

# RADIO AGE

RESEARCH • MANUFACTURING • COMMUNICATIONS • BROADCASTING • TELEVISION

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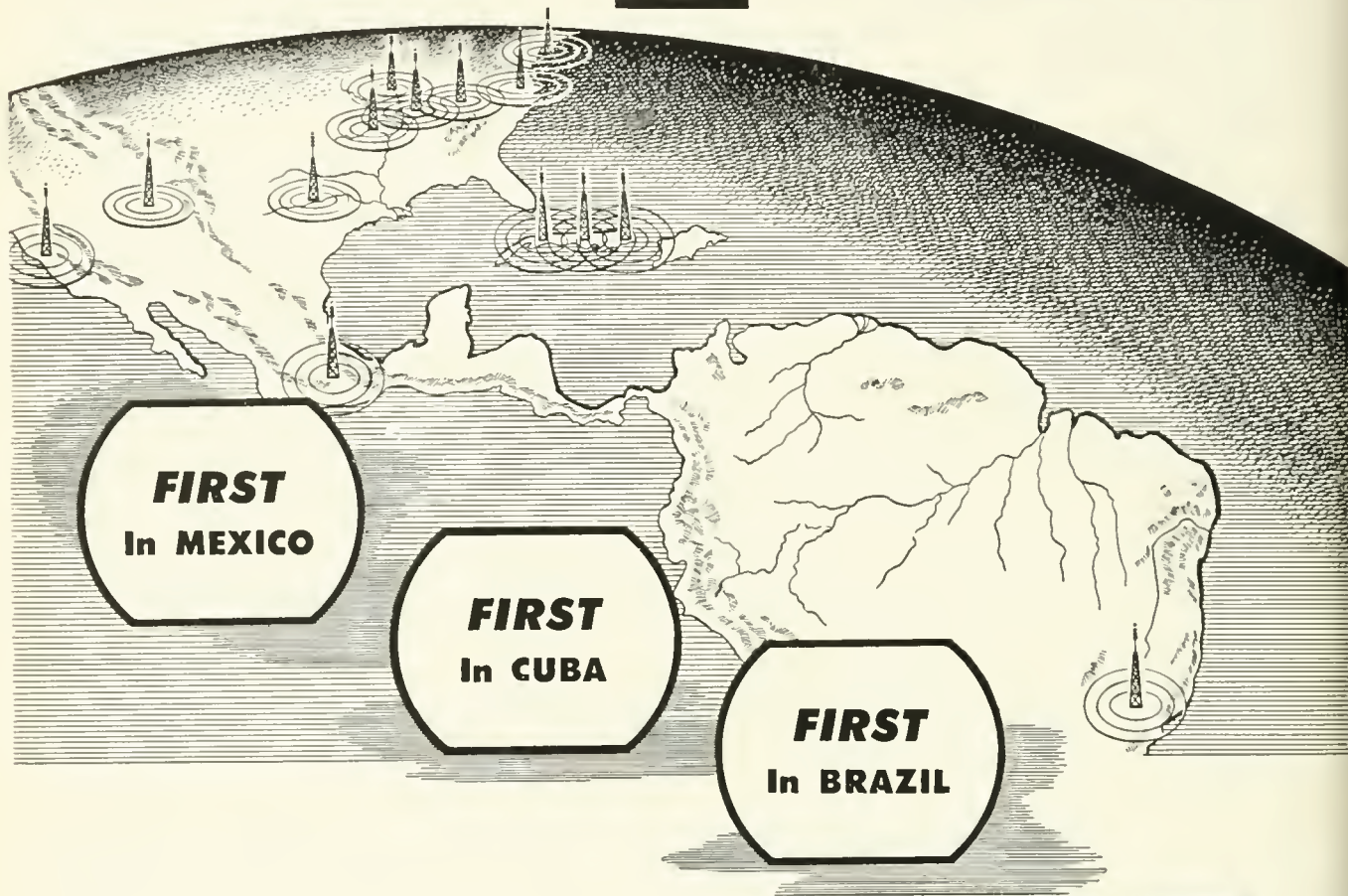
PORTABLE TELEVISION TRANSMITTER  
AND CAMERA



APRIL  
1951

# RCA TELEVISION

## First choice of ALL the Americas!



RCA is proud to welcome Mexico, Cuba, and Brazil—their great audience, and their great creative talents—into the family of RCA Television. The first stations to bring video programs to Mexico, Cuba, and Brazil are completely RCA equipped.

In the United States of America, the great *majority* of television stations have installed RCA transmitters and associated equipment. RCA is the first choice of *all* the Americas.

Television, the new teacher, is helping to train and to educate, as well as to entertain.

Your RCA Distributor will be glad to keep you fully informed on

RCA television and its great possibilities in the economy and the culture of your country.

### RCA salutes Latin America's pioneers in television:

#### BRAZIL

PRF3TV—Emissoras Associadas  
São Paulo

#### CUBA

Union Radia, Havana  
CMQ—Havana  
Telenews Co., Alansa, S.A.\*, Havana

#### MEXICO

XHTV—Televisión de Mexico, S.A.,  
Mexico, D.F.



More than a million RCA TV Receivers are in use in homes in the U.S.A.

RCA television receivers inherit the manufacturing and design experience poured by RCA into the more than 1,000,000 RCA television sets now in use in the U.S.A. More than 20 years of experience and \$50,000,000 in video research have made RCA quality and performance the finest in television.

<sup>1</sup>Under construction



RCA INTERNATIONAL DIVISION

**RADIO CORPORATION of AMERICA**

RCA BUILDING

30 ROCKEFELLER PLAZA, NEW YORK, N.Y., U.S.A.

World Leader in Radio . . . First in Sound . . . First in Television

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RESEARCH • MANUFACTURING • COMMUNICATIONS • BROADCASTING • TELEVISION



VOLUME 10 NUMBER 3

APRIL 1951

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only 53 pounds,  
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television camera  
transmitting station,  
by RCA, permits  
"spot" pick-ups of  
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Story on page 20



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MODELS OF GUIDED MISSILE AND "ENEMY" BOMBER ABOUT TO MEET IN A DEMONSTRATION OF THE ELECTRONIC ANALOGUE COMPUTER DEVELOPED AT RCA LABORATORIES.



WHEN PLANETS IN THEIR TRAVELS AROUND THE SUN ARRIVE IN THE RELATIVE POSITIONS SHOWN HERE, MAGNETIC STORMS APPEAR ON EARTH

# Magnetic Storms Directly Related to Positions of the Planets

*Analyst at RCA Communications, Inc., Reveals Findings After Five-Year Study. May Lead to Long-Term Predictions of Radio "Weather" Changes.*

EVIDENCE that a direct relationship exists between magnetic storms on earth and the position of planets with respect to each other and the sun was disclosed recently by John H. Nelson, radio-wave analyst of RCA Communications, Inc.

Findings of Mr. Nelson supporting this new approach to the cause of forces that disturb world radio communications appeared for the first time as a documented report in the current issue of the *RCA Review*, a scientific quarterly of the Radio Corporation of America. Heretofore, sunspots and allied activity on the solar surface have been considered prime causes of magnetic storms that bombard the earth.

Mr. Nelson's report suggested

that these disruptive forces may be forecast months or even years ahead of their materialization, thus permitting ample time to select the best radio channels to avoid curtailment of traffic.

Based on Mr. Nelson's predictions for the 1951-'52 winter season, selection already has been made by RCA for the best working radio routes and frequencies of its world-wide radiotelegraph circuits to be used under the radio weather conditions forecast for that period.

The conclusions reached in Mr. Nelson's report were the result of nearly five years of studying radio-wave behavior in relation to sunspots and the movement of the planets. Using a six-inch telescope atop an RCA Communications

building in the heart of New York's financial district, he daily plotted the position and characteristics of sunspots on the solar surface.

It was during the observation of sunspots that Mr. Nelson became convinced that, besides their activity, other forces acting upon the sun also affected magnetic weather conditions upon the earth's surface. This conviction led him into research involving the exact position of planets with respect to the sun.

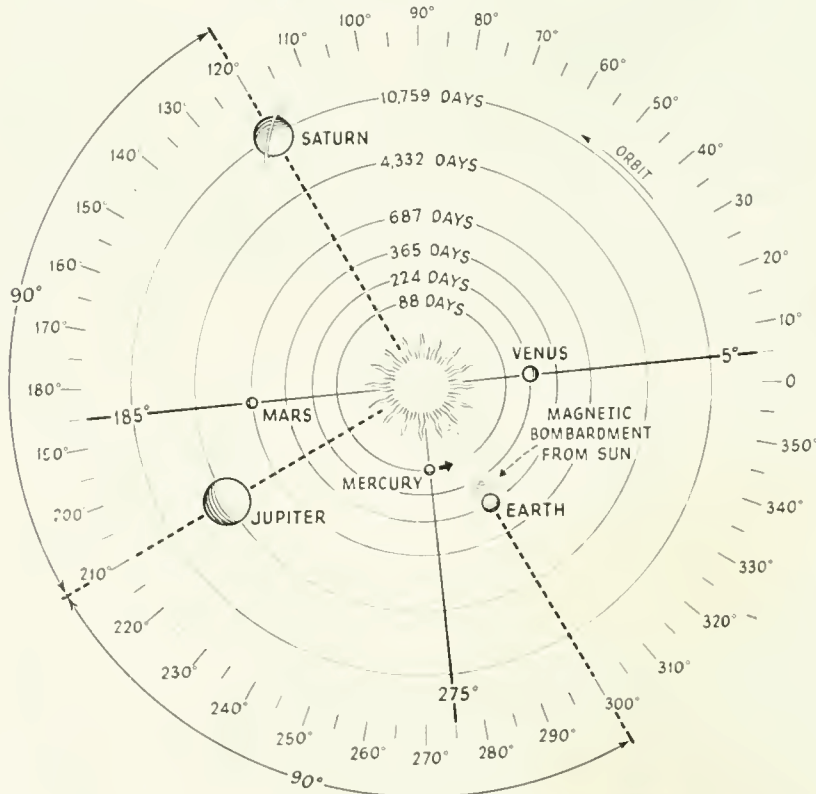
By plotting the course of the six inner planets of the solar system on a daily basis, Mr. Nelson found that:

1. When two or more planets are at right angles to each other, or in line on the same side of the sun—or in line with the sun between them—magnetic disturb-



JOHN H. NELSON, RCA RADIOWAVE ANALYST, TRAINS HIS TELESCOPE ON THE SUN FROM HIS ROOFTOP OBSERVATORY AT 25 BEAVER STREET, NEW YORK CITY, WHERE HE DISCOVERED EVIDENCE OF A NEW RELATIONSHIP BETWEEN THE POSITIONS OF PLANETS AND MAGNETIC STORMS.

