

*since 1949 & 1950 Together*

# RADIO AGE

RESEARCH • MANUFACTURING • COMMUNICATIONS • BROADCASTING • TELEVISION

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JANUARY



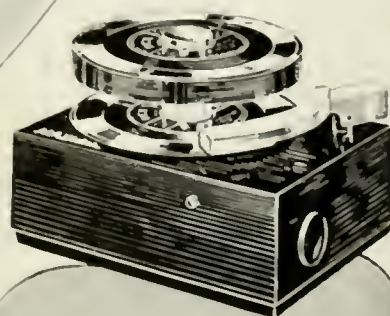
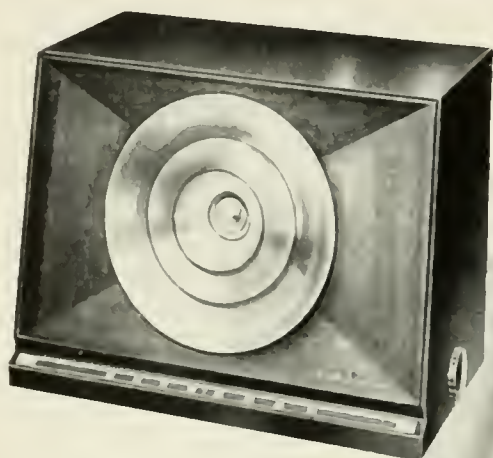
1950

# Tone you could never get before in a Table model



*Golden Throat*

Finest tone system  
in RCA Victor history



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 "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.



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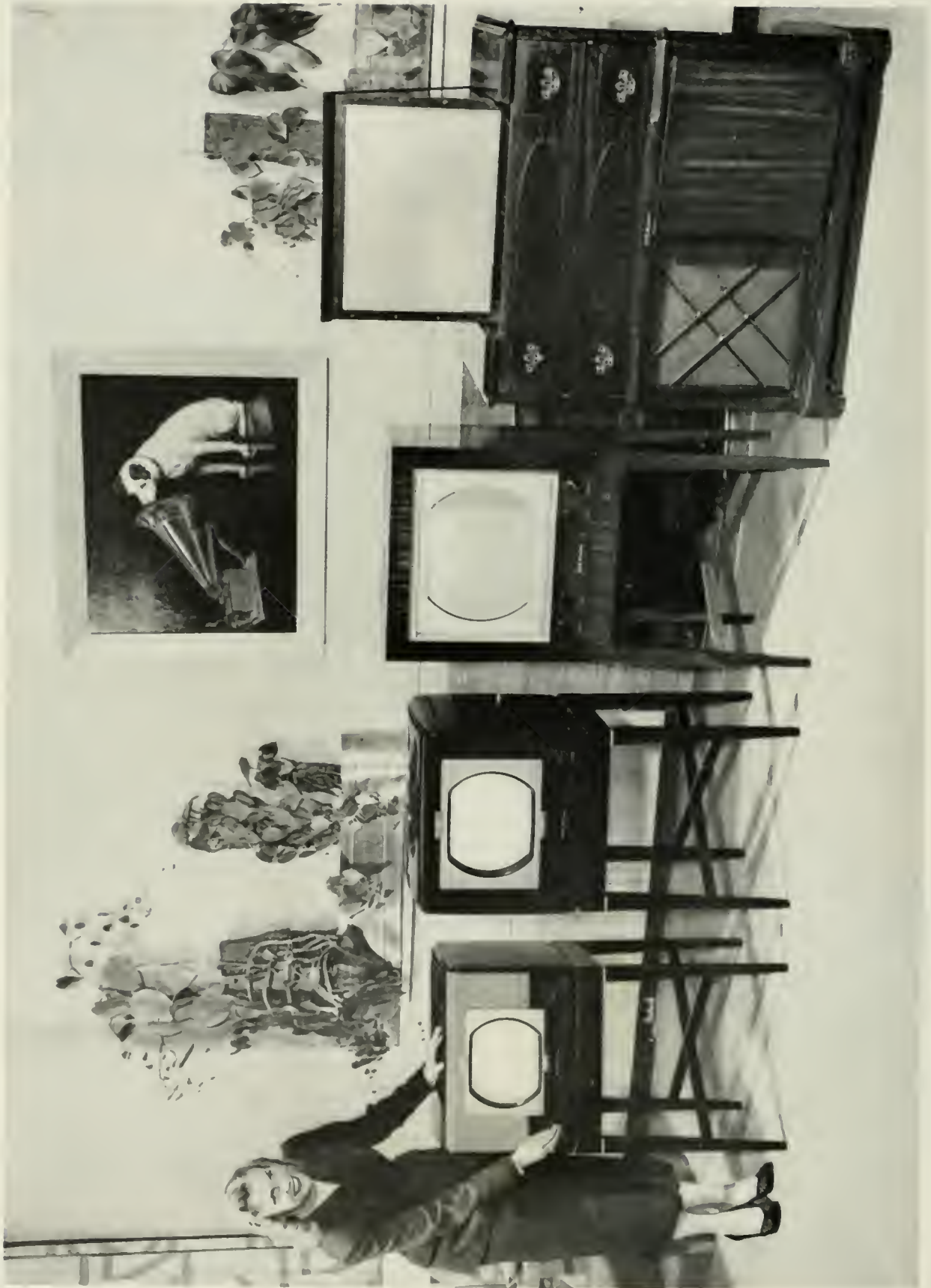
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Radio Age is published quarterly by the Department of Information,  
Radio Corporation of America, 30 Rockefeller Plaza, New York 20, N. Y.



