding factor. He will have to be telegenic, wear the right haberdashery, flash a friendly smile and be sincere.

"How sincere the candidate looks to the voter may be more important

than how eloquent he sounds; a smile may be worth more than 10,000 words."

Also, in the critical field of international relations, General Sarnoff said, television may well be one of the tools of science which will weld this planet into "One World."

"When international television comes, as it will, people throughout the world will see democracy and the American way of life in action instead of merely being told about it."

Looking to the future, General Sarnoff said: "Science sets the pace. New industries yet undreamed of will be created and developed." He predicted that even such electronic wonders as color television, radiograms at fantastic speeds, Ultrafax sending a million printed words a minute, radar, electronic computers and electron microscopes will soon seem routine.

## *Descendants Will Call Us Slow*

"Fifty years from now our descendants will say that we were very slow in 1950," he continued. "Their automobiles, locomotives and ships may be powered by atomic energy. Their systems of transportation will surpass in safety, speed and comfort anything we have today. Those who may wish to stay at home and see the world will be able to look around the globe by color television."

General Sarnoff told the graduating class that it was entering "a world of progress, where new forces open broader fields for unlimited growth and expansion."

His own youth, he recalled, gave proof that "America is faithful to its glorious traditions as a land of opportunity and liberty." And he reminded the graduates that, because they have this rich American heritage of freedom and opportunity, they have great responsibilities to safeguard and promote it by observing all the duties of good citizenship.

In conclusion, General Sarnoff noted the pressure of the "cold war," but declared that "reality and

reason alike suggest that there should be no immediate danger of armed conflict between the United States and Russia." He urged a strong America, and added:

"We must maintain our confidence and courage, our national preparedness and leadership, our scientific advances and technical skill. By continually strengthening these girders in our spiritual, economic and political structure we shall grow in power to fulfill our responsibility to the world. Clear thinking, realistic understanding and patriotic support from every individual is necessary if war is to be prevented and world peace is to be made enduring. America seeks the friendship of all people.

"Those of us who have passed through two devastating world wars, hope that you young people will be spared a third conflict; that you will behold the dawn of universal prosperity and peace so that you may live in happiness and be free to apply your talents to constructive purposes.

"War is not inevitable. When the shadows seem to lengthen let us remember that it is always darkest before dawn. In the sunshine of the new day may peace on earth and good will among men prevail and fulfill the high purposes of God."

## RCA and DuMont Settle Patent Litigation

Dismissal of litigation which has been pending since 1948 between Radio Corporation of America and the Allen B. DuMont Laboratories, Inc., concerning claims of patent infringement on radio receivers, electron tubes and radio transmitters, was announced jointly on June 6, by Brigadier General David Sarnoff, Chairman of the Board, Radio Corporation of America, and Dr. Allen B. DuMont, President of the DuMont Laboratories.

At the same time, it was announced that RCA had granted DuMont its standard licenses covering radio receiving and transmitting tubes, television receivers and transmitters. DuMont has granted a license to RCA for the same categories of equipment.

# Business Triples in 10 Years

(Continued from page 12)

duced by RCA Victor in excess of 1,000,000 annually. Judged by its great popularity, the RCA 45-rpm system of recorded music has proved a development of which we may well be proud."

Early in January, 1950, RCA Victor announced that it would issue superior 33 $\frac{1}{3}$ -rpm long-play records. They have been on the market since March. These records of improved quality and tonal fidelity feature the world's greatest artists, performing the world's finest music, for the benefit of music lovers who desire continuous selections in long-play form. The "33 $\frac{1}{3}$ " records supplement the complete line of recordings on 45- and 78-rpm disks; they do not displace "45's" or "78's" in the RCA Victor catalog, but are an additional service.

"All major recording companies, except two, and a large number of small manufacturers now offer the '45' type of record," declared General Sarnoff, "while more than 70 instrument manufacturers have incorporated turntables to play the '45' records in their products."

To accommodate these three types of records, General Sarnoff said, the RCA Victor 1950 line of Victrola phonographs and radio-television combinations features instruments that play all three phonograph speeds. It will be RCA's continued policy, he added, to make available to the public RCA Victor's unsurpassed library of music and noted artists, recorded for all phonograph speeds.

## Broadcasting and Telecasting

General Sarnoff said that notable progress has been made by the National Broadcasting Company — a service of RCA — both in radio broadcasting and television during the past year. The dimensions which radio has reached, he said, graphically illustrate the great potential which exists for television. According to the latest statistics, 10,700,000 American homes are equipped with 65,100,000 radios. Adding to this figure the number of portable radio sets and radios for automobiles, there are more than

85,000,000 radios in the United States.

"The operation of a television network is as yet unprofitable, but the margin of loss is steadily being reduced," he said. "We are confident that television stations and networks will become profitable enterprises within a reasonable time, as the size of the audience, number of advertising sponsors and advertising rates increase."

## Looking Ahead

Discussing the future outlook, General Sarnoff declared in conclusion:

"The volume of business and earnings of the RCA for the first three months of 1950 are gratifying. The prospects for the year as a whole are good. It is to be expected that a constantly changing and expanding art and industry, in a world that is far from settled, should present many problems for solution. In our efforts to solve these problems on a firm and lasting basis, we must ever be mindful of the interests of the public, our customers, our employees, and our stockholders. We sincerely believe we are doing so and as the record shows, we are making substantial progress from day to day and year to year. We want all of these interests to benefit from the progress made by the Radio Corporation of America."

## Africa — Market of The Future

(Continued from page 29)

there to the interior cities the only movement is by river steamer. Much loading and unloading takes place which inevitably causes much breakage and adds to the ultimate cost of the goods.