WHEN PLANETS AND SUN ARE IN THE POSITIONS SHOWN IN THIS DIAGRAM, THE RESULTING BOMBARDMENT OF THE EARTH BY MAGNETIC STORMS REACHES ITS MAXIMUM INTENSITY.



ances occur more frequently on the earth's surface.

2. That the most disturbed 12 months' periods will be those preceding and following the positioning of Saturn and Jupiter in such a configuration with relation to the sun.

3. That the most severe disturbances occur when Mars, Venus, Mercury and the Earth are in critical relationship near the points of the Saturn-Jupiter configuration.

4. When Saturn and Jupiter have moved away from the critical relationship, there is a corresponding decline in the severity of magnetic weather, although storms of shorter duration result from the critical combinations of smaller planets.

5. That the least disturbed periods occur when Saturn, Jupiter and Mars are equally spaced by 120°.

By means of his planetary research, Mr. Nelson has been able to predict for two years in advance the approach of major magnetic disturbances on the earth's surface. Combining his planetary observations with a daily telescopic inspection of the sun's surface, he has obtained an accuracy of 85 per cent in his daily forecasts of good and bad radio weather.

Conclusions presented by Mr. Nelson in the *RCA Review* led to support to other investigators, notably Ellsworth Huntington and Henry Helm Clayton, who suspected that the planets had an influence upon sunspot activity and conducted extensive research on the subject.

#### Planets Affect Solar Surface

Although Mr. Nelson's research was related to the earth's magnetic storms in relation to radio communications rather than sunspots, his study indicates that the planets influence the surface of the sun and the solar reactions frequently associated with sunspots.

In developing evidence of planetary influence, Mr. Nelson prepared hundreds of charts of planet positions, radiotelegraph circuit behavior and sunspots, and then compared the relationships between them. He found that because of their slow motion around the sun

Saturn and Jupiter may stay in a critical relation to each other for as much as two years, in which event the inner planets, as they circle the sun more rapidly, have an opportunity to create additional critical relationships, which add to the effects of the Saturn-Jupiter team.

In preparing his evidence, Mr. Nelson relied heavily on the hundreds of daily propagation reports gathered for him by RCA technicians at Riverhead, L. I., and by overseas technicians associated with Radio France and the Telegraph Administration in Sweden. Assistance also was rendered by his brother Carl W. Nelson, an amateur astronomer and meteorologist in Massachusetts, who aided in plotting the planetary configurations and in ascertaining the angles of least disturbance.

#### *Sunspot Size Not Critical*

Prior to planetary studies that have made possible his long-range predictions, Mr. Nelson achieved considerable success in forecasts based solely upon his observations of sunspots. In 1948, he and his associates caused comment in astronomical circles by a report in which they said their investigations showed the size of sunspots to be "a meaningless criterion" in predicting disruption caused to radio circuits. The type of the sunspots, their age and activity, and their position on the face of the sun, were declared to be the determining factors of disruptive bombardment.

Moreover, Mr. Nelson and his associates established at that time the existence of a "critical zone" on the face of the sun—an area about 26° in radius from the optical center of the sun, on its eastern hemisphere. It was discovered that the position of the sunspots in relation to this critical zone was of utmost importance. Damaging effects were noted when new active sunspots were within this zone.

Subsequent investigations by Mr. Nelson have shown this critical zone to be expanding as the sunspot cycle approaches its next low point of activity, which is expected to occur at approximately the end of 1954. This zone remains a valuable asset to Mr. Nelson in making his daily forecasts of magnetic weather.



WITH SLIDE-RELE AND GLOBE, NELSON TABULATES INFORMATION WHICH PERMITS ENGINEERS TO PLAN STATIC-FREE COMMUNICATIONS CIRCUITS FAR IN ADVANCE OF THE COSMIC DISTURBANCES THAT HERETOFORE HAVE BAFFLED EXPERTS.

## Aggressive Promotion Will Meet TV Sales Situation, Says H. G. Baker

The same old-fashioned, aggressive advertising and merchandising efforts, and the promotional ingenuity which the industry in the past has demonstrated that it commands, should be successful in meeting the current television sales situation. This was the encouraging statement issued by H. G. Baker, Vice President and General Manager of the RCA Victor Home Instrument Department, in response to queries from the press when television set sales showed a slight decline in late March.

Admitting that the situation is a "challenging" one, Mr. Baker said: "Television business begins to fall off every year around this time. There should be no cause for concern in a situation the radio and television industry has experienced in the past. From our own standpoint, RCA Victor's current television sales are considerably higher than they were during the like period last year.

"We in the television industry must face the fact that we cannot expect forever that the customer

will beat a path to the television dealer's door," he added. "There must be a return to aggressive, competitive retail operation. And if that time has already arrived, then certainly this industry, by employing its established talent for sales promotion, can go a long way toward taking up the slack in the current sales decline, without falling back on pricing measures."

Emphasizing that the sales initiative is in the hands of the industry, Mr. Baker pointed out that RCA Victor is currently pushing the greatest concentration of television advertising in the company's history, built around full-page and half-page insertions in 137 major newspapers in 108 cities.

"This campaign is a hard-hitting effort to carry our television sales story to every major television market in the country," he said. "And it represents a major reason why RCA Victor television sales today, despite the seasonal decline, are considerably higher than they were this time last year."

# Planning Industrial Mobilization

*Research, Development and Adequate Production of the Millions of Items Essential for National Defense Represent the Challenge which Faces American Industry, Foster Says.*

**I**NDUSTRIAL Mobilization Planning can be defined as the joint effort of industry and Government to insure the best utilization of our industrial might. It is indispensable for the assurance of adequate national strength to preserve our national security. Our experience in the two world wars has proved the vital necessity of such planning. On each occasion, we were given two years of grace in which to tool up for war — an opportunity we most likely will never again be permitted — while our allies took the brunt of the initial attack. Even then, it took us many months to develop the support required for a successful war effort. In the meantime, the enemy made sweeping advances over territory which it took us years to regain — at unconscionable cost, in terms both of resources and lives. It is just as important to avoid "too little too late" in terms of industrial support as it is in terms of fighting forces.

Although our fighting forces should be maintained in sufficient strength to preclude any sane thoughts of military action against us, it is axiomatic that our national economy cannot and should not be expected, in peacetime, to support the fighting potential required in time of war. It is, likewise, axiomatic that we cannot expect industrial facilities, geared to the production of goods for the peacetime economy, to be converted overnight to the production of enormous quantities of munition of war. Nevertheless, if costly lessons of the past are to be heeded, we are faced with the stark necessity of curtailing to the irreducible minimum the time required for such conversion.

Facilities and equipment must be available, and harnessed, ready to go, to produce items not now manufactured at all or in insufficient quantities. The best technical know-how must be developed, in the most efficient manner and in the minimum of time, to produce predeter-



By Admiral Edwin D. Foster

*Director,  
Mobilization Planning Department,  
RCA Victor Division.*

mined quantities of these munitions. And specific plants must be assigned the responsibility for specific wartime production, and equipped with precise knowledge of conversion requirements. These are the prime military objectives of Industrial Mobilization Planning.

### *Must Support Civilian Economy*

At the same time, provision must be made for the continued support of our civilian economy, since without this support, no military effort can be sustained. It is the job and the duty of both Government and industry to work together to preserve an optimum balance between these dual objectives.

Basic to all of this effort is determination of requirements. Requirements can be determined only if we have a plan of operations. Our defense plans, of course, are made by our Joint Chiefs of Staff to meet the requirements of the international situation, as evaluated by the National Security Council.

The character of this whole program—including the basic and supporting plans, and the requirements that stem from these—is one of constant change and adjustment. On the one hand, the basic operational plan must be geared to changes in the international situation. On the other hand, technological progress has added and is still adding further complexity to the solution of our logistical problems. It was not so many years ago that armies subsisted on their bellies; that navies could replenish their supplies at almost any port of call, if necessary by plunder; and that air forces were unheard of. Technological evolution has changed all of this. Our fighting machine has now become a mechanical and electronics colossus with a seemingly insatiable appetite, requiring a constant stream of an unbelievable number of supplies, flowing from all parts of our country, and in many instances from remote parts of the world.

### *Millions of Items Involved*

The magnitude of the problem is indicated by the number of items required. The Navy alone requires almost three million items. The Army and Air Force require other items peculiar to their needs, which likely add a couple of million more. It is not enough that most of these items be ready for use when and where required. It is mandatory that all of them be available. Consider the helplessness of the most modern fleet, completely manned with the finest and best trained personnel and thoroughly equipped in every respect, except that the ships have no rudder mechanisms—or that of an Air Force lacking spark plugs.

The development of our fighting machine into an infinitely complex structure has been paralleled by the rise in importance of speed in putting our fighting machine into operation. The pace has been accel-



erated in every way. The measure of distances, for example, has been progressively reduced, because of these technological and scientific advances, from years, to months, to days, to hours, and in some cases even to minutes. Areas formerly considered impregnable because of their geographical isolation have now become vulnerable.

To meet the challenge of Mobilization Planning under these circumstances, the full impact of what so often has been termed our secret weapon—research, development, and quality and quantity production—must be utilized to the maximum, and that requires hard-headed planning.

The Department of Defense industrial mobilization program is a broad structure of many parts. One that is of special interest to us here is Mobilization Planning for War Procurement, particularly as it applies in these days of "creeping" mobilization.