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

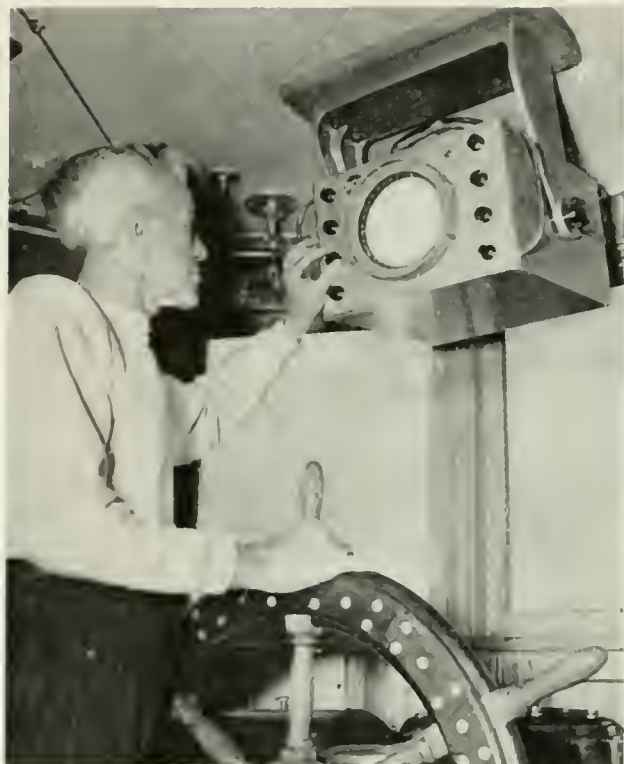
RCA VICTOR 45-RPM AUTOMATIC RECORD PLAYER HAS THE FASTEST PHONOGRAPH RECORD-CHANGING MECHANISM EVER DEvised.

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.