Two of the first RCA 50-kw short-wave broadcast transmitters are installed on opposite sides of the Congo river. One is in Leopoldville and the other in Brazzaville, in French Equatorial Africa. Much additional RCA equipment is giving a good account of itself in both areas.

Madagascar, the last country visited, is one of the largest islands in the world. Although a French colony, it seems to have attained more autonomy than colonies nearer France.

Africa is a continent of opportunity. While dollar sales now are not large in proportion to other areas, it is one of the few undeveloped and rich areas now rapidly expanding. RCA is getting a good share of the business open to Americans now, and we will continue to exert every effort to get more.

## Ways to Wage Peace

(Continued from page 25)

of all the democracies so that the message of freedom may ring out through their own agencies of communication. So much for our friends. For those who have declared cold war upon us, our task is to penetrate the Iron Curtain. I do not believe it is impenetrable to ideas."

General Sarnoff concluded: "Reality and reason would dictate that there is no imminent danger of armed conflict between Russia and the United States, if we maintain our national confidence and courage, our preparedness and leadership, our scientific achievement and technical skill. We must strengthen our economic stability and fulfill our responsibility to the world.

"No one is wise enough to chart the horoscope of humanity's future in the new physical era before us. But this much seems clear. We are rounding a turn on the road with two forks ahead that lead in two different directions. One presents a new vista of universal prosperity and peace; the other shows the dark shadow of universal destruction.

"With signposts so clearly marked, it is impossible to believe that man will deliberately take the wrong turn. Man's basic instinct is to preserve himself and live, not to destroy himself and die. It is my conviction that the secrets of nature which scientific research is now beginning to reveal to us, will one day make war unthinkable and peace inevitable."

# How electronic "paintbrushes" create pictures in our newest art form

There's not a single moving part in a Kinescope —but it gives you pictures in motion

No. 4 in a series outlining high points in television history

*Photos from the historical collection of RCA*

● Ever watch an artist at work—seen how his brush moves over the canvas to place a dot here, a shadow, a line, a mass, or highlight there, until a picture is formed?

Next time you're asked how television pictures are made, remember the paintbrush comparison. But the "brush" is a stationary electron gun, and the "paint" is a highly refined coating of fluorescent material made light or dark in orderly pattern by electrons.

Developed by Dr. V. K. Zworykin, now of RCA Laboratories, the kinescope picture tube is one of the scientific advances which gave us *all-electronic* television . . . instead of the crude, and now outmoded, mechanical techniques.



An experimental model of the kinescope developed by Dr. V. K. Zworykin of RCA Laboratories is seen undergoing laboratory tests.

Today, through research at RCA Laboratories, these complex kinescope picture tubes are mass-produced at RCA's tube plants in Lancaster, Pa., and Marion, Indiana. Industrial authorities call this operation one of the most breath-taking applications of mass production methods to the job of making a precision instrument.

Thousands of kinescope faceplates must be precisely and evenly coated with a film of absolutely pure fluorescent material . . . the electron gun is perfectly synchronized with the electron beam in the image orthicon tube of RCA television cameras . . . the vacuum produced in each tube must be 10 times more perfect than that in a standard radio tube—or in an electric light bulb!

Once it has been completely assembled, your RCA kinescope picture tube is ready to operate in a home television receiver. In action, an electrically heated surface emits a stream of electrons, and the stream is compressed by finely machined cylinders and pin-holed disks into a pencil-thin beam. Moving back and forth in obedience to a radio signal—faster than the eye can perceive—the beam paints a picture on the face of the kinescope. For each picture, the electron beam must race across the "screen" 525 times. To create the illusion of motion, 30 such pictures are "painted" in every single second.

Yet despite these terrific speeds, there are no moving mechanical parts in an RCA kinescope. You enjoy the newest of our arts because electrons can be made to be obedient.



New 16-inch RCA glass-and-metal kinescope picture tube, almost 5 inches shorter than previous types, incorporates a new type of glure-free glass in its faceplate—Filterglass.

PRINTED IN USA



**Radio Corporation of America**

WORLD LEADER IN RADIO—FIRST IN TELEVISION



Recorded only in the distortion-free *quality zone*, music "comes alive" on RCA Victor 15-rpm records.

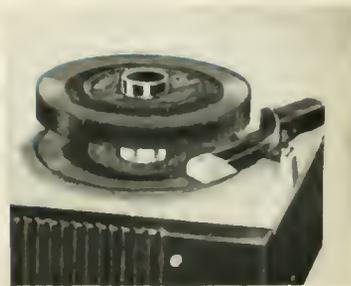
## *What magic number makes music mirror-clear?*

Now, for more than a year, music-lovers have had—and acclaimed—RCA Victor's remarkable 15-rpm record-playing system. Already, millions know "15" as the magic number that makes music mirror-clear.

As was said when the American Society of Industrial Engineers presented RCA Victor with its 1950 Merit Award, "We are moved to admiration by your bold departure from past practices in developing a completely integrated record and record-player system."

Research leading to "15"—confirmed at RCA Laboratories—covered 11 years... and resulted in small, non-breakable records which can be stored by hundreds in ordinary bookshelves, yet play as long as conventional 12-inch records. The automatic player, fastest ever built, changes records in less than 3 seconds—plays up to 50 minutes of glorious music at the touch of a button! Every advantage of convenience and cost, marks "15" as the ideal system!

*Another great RCA development is the finest long-play record (33 $\frac{1}{3}$ -rpm) on the market—for your enjoyment of symphonies, concertos, and full-length operas. Radio Corporation of America, Radio City, N. Y. 20.*



Fully automatic RCA Victor 45-rpm record player and records—small enough to hold in one hand... inexpensive enough for any purse.



**RADIO CORPORATION of AMERICA**

*World Leader in Radio — First in Television*