#### *All-out Effort Predictable*

By comparison, all-out mobilization planning is less complex. The conditions which we must face in an all-out effort are fairly predictable. We know then that we will make the maximum effort logistically to support the military—consistent with what is required for essential needs of the civilian economy. The emphasis may change operationally, as it did in World War II, from one theatre to another (Europe to Asia) or from one type of weapon to another (tank to landing craft), but the industrial effort is pretty well defined, both in scope and character. In the event of an all-out effort, many mobilization plans of the Department of Defense would go into active operation. These plans include programs for reserve plants and tools and the production allocation program, under which plants selected by the various defense agencies have tentatively agreed to accept orders immediately following M Day for the production of certain basic equipments in specified quantities. While these very extensive plans are far from having been fully perfected, a great deal has been accomplished to the end of cutting down the time needed to reach full scale operations in an all-out

war. In an all-out war, we can depend upon full controls being imposed and accepted by industry, by labor, by Congress and by the general public.

The situation today is entirely different. Conditions which must be faced in times of "creeping" mobilization are far less predictable. We just don't know the extent or kind of war, limited or otherwise, that we may be called upon to support. We cannot look to the Services for the positive guidance during "creeping" mobilization which they can give us for all-out mobilization. Accordingly, industry now must initiate its own plans for meeting the innumerable unpredictable contingencies of "creeping" mobilization.

#### *Factors to be Evaluated*

This involves maintenance of that fineness of balance between military and civilian production which will afford the military the support it requires, and still not weaken the civilian economy to a point where it cannot continuously sustain effective support of the military. Following are the more important factors we in industry must analyze and evaluate if we are to make the decisions which will attain this objective:

**Availability of Materials:** What will be the effect of restrictions imposed by the Government, either voluntarily or involuntarily, upon the importation of basic materials? What will be the effect of the price and wage controls, of manpower controls, of restrictions upon inventories, of the use in production of basic materials, and of allocations and priorities? What changes are likely to be made in these controls, and what would be the effect of such changes?

**Civilian Consumer Demand:** Civilian consumer demand for one's product must be considered in the evaluation of almost any commercial or industrial problem. At this time, it must be considered in the light of various abnormal factors and conditions. For example, what will be the effect upon consumer product demand of the increases in taxes that have been imposed; what additional taxes may we anticipate; when will they be made effective;

and what will be their effect upon demand for our products? Our living costs continue to rise and how will they affect the consumer market, particularly the marginal buyer, and what will be the psychological effect of substitution of materials in the manufacture of products, particularly if the potential customer assumes, even wrongly, that such substitution will adversely affect quality of the product? What will be the customer's reaction to any potential product shortages he may assume will exist? Will resulting buying cause peaks and valleys in demand? What war scares will develop and what will be their effect on consumer demand? What additional credit controls will be imposed and what will be their effect?

**Military Requirements:** Essential to determination of probable availability of materials for production are, of course, reliable estimates of what will be the character, scope, and magnitude of the abnormal military requirements. The uncertainty of operational needs, due to changes in strategic factors and technological advances, make impossible an exact determination of military requirements. The nature of equipment needs depends in large measure on the kind of action on which plans are concentrated—for example, whether on land, on the sea, or in the air.

**Congressional Appropriations:** How much the armed services buy is limited by the amount of money Congress appropriates for defense. We know that the attitude of Congress or of the Administration, or of both, has changed from one of a comparative "free-rein" to one of "let's have a good look-see."

#### *Effect on Defense Funds*

What effect will this have upon next year's defense appropriations? Will Congress repeat its practice of the last two years in deferring action for two months after expiration of the fiscal year?

Contrary to what many business men have assumed, "creeping" mobilization does not call for Government procurement of the type or magnitude of that of World War II. Whereas the maximum peak spending rate at the end of the war



SYMBOLIC POSTERS IN RCA VICTOR MANUFACTURING PLANTS EMPHASIZE THE COMPANY'S PROGRAM TO CONSERVE MATERIALS AND MANPOWER.

was almost 90 billion dollars, which in dollars of today would mean about 145 billion, the *spending rate* is now only 20 billion dollars, and it is estimated that it will be increased only to 30 billion dollars by July 1 of this year. Even if the total 1951 defense appropriations were spent in one year, the spending rate, allowing for the change in dollar value, would be less than 30% of the maximum spending rate in World War II.

#### *Only 60% for Procurement*

Another significant fact is that only about 60% of the 41.8 billions appropriated thus far this year will go for procurement, the remainder being required for routine services essential to maintenance of the military establishment—for example, pay of military and civilian personnel. This means that only about 25 billion dollars is available for procurement—and we have been told that almost 20 billion of these 25 billion dollars have already been obligated—that is, covered by contract or letter of intent.

**Time Lag:** Another most important factor for our evaluation is the time lag between the time funds

are appropriated and the time they are expended for the products manufactured. Two phases of this lag require consideration. The first is the long period it takes to prepare specifications, and the second is the time involved in reducing the overall specifications to blueprint forms and in tooling up for production. Remember that most of these items are new, or at least improved versions of what has been used heretofore. This is both logical and mandatory. We cannot freeze design in the military field for a protracted period. If we do, we will suffer defeat through a "Maginot Line" philosophy of defense. And it does take time to engineer new designs.

In any event, these essential time lags must be anticipated—by all concerned. Otherwise, there is danger of a serious production vacuum between the time normal commercial production is cut back and military production picks up. The effects of such a vacuum are all too well known in terms of unemployment, recessions and depressions. Of special concern, too, is the risk of dissipating technical know-how at the very time when it should be

developed and increased. This we find particularly true in the electronics industry, where a much greater than average increase in productive effort will soon be demanded because of the tremendous increase in military electronics requirements.

**Government Procurement Procedures:** Because the necessary conversion of facilities is costly, care must be taken to see that the interest of both the Government and industry are protected in negotiation, redetermination, and renegotiation. This calls for special attention to changes in current procurement. Since the beginning of the Korean effort, negotiation has been used more and more in the award of Government contracts. When, last December, the President declared a National Emergency, the awarding of military contracts by negotiation rather than after formal advertised bid requests was greatly facilitated. Army, Navy and Air Force procurement offices were authorized to dispense with formal bidding procedures to the degree necessary to prevent production delay. The exercise of this authority has improved the coordination of current procurement with all-out mobilization plans under the production allocation program.

#### *Tooling-up Problems*

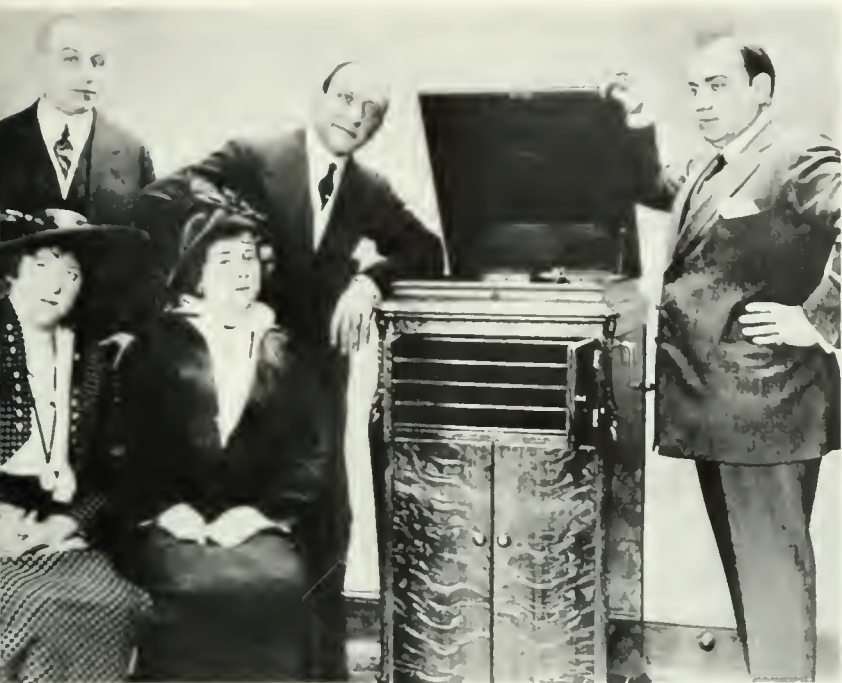
How, for example, can industry satisfactorily meet requests as one recently posed by the Services: namely, tooling up for all-out mobilization for a specific item on the basis of a firm order for a small quantity only and with no guarantee of later orders for large quantities.

But if we do our mobilization planning fairly and realistically, and if we all put our shoulders to the wheel, the decision we make in the interest of our individual companies will, in most cases, serve the interests of the nation as well, and our company's interests will be best served if we do this planning now. Otherwise, the time lag may result in a gap between the time commercial production *may* be curtailed and the time we get war production under way. This *might* well cause a lot of red ink in our

*(Continued on page 30)*

# Great Voices Brought to Life

*Priceless Recordings by the World's Outstanding Musical Artists have been Taken from RCA Victor Vaults, Skillfully Restored, and Made Available to the Public.*



ONE OF OPERA'S MOST FAMOUS QUINTETS AS IT LISTENED TO ITS OWN RECORDING OF VERDI'S "THE QUINTET". STANDING, LEFT TO RIGHT: LEON ROTHIER, ANDRES DE SEGUROLA, AND ENRICO CARUSO; SEATED: FRIEDA HEMPEL AND MARIA DUCHENE.

SELECTIONS FROM THE NEW "TREASURY" SERIES ARE PRESENTED TO DR. LUTHER H. EVANS, LIBRARIAN OF CONGRESS, BY ROSA PONSSELLE (CENTER), MRS. ENRICO CARUSO (LEFT), AND MRS. JOHN MC CORMACK.



By George R. Marek

*Director of Artists and Repertoire,  
Record Department,  
RCA Victor Division.*

PRICELESS master phonograph recordings, many of them stored for decades in RCA Victor's vaults at Camden, N. J., have once again been removed from their felt-lined envelopes and used to reproduce the music and voices of the world's greatest artists in a new twelve-album collection of historic records, titled "Treasury of Immortal Performances." Spanning the period from 1904 to 1937, the Red Seal albums consist of 120 performances by 54 vocal and instrumental personalities including Caruso, McCormack, Schumann-Heink, Farrar, Bori, Garden, Chaliapin, Ponselle, Rachmaninoff and Paderewski.

Six additional albums of the new series are devoted to a historic collection of popular records, each representing a phase in the development of jazz, swing, blues and folk music in this country. Also available in both 45- and 33-1 3-rpm records, they contain favorites by Russ Columbo, Hal Kemp, Glenn Miller, Ted Weems, Tommy Dorsey, Benny Goodman, Bing Crosby, Frank Sinatra, Fats Waller and Louis Armstrong.