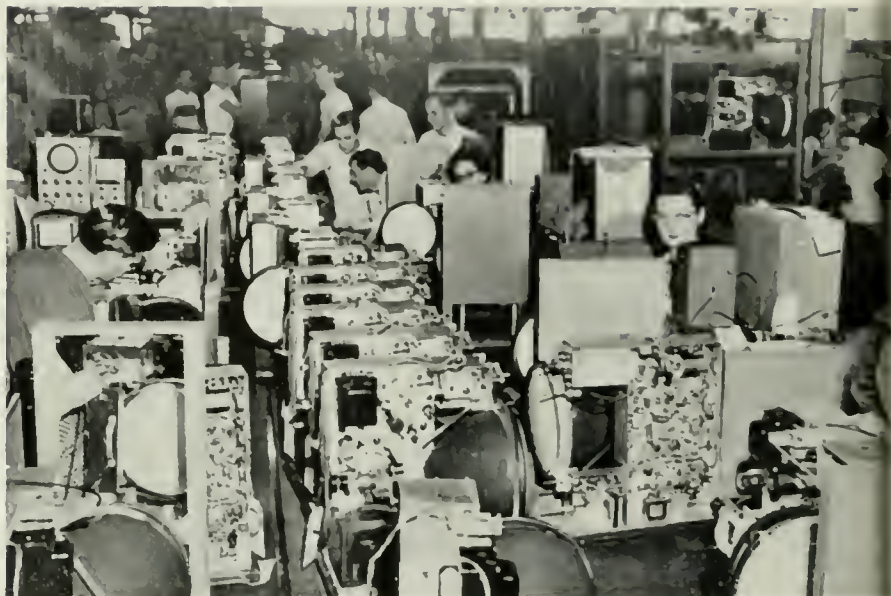
Another new RCA tube called the Graphechon has "visual memory." It can store radar signals and transient phenomena which occur in less than a millionth of a second and which ordinarily fade out in only a few seconds when traced on fluorescent screens yet this tube stores such signals for more than a minute.



[RADIO AGE 3]



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.

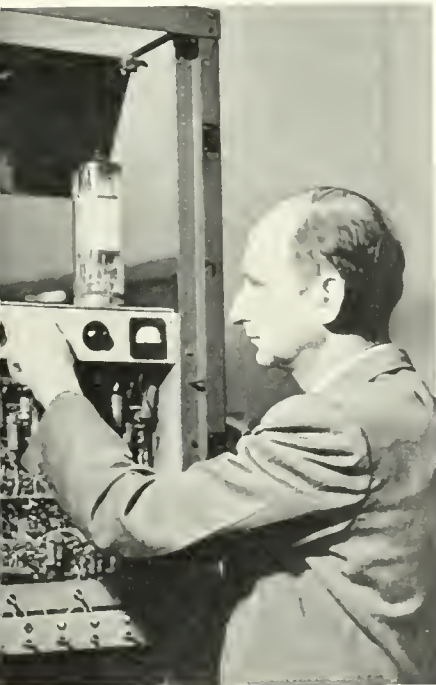
Notable progress is being made by RCA Laboratories in the development of a color picture reproducer of the single-tube type. Perfection of this color picture tube will greatly