To commemorate the release of

this series of albums and the 50th anniversary of phonograph recording by RCA Victor, a special presentation of the "Treasury" collection was made to the Library of Congress on February 20.

In accepting the albums for the national archives from Rosa Ponselle, operatic soprano, Dr. Luther H. Evans, Librarian of Congress, noted that, "It was gifts from the Victor Company in the mid-1920's which started the Library of Congress record collection." He went on to say, "Over the years, without interruption—under the old name and under the present name of Radio Corporation of America—the company has continued to be very generous in giving to the Library recordings by its outstanding artists." Among the celebrities attending the presentation ceremony were Mrs. Enrico Caruso and Mrs. John McCormack, widows of the two artists whose legendary performances have been recaptured.

#### *Music Critics Selected Records*

The "Treasury" is the result of months of intensive research by RCA Victor's Record Department at Camden where more than 7,500 old copper master records are carefully preserved in specially ventilated vaults. Several competent musical authorities listened to more than 700 master discs and then chose by vote the records which they considered most representative of a particular vocalist or musician. After the artistic decisions for the repertoire had been arrived at, RCA Victor technicians made the ultimate decision as to the suitability of each record for modern reproduction. The earliest selection in the album series is from a 1904 acoustical recording of the "Death of Otello" by Francesco Tamagno and the most recent was taken from Paderewski's 1937 electrical recording of his own "Minuet in G" and the first movement of Beethoven's "Moonlight Sonata."

In transferring such memorable performances from original masters to the 45- and 33-1 3-rpm records, each of the discs was subjected to meticulous technical scrutiny and rehabilitation. During the fall of

1950, six men under the direction of Albert Pulley, Chief Recording Engineer of the RCA Victor Record Department in New York City, went to work on this formidable task.

Many of the old copper masters "showed their age." By laboring over each record groove with microscope and engraving tools, RCA technicians skillfully restored the original waves and whorls of the spiral tracks. Some of these men are so skillful in this specialized field that they are able to read music by observing fluctuations of the record grooves.

#### *Transferred to Magnetic Tapes*

All the "Treasury" performances were then transferred from the restored masters onto magnetic tape recordings, which permit retakes, editing, cutting and the removal of excess noise. Without affecting the music, the scratches and flaws in the primitive tone tracks were detected and erased by sensitive in-

struments. In some instances, several masters of the same recording were available, making it possible to use one to fill in certain portions where another had blanked out. As the result of such engineering techniques, these matchless musical performances have been brought back to life on the new vinyl plastic records with remarkable fidelity.

Among the selections by Caruso are some which were "revitalized" a decade or more after the tenor's death in 1921. This accomplishment was made possible by re-recording his voice against an improved orchestral background. These electrical reissues, which created a sensation at the time, have retained the magnificent tonal quality of Caruso's voice in roles from "Rigoletto" and Bizet's "Pearl Fishers," and others.

In 1952, RCA Victor plans to issue a second "Treasury" series compiled from its musical gems of bygone years.

VAULT OF PRICELESS MASTER RECORDINGS IN CAMDEN, N. J., FROM WHICH OUTSTANDING PERFORMANCES OF 54 WORLD-FAMOUS ARTISTS WERE CHOSEN FOR THE "TREASURY" SERIES.



# New Walkie-Talkie Produced by RCA in Record Time

*Production Schedule Beaten by 60 Days as First Unit of Smaller, More Powerful Radio is Presented to Maj. General Akin, Chief Signal Officer.*

A NEW walkie-talkie for the armed forces with twice the range of its World War II counterpart, but having only half the weight and bulk of its predecessor, has been developed by the Radio Corporation of America and turned over to the U.S. Army Signal Corps, which provided the specifications. The first production model was presented to Maj. General Spencer B. Akin, Chief Signal Officer, U.S. Army, by Walter A. Buek, Vice President and General Manager, RCA Victor Division, in ceremonies held at Camden on March 8.

An outstanding example of the advance in the design of sub-miniature components, the new walkie-talkie is the smallest tunable radio transmitter-receiver of its type ever produced. Through the ingenuity of engineers, many of the parts have been compressed to fit into metal cylinders no larger than a miniature electron tube. The complete two-way communication unit contains 16 tubes, yet is only 9½ inches high, 10½ inches wide and 4 inches deep. Including batteries, antennas and handset, it weighs only 29 pounds. It can be used while strapped to the back of the operator, mounted in a vehicle, or set up as a semi-permanent ground station. With an output of approximately 1 watt, the walkie-talkie has a range of about 5 miles.

## *Design Problems Outlined*

Some of the major problems met and solved by RCA engineers in cooperation with the Signal Corps were outlined by T. A. Smith, Assistant General Manager, Engineering Products Department, during the presentation ceremonies in Camden.

"The story," he said, "begins officially shortly after the war. Unofficially, it began even earlier—before the end of the war. It might



MAJ. GENERAL SPENCER AKIN, CHIEF SIGNAL OFFICER, U. S. ARMY, DIRECTS MANEUVERS OF ARMY PLANE IN FIRST PUBLIC DEMONSTRATION OF NEW RCA WALKIE-TALKIE UNIT AT CAMDEN, N. J.

be said to have begun with the problems of GI's struggling with vital communications gear, made as light and portable as anyone could design it, but still heavy and cumbersome to carry.

"World War II 'walkie-talkies' had added a new concept of communications to field warfare. But along with great advantages they brought certain difficulties in the way of reduction of maneuverability, maintenance problems and transportation requirements. Bulkiness and weight, however, were the two main disadvantages of the old equipment. In fact, in some sectors they were referred to—not too lovingly—as 'backie-breakies'.

"Engineers of the Signal Corps were, of course, well aware of this.

Even before the war ended they were making plans for a new equipment. They started putting their ideas down on paper based upon their experiences during World War II and soon drew up a list of specifications for the set they wanted. These requirements seemed impossible of achievement by techniques known at the time.

"Signal Corps engineers, however, believed that by utilizing the newly-developed art of sub-miniaturization to the fullest extent it would be possible, over a reasonable period of time, to develop the set they wanted.

"The problem of sub-miniaturization, or making things much smaller, is not simple because all of the many parts—and there are



MANY WALKIE-TALKIE COMPONENTS ARE SO SMALL THAT THEY MUST BE ASSEMBLED UNDER MAGNIFYING LENSES.

hundreds in the new walkie-talkie—must be reduced in size. This means that the ordinary transformers, condensers, resistors, tubes, nuts and bolts and even wires used by the designer had to be redesigned. In most cases in the design of a new piece of electronic gear, standard, easily available components could be employed. Here, nearly every component had to be redone and a model built to test its efficiency and performance. New circuits had to be devised to provide added flexibility and efficiency.

“Signal Corps representatives talked the project over with RCA engineers, who agreed that it was possible—though very difficult. Accordingly, in June 1946, the Signal Corps placed a contract with RCA which called for the development of a new, much smaller, much lighter walkie-talkie that would meet a long list of exacting requirements.

“During the following period, RCA engineers working with Signal Corps engineers built, tested, rebuilt, retested and rebuilt again until they had completed engineer-

ing models of a new unit which met all of the requirements originally laid down. These models were exhaustively field-tested and finally in spring of 1950, declared ready for production.”

When RCA was first asked to bid on the instrument, it was estimated that 55 weeks must elapse before the completed units could begin rolling off production lines. However, the Signal Corps needed the equipments and urged company engineers to use every facility to shorten the schedule. Anxious to deliver the goods, RCA put into motion all tricks known to the trade and as a result production was promised in 44 weeks.

#### *Every Department Alerted*

To accomplish a feat that, to many, seemed impossible, it was necessary that every department be alerted and primed for the task ahead. Soon, Engineering, Purchasing, Inventory Control, Fabricating and Material Inspection knew almost to an hour when its contribution would be needed if the tight schedule were to be maintained. How well this integration worked out was acknowledged by General Akin when he accepted the first walkie-talkie. The instrument, he said, “represents a major engineering and production achievement. The speeding up of this production 60 days ahead of schedule tells its own story of efficiency on the part of management—and cooperation and energy on the part of the skilled workers who built this equipment. It did not just grow. It was created through a combination of scientific advance, industrial know-how and military experience.

“And as these sets come off your assembly line, we—the military—will take over. Our supply system will deliver these sets where they are needed. We will send the replacement parts required to maintain them. Our schools will train the communications specialists, who will use them as a weapon in national defense.”

Large-scale production of the new walkie-talkie, it was announced, will start as soon as the Signal Corps has completed its field tests.

CHECKING ONE OF THE WALKIE-TALKIE SUB-UNITS FOR MECHANICAL PERFECTION AT THE RCA VICTOR PLANT IN CAMDEN.



# Major TV Expansion Foreseen

*Dr. Jolliffe Tells Princeton Students that Public Will Benefit from RCA-NBC Tests with UHF at Bridgeport.*

MORE than a year of field testing by the Radio Corporation of America and the National Broadcasting Company has shown that major expansion of television broadcasting is practical and possible at ultra-high frequencies, Dr. B. Jolliffe, Executive Vice President in Charge of RCA Laboratories, declared in a lecture at the School of Engineering, Princeton University, on April 17.

"Our engineers have determined that practical UHF television receivers can be built and that present television sets can be readily adapted for use at ultra-high frequencies," Dr. Jolliffe said. "This means that sets now in use and those being manufactured will not be made obsolete by the new development. Receivers and adapters will be available when UHF television transmissions are authorized. When ultra-high frequencies are used, many communities can have satisfactory television that could not have had any television service without this expansion in UHF. Existing service at very-high frequencies also can be extended." Dr. Jolliffe's remarks concerning the success of RCA and NBC in pioneering investigations of the UHF were made to emphasize the importance of industrial research in the progress of television and other American industries, the

theme of his Cyrus Fogg Brackett Lecture before the Princeton engineering students.

He recalled that at the time of the "freeze" in 1948, when the Federal Communications Commission halted action on applications for new television stations, use of the UHF was proposed for the expansion of television. He added:

"There was little information available at that time concerning the usefulness of these frequencies for television broadcasting, although some propagation tests had been made. To determine the problem of television broadcast transmission and reception in the UHF, RCA inaugurated a full-scale field test.