ly 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**

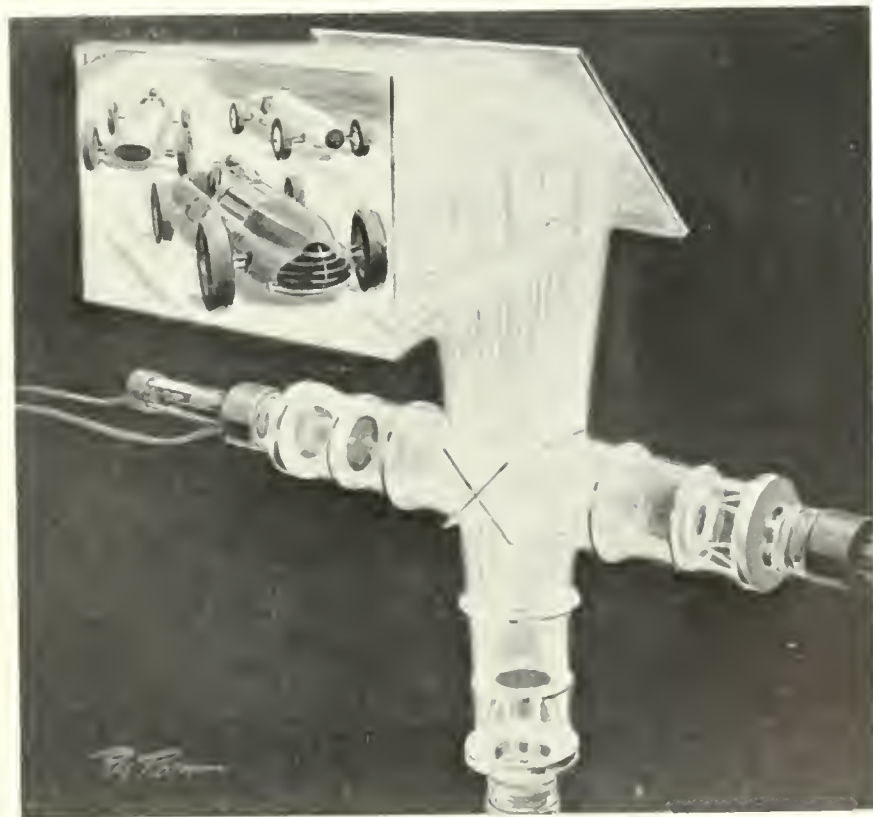
Television, however, is only one field in which the magic of electronics is being felt. In 1949, RCA Victor introduced a new and revolutionary system of recorded music, with the phonograph further electrized and embodying the fastest record-changer ever to be developed. This new and compact record-player 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.

[RADIO AGE II]

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.

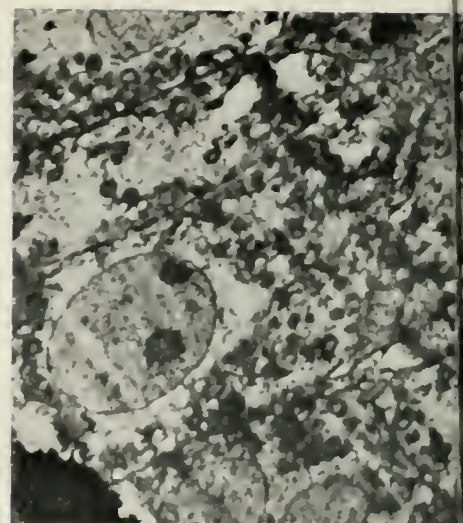
"With our new methods," Dr. Hillier said, "it is possible to slice a single cell into a hundred sections. Were each section to be a sixteenth of an inch square, such a specimen would have the equivalent of 2,500 square feet of surface under a magnification of 10,000 diameters in an electron microscope. 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



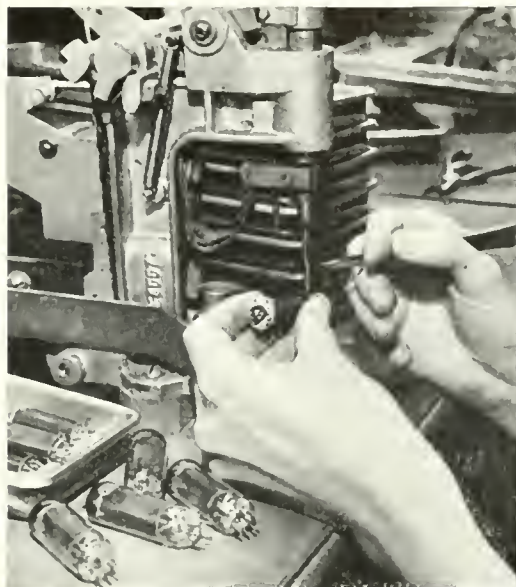
A NEW TUBE, CALLED THE GRAPHICON, CAN STORE FOR MORE THAN A MINUTE CERTAIN TYPES OF ELECTRICAL SIGNALS WHICH ORDINARILY WOULD FADE OUT IN A MILLIONTH OF A SECOND WHEN TRACED ON A FLUORESCENT SCREEN.