"A transmitter was built and installed at Bridgeport, Conn., and test receivers were installed in a number of homes in and near that city. The station, KC2XAK, which is operated by NBC, began transmissions in December, 1949.

"The regular schedule of programs of NBC's New York station WNBT has since that time been relayed by microwave from New York to Bridgeport. This was the first UHF station in the United States to operate on a regular schedule. The Bridgeport area has been used as a testing ground for UHF receivers by RCA and others."

Recalling that the FCC has re-

cently announced a proposed allocation which involves the use of UHF, Dr. Jolliffe said the Commission's proposed channel assignments provide for nearly 2,000 UHF and VHF television stations in more than 1,200 communities. He pointed out that certain procedure steps by the FCC are necessary before the "freeze" can be lifted, but added that if production facilities are available for television at the conclusion of this procedure, television broadcasting will expand rapidly and television broadcasting service can become a "really nation-wide service."

## UHF Converter for TV Proved Best by Test

Large-scale experiments in the transmission and reception of ultra-high-frequency television signals, carried out by RCA, show that a converter is the best means of enabling present TV sets to receive stations that may operate in the higher frequency channels recently proposed by the Federal Communications Commission. A bulletin containing this information has been sent to distributors of RCA television receivers by W. A. Buck, Vice

*(Continued on page 29)*



FROM THIS TOWER NEAR BRIDGEPORT, CONN., RCA-NBC HAVE BEEN CONDUCTING EXTENSIVE FIELD TESTS OF TELEVISION PROGRAMS TRANSMITTED ON ULTRA-HIGH FREQUENCIES. BELOW: CONTROL CONSOLE AND TRANSMITTER SWITCHBOARD AT BRIDGEPORT STATION.



# Television Goes Abroad

*Crews of RCA Technicians, Transporting Special Equipment, have Demonstrated American Television in Ten Foreign Countries.*

WHILE television has become a household word to Americans, it still symbolizes mystery to millions outside the United States who read about its wonders, but cannot enjoy them regularly. However, through the activities of the RCA Victor Shows and Exhibits Division, more than 9,000,000 people in 10 foreign countries have actually viewed telecasts for the first time. To carry on this missionary work, teams of technicians, acting as emissaries rather than salesmen, have traveled more than 500,000 miles to date, introducing the new medium abroad through on-the-spot demonstrations.

On the average of once a week, a Service Company demonstration crew is somewhere "on location," in this country or abroad, telecasting a parade, ship launching, religious ceremony, sports event, public affair, or surgical operation. Attired one day in hip boots and the next in tails and cummerbund, these nomadic technicians who transport RCA equipment to South America, Sweden, Italy and other far places stand apart from their desk-bound fellow workers.

The recent introduction of television in Sweden, at the interna-



By Richard C. Hooper

*Manager,  
Shows and Exhibits Department,  
RCA Victor Division.*

tionally famous Nobel Prize Award ceremony, was a typical overseas assignment. The crew took off for Stockholm on extremely short notice, with 6,800 pounds of broadcast equipment and 56 pieces of personal luggage. Two TV field cameras; two "life-size" projectors, which give 6- by 9-foot pictures; and an array of 16- and 19-inch receivers were used to set up operations in Stockholm's Concert House.

When King Gustav VI presented the coveted awards to the world's leading physicists, chemists, medi-

cal scientists, and writers, 3,500 spectators witnessed the event, approximately half of them on RCA television sets installed outside the auditorium. In order to give complete coverage to the 2½-hour ceremony, one camera was set up in a box on the right side of the stage to obtain a picture of the presentations as seen by the audience. A second camera was mounted on a balcony at the rear of the stage to cover the entire audience.

To enable the King, his royal family, and others seated in the orchestra to observe the technical perfection with which the ceremonies were reproduced on television, a 16-inch receiver was installed at the base of the speaker's rostrum, facing the audience. Other direct-view receivers and two projection models were installed outside the main hall to accommodate the overflow crowd. Additional equipment was placed in Stockholm's Cinema Royal, which was filled to its 1,000-seat capacity.

As is often the case with foreign assignments, the crew faced a technical problem before it could proceed with the actual telecast. Sweden uses 50-cycle electric power, while RCA equipment is designed

RCA TELEVISION CAMERAS AND RECEIVERS, INSTALLED IN STOCKHOLM'S CONCERT HOUSE, BROUGHT A CLOSE-UP VIEW OF THE FAMOUS NOBEL PRIZE AWARD CEREMONY TO THOUSANDS OF EAGER SPECTATORS INSIDE AND OUTSIDE THE AUDITORIUM.





operate on the 60-cycle power line in the United States. As a solution to this situation, the technicians provided their own source of electricity by borrowing two gas-engine-driven generators from the Swedish Navy.

Although telecasting the Nobel awards ceremony was the group's main task on this assignment, it was not the only one. The engineers telecasted King Gustav at a private show at his palace; put on a demonstration for the Riksdag (legislature); telecasted a heart operation at the Karolinska Hospital, and an abdominal surgery at Stockholm's Karolinska Hospital.

### Crew Worked Long Hours

With only four hours of daylight in winter in Stockholm—the technicians went to bed and got up in the dark, working nearly around the clock, scarcely knowing that the sun shone, when it did. At the request of government officials, the RCA group produced several special programs, one of which covered the operation of recently-developed televisions. Another demonstrated the use of TV in the classroom as an aid in the teaching of physics, science, electronics and home economics. Before the crew embarked for home they had shown American television to approximately 25,000 residents of Stockholm.

While this RCA group was at work in "the land of the midnight sun" another crew—almost halfway around the world—was demonstrating television to several thousand government leaders, doctors and nurses gathered in Havana's General Calixto Garcia Hospital.

The Cuban demonstration was part of a series of four conducted by RCA in Latin America, in cooperation with E. R. Squibb & Company. A total of 149 pieces of equipment, weighing 8,500 pounds, were transported from Peru (the first stop) to Colombia, to the Dominican Republic, and finally to Havana to stage the dramatic surgical casts.

In each demonstration, which lasted approximately two hours, the procedure was much the same. The camera was suspended directly over the operating table to pick up the operating field and the hands of the surgeon and his assistants.



RCA TELEVISION EXPERTS BOARD A PLANE FOR SWEDEN TO INTRODUCE THE NEW MEDIUM IN THAT COUNTRY.

A second camera, on a level with the doctors, gave an over-all picture of the action. Adjacent to the surgery, the crew set up a small studio in which doctors held discussions on surgical methods, patients' symptoms and case histories. Camera No. 2 was wheeled into position to cover the studio, and back to the surgery for the actual operation.

In Lima, the cameras, which were set up in the modern Hospital Obrero, covered 14 operations presented under sponsorship of the Seventh Inter-American Surgical Congress. Physicians from all parts of South America were among the audience of approximately 7,500 persons.

### Surgery Televised in Bogotá

The Bogotá operations were televised in the Hospital of San Jose, and receivers were made available in a nearby medical school for approximately 6,000 spectators.

At Ciudad Trujillo, about 3,000 persons watched similar demonstrations conducted in the Professor Marion Military Hospital.

Surgery is frequently selected as the subject for such demonstrations because it dramatically illustrates that television is not merely an entertainment medium. People everywhere have heard of American comedy, drama and juvenile shows, but

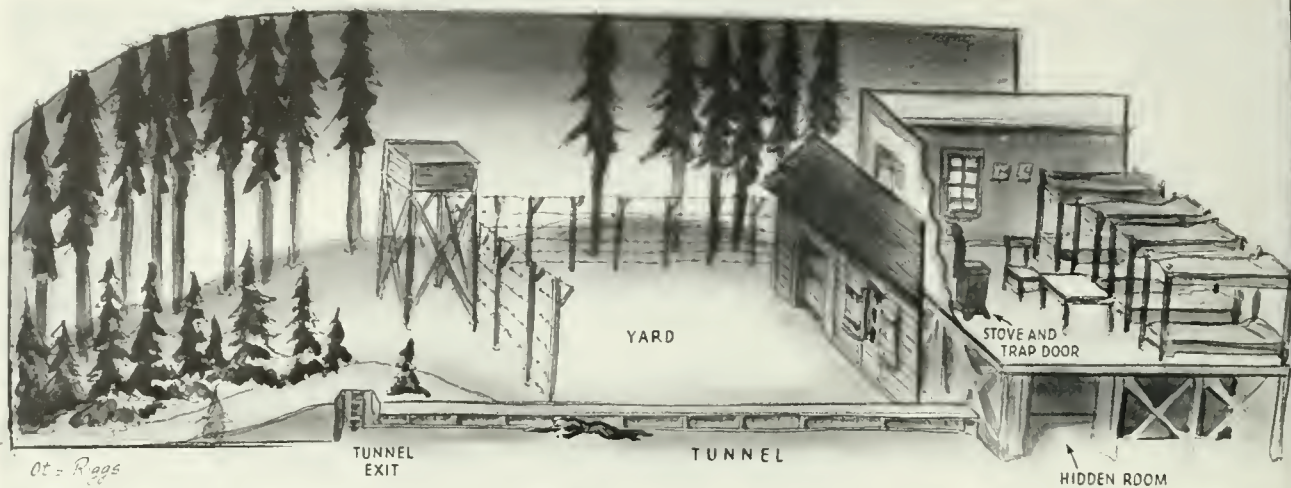
few are aware of television's potential as an instrument of education and public service.

When TV made its Canadian debut in 1949, technicians set up RCA cameras and receivers in the Saskatoon General Hospital, in Saskatchewan for the Medical Association's annual convention. This demonstration impressed its Canadian spectators to such a degree that RCA crews were called back on subsequent occasions to televise non-medical conventions in Toronto and Montreal.

These travelling members of the RCA Service Company are as adept at maneuvering a TV camera in a "corrida de toros", or bullring, as they are in an operating room. In fact, one of the Division's first foreign assignments was a junket to Mexico City, in 1946, to telecast a series of bullfights from the 60,000-seat Plaza Mexico. On this occasion the program was transmitted by microwave radio relay to the Hotel del Prado, six miles away, where an additional 7,500 spectators viewed the event on RCA receivers.