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.



WELDING OF THE HAIR-LIKE FILAMENTS OF MINIATURE TUBES REQUIRES KEEN EYES AND STEADY HANDS.



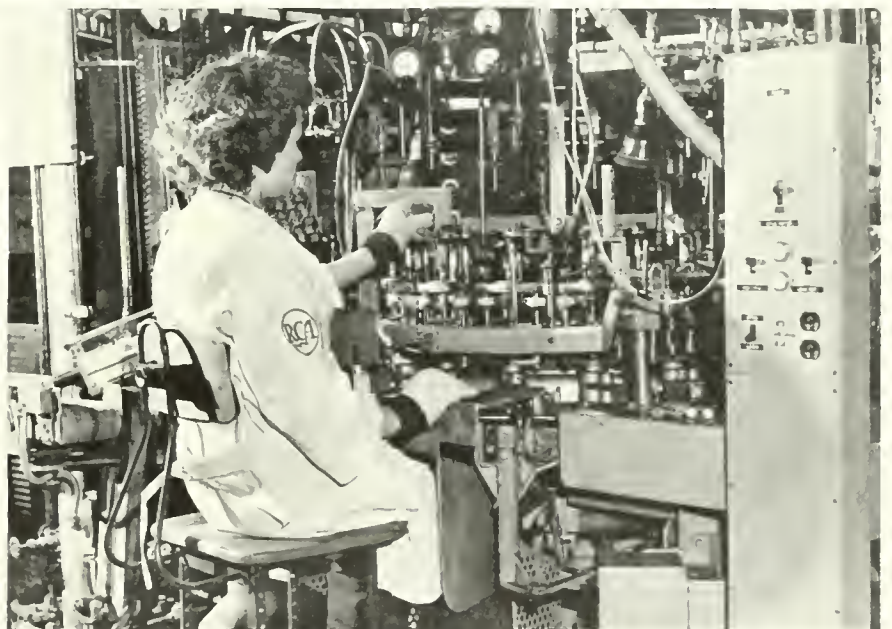
BEFORE THE ELEMENTS ARE SEALED INSIDE THE TUBE, EACH PART IS CAREFULLY TESTED FOR PERFECTION.

ELEMENTS SO SMALL THAT THEY MUST BE HANDLED WITH TWEEZERS ARE ASSEMBLED TO FORM THE TUBE'S INTERNAL STRUCTURE.

## MAKING MINIATURE TUBES

*At the Indianapolis Plant of the  
RCA Victor Division*

ON THIS TURNABLE, 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.

[www.americanradiohistory.com](http://www.americanradiohistory.com)



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.*

**W**ORLD-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.

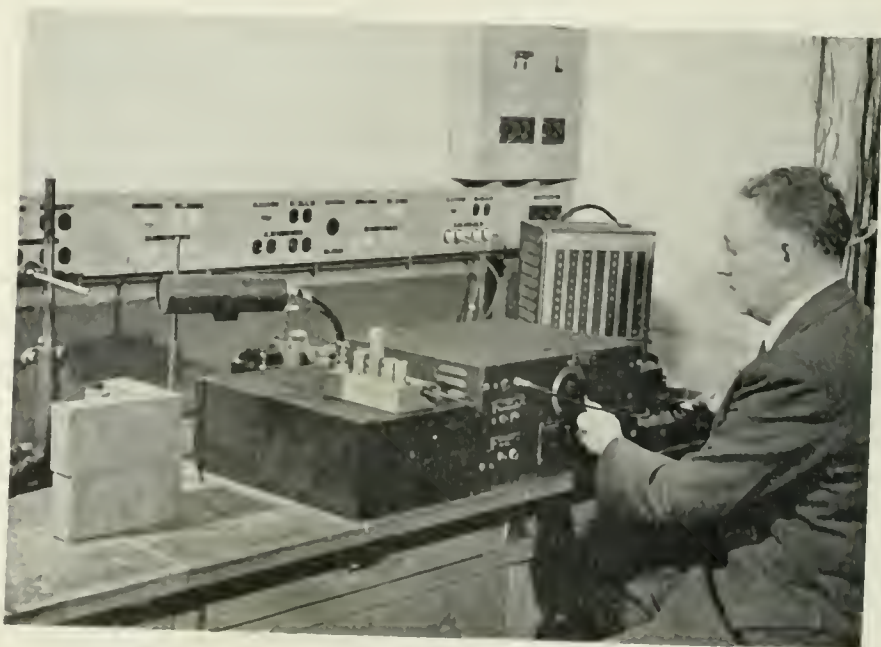
## *Process is Repeated*

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.

[16 RADIO AGE]

# 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 AGE 17]

# 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.*

IN 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."

## 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 electrized 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.

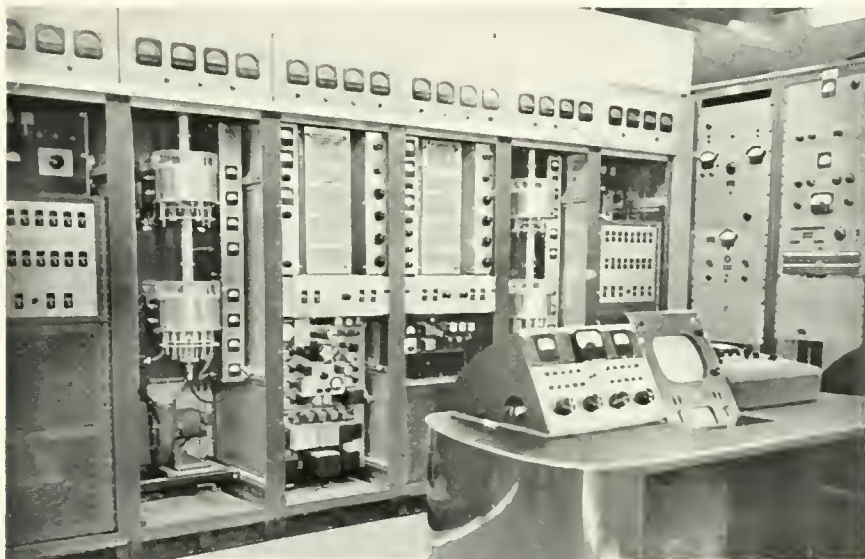
Application for a construction permit for the station was filed with the FCC February 8, 1949 and was granted to NBC May 4, 1949. Construction of the building was completed November 15, 1949.

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.

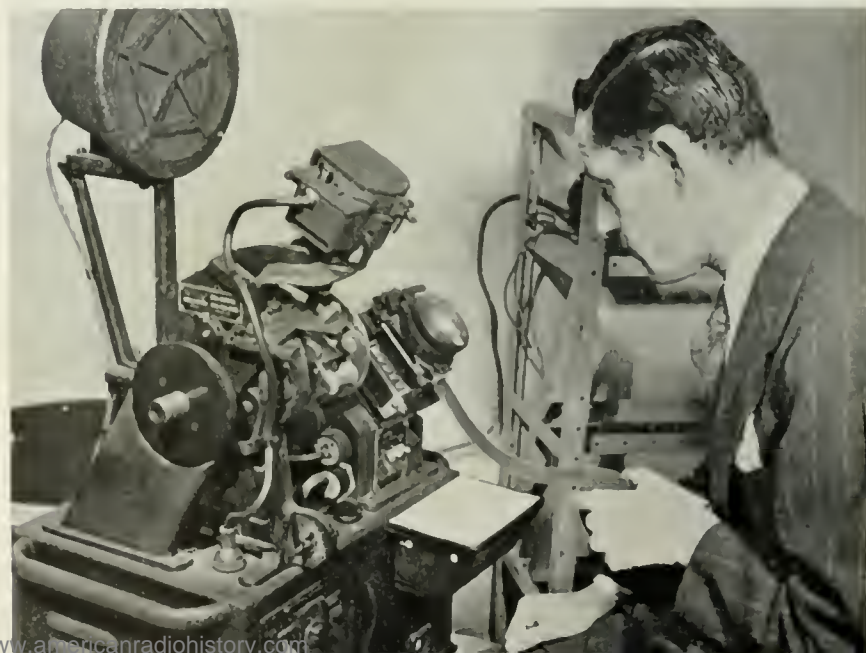
Here again, each party edits the other's films whenever necessary.