In the summer of 1948 RCA television cameras were focused on similar bullfights in Madrid, during a series of demonstrations conducted by RCA to acquaint the Spanish people with American television.

(Continued on page 26)



ARTIST'S ORIGINAL SKETCH FROM WHICH THE STAGE SETS FOR "THE GREAT ESCAPE" WERE DESIGNED.

# "The Great Escape"

*Staging Specialists at NBC Adapt a Thrilling Wartime Episode for Television Presentation  
Providing Viewers with One of TV's Outstanding Dramas.*



By Robert J. Wade

*Manager,  
Staging Services Division,  
National Broadcasting Company.*

CREATING scenery for the "average" television drama, no matter how spectacular or gigantic the presentation may be, normally presents no great problem for NBC's experienced production staff. But occasionally designers of the network's stage settings are confronted with a script which challenges even the most imaginative mind and the most extensive TV facilities.

Such was the case with NBC's production of "The Great Escape", one of the most thrilling adventure stories to come out of World War

II. In this escapade, which took place in 1944, 76 British and American airmen, overcoming seemingly insurmountable obstacles, tunneled their way to freedom from the German prison camp called Stalag Luft II. Their achievement was no less amazing than its transition to the television screen.

How is it possible to simulate a tunnel 300 feet long and 30 feet underground?

Why is barbed wire hard to get nowadays?

How can four tons of dirt be made to weigh just one-quarter of that amount?

What happens to the paper holes cut from loose-leaf notebooks?

These were only a few of the questions to be answered by the staging specialists who prepared the scenery and props for "The Great Escape". Scenic designer Otis Riggs, who has created settings for more than 200 television productions, found this to be his most difficult assignment.

In order to create the illusion of underground activity for the key scenes in the drama, Riggs had to create a set which was substantially above the ground. He constructed the barracks room (where the un-

derground trap-door was located) 10 feet above the studio floor in NBC's studio 8-G, with the room's rafters resting just below the 17-foot-high studio ceiling.

A six-foot vertical shaft was constructed leading from the barracks room to the horizontal tunnel below. This vertical opening was a facsimile of one dug to a depth of 30 feet by the Allied PWs in Silesia. The second studio tunnel, 20 feet long and two feet wide, represented the original escape medium which ran underground for 300 feet to the outside of the German camp in the actual escape.

## *Tunnel Built Above Floor*

The main escape tunnel had to be raised four feet off the studio floor so that all action would be on a level with normal camera height. To support the weight of this off-the-floor construction, as well as the players and props, elaborate and sturdy platforms were erected—the largest ever demanded by an NBC show.

The winter setting of the drama caused NBC's Staging Services Department to reach for another superlative. Six hundred square feet of playing space, representing the



AUTHOR (LEFT) AND ART DIRECTOR  
ELWELL USE A MOCK-UP MODEL OF THE  
SET TO STUDY SCENERY AND STAGING.

PW yard and the final escape hole outside the compound, had to be covered with snow. This required 1,200 cubic feet of snow—which explains where the paper holes of goose-leaf notebooks go. The round and irregular shaped paper bits have a peculiar floating quality which makes them ideal in snowfall scenes. In addition to the paper, snow was represented by bleached corn flakes and commercial confetti, together with mica, which shimmers like ice. Dampened salt simulated snow spots on the men's uniforms.

"The Great Escape" also required more earth and sand than any other network production. The audience would hardly have accepted a tunneling scene without dirt and sand, particularly when the earth itself was a greater enemy of the escape-minded prisoners than the German guards and their bloodhounds.

### *Tons of Earth Required*

Four tons of earth initially were estimated for the show, but since this tonnage presented an enormous problem to staging men who had to transport the load up eight floors to the studio, the weight was reduced one-quarter by mixing tanbark and cork with gravel.

Designer Riggs, who became familiar with German prisoner-of-war camps when he was in Army service, discovered that barbed wire was scarce in New York. He solved his problem, however, by writing



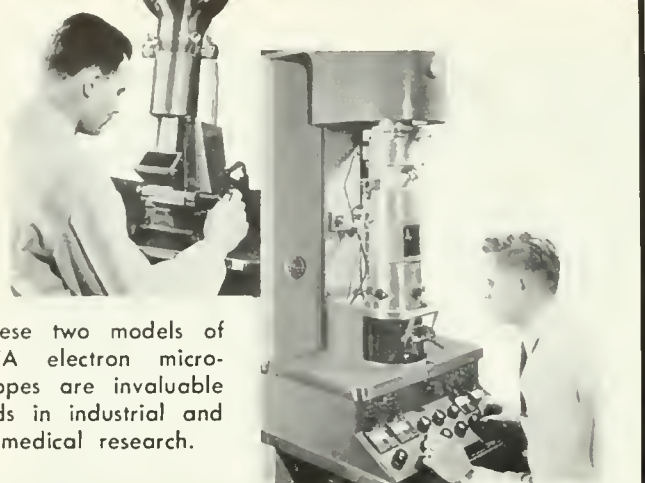
REALISTIC COMPLETED SETTINGS FOR THE PRISON CAMP YARD (ABOVE) AND ESCAPE TUNNEL (BELOW) CREATED THE ATMOSPHERE DEMANDED BY THE TENSE PLOT OF THE DRAMA.

to a mail-order house which specializes in farm equipment.

From the blueprint and script stages through to the final curtain, actors and technicians alike were imbued with the spirit of this moving drama. The cast of 40 actors, headed by Everett Sloan, Leslie Linden and Oliver Thorndike, rehearsed in the Paladium Ballroom, using night-club tables and chairs as crude props to create the effect of a tunnel. In the studio itself, skilled technicians, under the di-

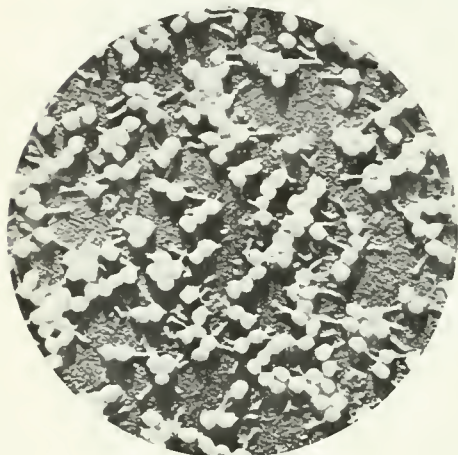
rection of Mr. Riggs and Robert Garthwaite, staging coordinator, spent one entire night setting up the complicated scenery and props.

During the actual telecast a total of 70 people occupied the studio's somewhat limited space. Camera-men, dollymen, actors and stagehands worked in perfect coordination with Producer Fred Coe and Director Gordon Duff, the final result bringing wide acclaim from the network's TV audience and the press.

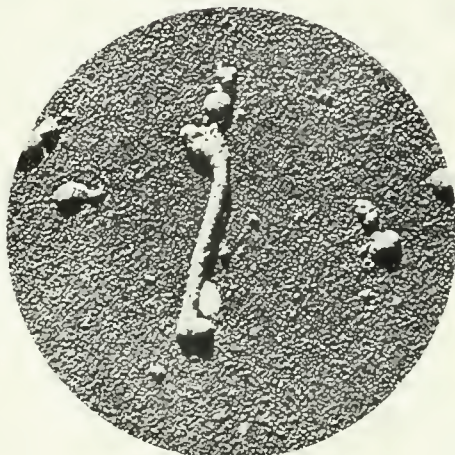


These two models of RCA electron microscopes are invaluable aids in industrial and medical research.

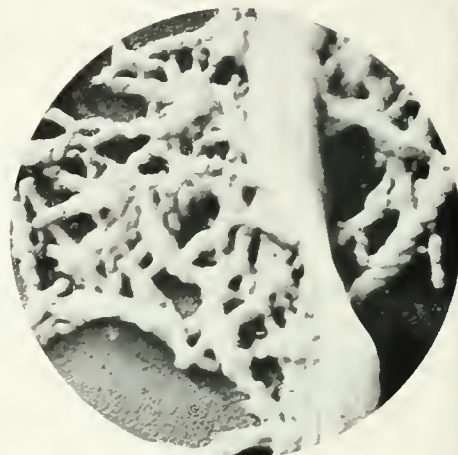
# the Electron Microscope opens Unseen Worlds



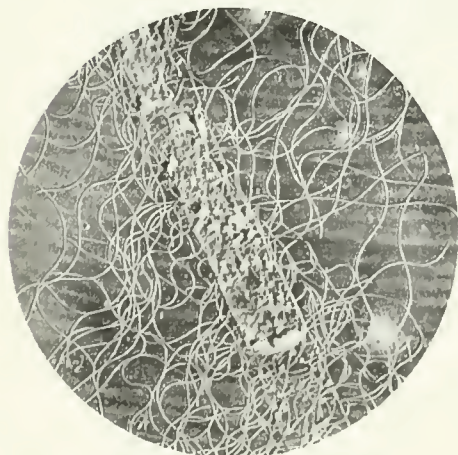
Medical research has been stimulated by enlargements of minute organisms such as this one, showing a type of colon bacillus.



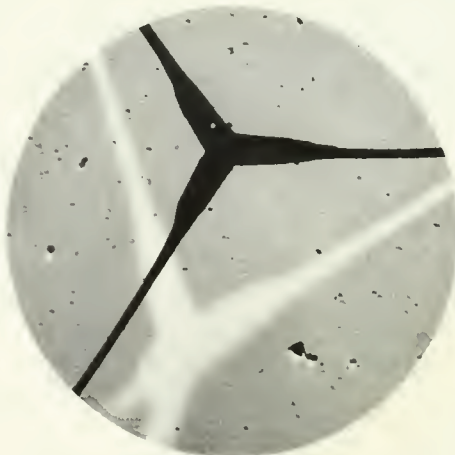
A relation between rodlike particles and influenza virus is indicated to bacteriologists in this micrograph, magnified 35,000 times.



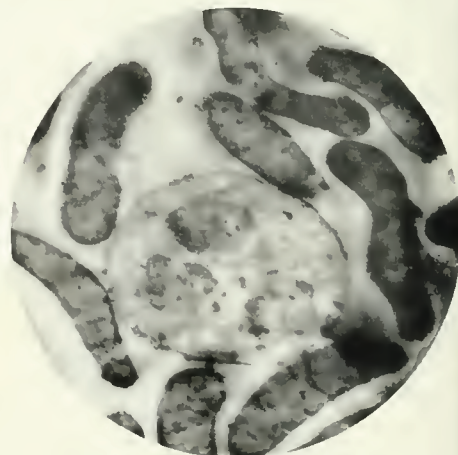
Ropey structure of lime soap grease was unsuspected until the electron microscope brought the unusual formation to visible size.



The wavy threads in this micrograph of a bacterium are less than a millionth of an inch wide, visible only in an electron microscope.



A crystal of zinc oxide smoke is a pattern of perfect symmetry under the powerful lens of the electron microscope.



Red blood cells surround a white blood cell in this ultra-thin section of human tissue photographed at RCA Laboratories.



THE NEW RCA-EQUIPPED LUXURY LINER SS INDEPENDENCE RECEIVES A TYPICAL MARINE SALUTE AS IT ENTERS NEW YORK HARBOR FOR THE FIRST TIME.

AN OFFICER TAKES THE SHIP'S BEARING WITH THE LATEST MODEL RADIOMARINE DIRECTION FINDER.



## New Luxury Liner Is Equipped with Latest Radio Instruments

*All Navigation and Communication Apparatus on Independence Supplied by Radiomarine.*

WHEN America's newest luxury liner, the 26,000-ton American Export Line's *Independence*, sailed on her maiden voyage in February, she was virtually a showcase of Radiomarine communications and navigation apparatus. As adjuncts to the safety and convenience of the ship's 1,000 passengers were the following equipments, all manufactured by RCA: long range radar; direct-reading loran; pinnacle-type direction finder; two radiotelephone transmitters; a radiotelegraph station and an internal communication system which permits passengers to send and receive radiograms, ship-to-shore, direct from staterooms and cabins.

RCA's new high-power shipboard console consists of a 500-watt main transmitter with eight channels, a 500-watt high-frequency transmitter with 10 channels, a 40-watt emergency transmitter with five channels, and three receivers with a combined frequency range of from 15 to 650 kilocycles and from 1.9 to 25 megacycles.

The radar, with its 12-inch viewing scope, is an improved version of the type now installed aboard

such ships as the Holland-American Line's *SS Nicur Amsterdam*, the Swedish-American Line's *SS Stockholm*, the United States Line's *SS Washington* and many other large, transoceanic liners. The unit operates on a wave length of 3.2 centimeters, with a range from 75 yards to 40 miles.

In the ship's Chart Room, the direct-reading loran indicator displays time differences directly on a simple dial, making interpolation unnecessary.

After his ship's recent ocean

trials had been completed, Captain Hugh L. Switzer, master of the *Independence* (the American Export Line's speedy flagship), said: "Our communications and navigation equipment performed admirably, as expected. Radiomarine can well be proud of the accuracy, durability and dependability of their products."

A duplicate of the *Independence* installation is being made aboard her sister ship, the *Constitution*, now nearing completion at the Quincy Mass., shipyard.

SCENE ON BRIDGE OF THE INDEPENDENCE SHOWING, AT LEFT, THE RCA RADAR UNIT WHICH CAN DETECT OBJECTS WITHIN A 40-MILE RANGE.



# Portable Television Transmitter And Camera

*Using Pencil-Sized Tubes and Miniature Components, RCA Develops Back-pack Unit  
Weighing Only 53 Pounds and having Range of One Mile.*

A NEW portable television camera and transmitting station, designed to operate in the field as a one-man back-pack unit, was demonstrated by L. E. Flory, of the RCA Laboratories, at a meeting of the Institute of Radio Engineers on March 21.

Weighing only 53 pounds, the back-pack station is planned to function with its own battery-power supply. It has a range of approximately one mile. Because of its easy portability, numerous applications for the new equipment are foreseen by RCA research engineers. Among these are news coverage, with television-equipped reporters flashing pictures and commentary directly to editorial rooms, and remote industrial viewing and control.

The new transmitter operates in conjunction with a control station which may be located as far as a mile from the camera. Signals corresponding to the scene being televised are transmitted to the control point on an ultra-high frequency with a power of two watts. In addition to acting as a monitor for the

televised picture, the control point performs two other functions. It sends out a stream of pulses which stabilize the camera and can be used also to issue vocal instructions to the cameraman.

Recent developments in the design of pencil-sized tubes and other sub-miniature component parts made possible the impressive reduction in bulk and weight of the equipment.

## *Equipment Carried as Back-Pack*

The back-pack is carried in knapsack fashion, suspended from the narrator's shoulders by flexible straps. Two small antennas extend from the top of the pack and are used respectively to transmit the picture signal to a base station and to receive voice and control signals from that same point.

The camera is an adaptation of the RCA industrial TV camera using the Vidicon tube. As an added feature, the camera includes a miniature kinescope picture tube which serves as a view-finder for the cameraman. Through it he is able to see an exact reproduction of

the scene on which the camera lens is focused.

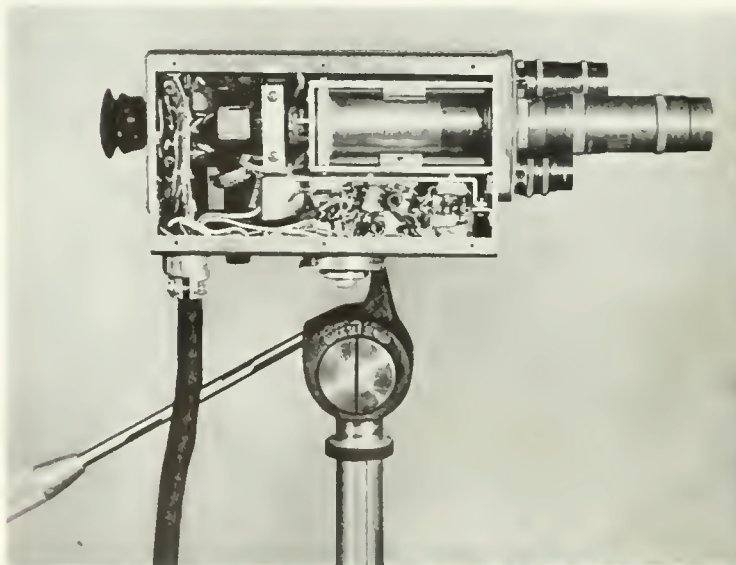
The equipment contains 42 tubes which, with their associated circuits, provide all synchronizing frequencies for a standard 525-line, 30-frame interlaced television picture. Included in the unit are the battery-operated power supply, deflecting circuits, amplifiers, and a radio receiver for receiving instruction and other essential information from the control point. A single battery operates the portable station for about 1½ hours.

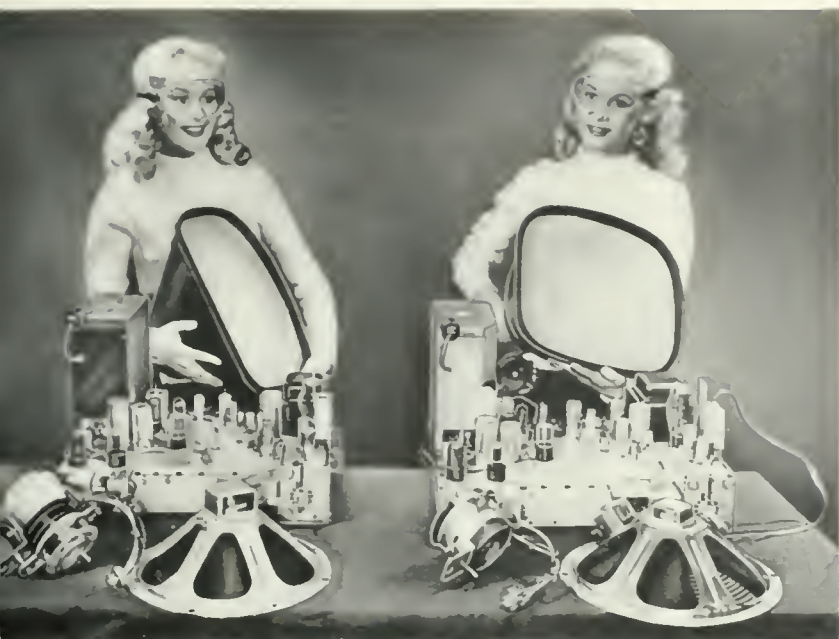
The narrator-cameraman's voice is picked up and transmitted through the combination of a small microphone built into the camera case and an ingenious electronic circuit which adds the voice signals to the picture signals as they are radiated to the control point.

Research and development of the portable television equipment were carried out by Mr. Flory, W. S. Pike, Jr., J. E. Dille, and J. M. Morgan, of the RCA Laboratories, under the direction of Dr. V. K. Zworykin, Vice President and Technical Consultant.

CONTROL PANEL OF PORTABLE TV SYSTEM, INCLUDING MONITOR SCREEN AND TWO-WAY RADIOTELEPHONE FACILITIES.

SIDE VIEW OF PORTABLE TELEVISION CAMERA, SHOWING VIDICON TUBE (UPPER RIGHT) AND CONTROL UNITS.





SUBSTANTIAL SAVINGS IN COBALT, STEEL AND OTHER CRITICAL MATERIALS HAVE BEEN ATTAINED IN THE NEW RCA TELEVISION CHASSIS (RIGHT) WITHOUT AFFECTING RECEIVER OPERATION.

## Critical Materials Saved

*Technical Developments in Picture Tubes and Loudspeakers Alone Reduce Cobalt Usage by 90 Percent.*

NEW technical developments, which will enable the radio and television industry to effect large savings in defense-strategic materials and still maintain present high-quality standards, have been disclosed by the Radio Corporation of America.

They include an electrostatic picture tube and redesigned loudspeakers, which alone reduce the amount of critical cobalt in the average television receiver by 90 percent.

"When these conservation steps are applied by the industry," Frank Folsom, President of RCA, declared, "they will save millions of pounds of cobalt, copper, nickel, aluminum, brass, steel, and other critical metals."

The new engineering developments, which extend over the whole range of radio and television production, are the direct result, Mr. Folsom said, of the Corporation's comprehensive conservation program which was stepped up with the outbreak of the Korean War.