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.

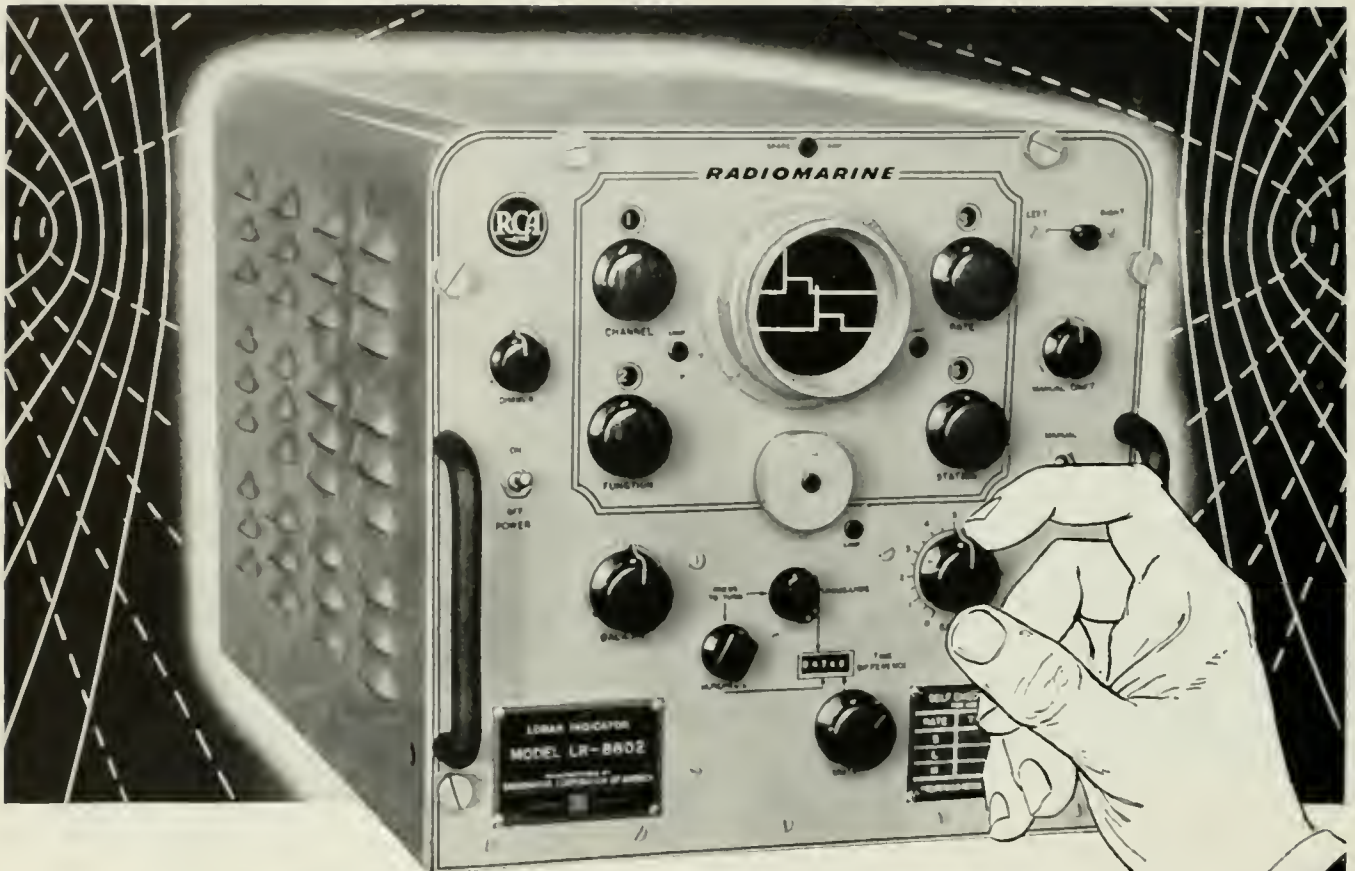
In addition to the New York system, the new FM communications units have been installed at Boston, Philadelphia, New Orleans, San Francisco and Long Beach. Plans are under way to extend these flexible radiotelephone links to Norfolk; Houston; Portland, Oregon; Seattle; Mobile and Savannah.

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® DIRECT-READING LORAN

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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.

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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.

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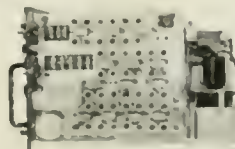
#### Direct-Reading Time Difference Meter

Complete reading of time difference appears on one meter, as shown above. Makes interpolation unnecessary. Avoid 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

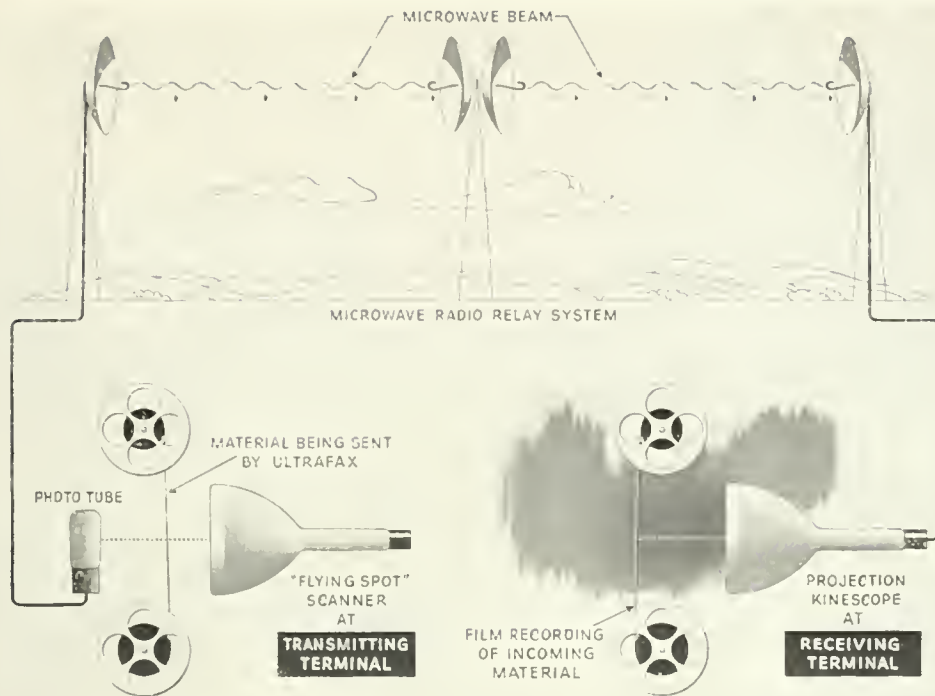
Compact design and separate power supply permits mounting the indicator on a shelf or table, bulkhead or overhead. Fewer controls insure better readings.

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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