RCA already has turned over to radio, television, and tube manufacturers throughout the industry developments resulting from its 8-months emergency-intensified research work, he said. The manufacturers were also assured that additional engineering advances will be passed on to them.

### *Product Quality Maintained*

RCA approached the problem of material conservation, it was pointed out, with the idea of maintaining product quality and performance by taking full advantage wherever possible of new non-critical materials.

In his letter to the manufacturers, Mr. Folsom declared:

"I know you will join with us in earnestly pursuing this conservation program, not only for the resulting substantial savings in vital metals, but also to demonstrate to our Government officials the industry's resourcefulness in this time of emergency." He added:

"Only by doing everything possible to help itself can the industry feel morally justified in asking the help of Government agencies in supplying sufficient critical materials to permit continued production of peacetime products which, in turn, enable us to hold together our technical skills and our trained workers until they are needed to produce electronic equipment for the military services."

By finding new ways to use scarce materials, Mr. Folsom explained, the industry has been able to maintain a substantial level of production which has meant continued employment for thousands of skilled workers in the plants of both manufacturers and suppliers.

### *Mobilization Determines Production*

How long the present production rate can be maintained will depend, he added, on material restrictions imposed by expanding requirements of the mobilization program, as well as on the continued ingenuity of the industry in finding ways to further conserve strategic materials.

Mr. Folsom listed these material savings for every million average 17-inch television sets produced by the industry: Alnico V (an alloy containing 24 percent cobalt, and other scarce materials), 732,800 pounds; steel, 784,000 pounds; copper, 510,700 pounds; aluminum, 224,000 pounds; brass, 146,400 pounds; and nickel, 46,000 pounds.

The conservation program also has been extended by the RCA Service Company to installation of television sets in the home. By redesigning the antenna, aluminum has been cut 50 percent, an annual saving of 2,000,000 pounds per million installations if applied on an industry-wide basis. The use of copper in transmission lines also has been drastically reduced with the possibility of still further savings.

The new electrostatic picture tube eliminates the need for a large external focusing magnet, biggest cobalt user of any television part, and is fully comparable in performance to picture tubes now in use. The redesigned loudspeakers also permit substantial savings of this scarce metal through the use of a new magnet structure.

# Measures Color Values

*Electronic Device, Called a Tristimulus Photometer, Gives Accurate Analysis of Spectrum Components in Light Source.*

COLOR from a direct light source can be measured quickly and accurately through the use of a new instrument developed by RCA Laboratories, Princeton, N. J.

Called a "tristimulus photometer," the new instrument uses only five electron tubes and is no larger than a shoe-box. It simultaneously determines the relative strength of the three basic color components in a light source under study and gives an instantaneous reading. Previous methods of color specification require roughly one-half hour of measurement with a spectrometer followed by several hours of computation.

Though the spectrophotometric method gives a higher degree of accuracy, the tristimulus photometer can give values of the three-color components sufficiently precise for every-day engineering work and can readily distinguish between two different color samples which are close enough together in value so they would appear identical to the eye.

The instrument was designed specifically to provide a laboratory and studio check on the faithfulness of color reproduction in color television. However, since it can determine the values of a reflected light

source as well as a direct one, the device may also have valuable application in the textile, paint and other industries where color matching is critical. A direct-reading electronic instrument has been designed by the National Bureau of Standards of the U. S. Department of Commerce, which can define the components of reflected light, but cannot handle a direct light source such as that of a television screen.

## *Apparatus has "Eye" and "Brain"*

The new instrument consists essentially of an "eye" and a "brain." The "eye" is made up of a lens which focuses the light under study onto a mirror assembly designed to split the beam into three parts of equal intensity. The three beams then pass through three filters, each sensitive to a range of wavelengths corresponding to the basic color components.

The "brain" of the instrument starts with three photocells, one for each filter. The photocells convert the light energy to electrical energy which passes through circuits, each of a different design, to compensate for the mathematical dissimilarities between the three color components. Finally, a corrected value for each component is read on microammeters.

## Proposes "Pool of Ideas" For Television Service

Confidence that the television service industry could, by pooling its ingenuity, effect measures necessary to see it through the critical months ahead in the face of the twin problems of availability of qualified service technicians, installation materials, and replacement parts and tubes has been expressed by E. C. Cahill, President of the RCA Service Company.

As a contribution to the "pool of ideas", the Service Company will soon make available to the servicing industry a comprehensive conservation and alternate materials program related wholly to installation and servicing of television receivers, Mr. Cahill disclosed.

This report will expand and supplement the over-all materials conservation report which the Radio Corporation of America has already turned over to television, radio, and tube manufacturers. The RCA materials conservation report has also been sent to the servicing industry, he said.

The supplementary report will contain a compilation of the most commonly used parts and tubes in installing and servicing television sets. A comprehensive cross index indicates the many alternate parts and tubes which can be used when so-called standard components not readily available.

"While the industry has long been aware of the wealth of alternate components available, we have all more or less concentrated on specific parts and tubes," Mr. Cahill pointed out. "Today, there is a great need for a compilation which can keep the technician and service agency fully informed on alternate components which perform as effectively as a given part or tube which may be in scarce supply."

Mr. Cahill declared that the RCA Service Company will continue to make available the one-year Factory Service Contract as well as the lower-cost limited contract. It will also provide service on a time-and-materials basis to those RCA Victor television set owners who prefer this type of service.

GEORGE C. SZIKLAI, OF RCA LABORATORIES, DEMONSTRATES THE TRISTIMULUS PHOTOMETER, WHICH PERMITS RAPID ANALYSIS OF COLORS.





# Engineers Assured Enemy Action Will Not Silence Radio Stations

*RCA Laboratories Staff Member Says Protective Measures Will Be Effective in Emergencies.*

PROTECTIVE measures already in force at American radio stations are sufficient to outwit enemy attempts to silence all broadcasting by bombing and sabotage, Arthur Van Dyck, staff assistant at RCA Laboratories, assured members of the American Institute of Electrical Engineers in session at the Hotel Astor, New York, on January 23. In densely populated areas such as New York, he pointed out, radio stations are distributed over a wide area and even though one or more are silenced by enemy action the remaining transmitters would continue to be available for distributing vital information and instructions to the populace.

The problem of transmitter protection, he said, is not a serious one in this country.

"If our system were like that of most other countries," he said, "with but one station serving each area the problem would be more difficult. To interrupt broadcast service from the 26 stations in the New York area, it would be necessary for an enemy to silence not one or two stations, but at least the fifteen which give good signals throughout the metropolitan area."

The damaging of any lesser number, he continued, would not stop broadcast service, provided that substitution and alternate use of stations had been arranged. Only a minor degree of organized planning is necessary to accomplish this, and it is being carried out.

In peacetime, Mr. Van Dyck explained, major stations have devised means for staying "on the air" when confronted by abnormal conditions, and their staffs are fully experienced in the requirements for continuous operation even under these difficulties. Emergency transmitters are available for immediate use in many stations, and some have emergency antennas.

"While it is probably impossible to prevent an expert and determined saboteur from putting any

single station out of operation, at least temporarily," Mr. Van Dyck conceded, "the protection is complete enough to discourage all but the most determined and well-equipped efforts."

Even the loss of the large towers of broadcasting stations would not be a crippling blow, he said. Emergency service could be established quickly through the erection of hundred-foot poles, or balloon-supported wires. Furthermore, he told the engineers, World War II experience proved that it is extremely difficult to put a radio station out of commission by air bombing, unless by a direct hit.

Care in setting up special protective measures would prevent the unauthorized use of broadcasting facilities by subversive action, he pointed out.

## Sarnoff Receives World Brotherhood Award

Brig. General David Sarnoff, Chairman of the Board, Radio Corporation of America, received one of the first World Brotherhood Awards of the Jewish Theological Seminary of America at ceremonies held at the Waldorf-Astoria Hotel on March 18. The award, which was presented by Dr. Louis Finklestein, president of the seminary, cited General Sarnoff for "his scientific contributions that have brought men everywhere closer in mind and spirit."

In accepting the award, RCA's Board Chairman pointed out that if men are to become masters rather than slaves of science, "we must learn to use its powers with good purpose; and that purpose must be the well-being of our fellow men."

"What is needed," he said, "is for all of us—you and I and our fellow men everywhere—to recognize and give practical application to the ideal of brotherhood. . . . We have no choice. Either all men

Mr. Van Dyck also expressed a doubt that broadcasting would be shut down in the event of an enemy attack, as was the custom at times in World War II. The silencing then, he said, was carried out to deny to enemy planes the use of radio signals for navigational purposes.

"No modern aircraft navigator," he explained, "would need to use broadcast station emissions to locate any city in the United States. As a matter of fact," he added, "there is more danger from special stations installed by enemy agents and operated when needed, than from use of our radio stations."

"In the event of an air attack," he explained, "many hundreds of points need to be alerted and signalling to them within a few seconds is vital. This can be done only by widespread high-power radio stations, and means are available whereby it can be accomplished on standard broadcast stations without interfering in any way with the normal operations of the stations."

learn to live and work together, or all men will perish together."

General Sarnoff recalled that he had recommended plans for an international broadcasting service which materialized as "The Voice of America," and subsequently also as "The Voice of the United Nations."

"Today," he said, "both of these broadcast services are striking examples of the power of radio to reach afar in an effort to cultivate greater understanding among the free peoples of the world." He expressed the hope that "the range of these broadcasts will be extended and that people everywhere—even those behind the Iron Curtain—will be permitted by their governments to listen to them."

"Television has not yet spanned the ocean," he said, "but I am sure it will. And when it does, we shall have a program that may be called 'The Voice and Vision of the U.S.A.' This can be a strong and powerful force for peace."

# Scientific Research as a Factor in American Business

*In Address to Patent Law Experts, E. C. Anderson Cites Contributions of RCA to Radio, Television and Other Technical Industries.*

MORE than \$50,000,000 has been invested by the Radio Corporation of America in television research and development, E. C. Anderson, Vice President in Charge of the Commercial Department of RCA Laboratories, said in an address before the Patent Law Association of San Francisco on February 28.

"Most of this outlay," Mr. Anderson added, "was made before a single dollar returned to anybody, including RCA."

Scientific research, he declared, has become the major factor in the progress of all American business. Out of pioneering research efforts, such as RCA made in television, have come the new inventions and techniques which have brought prosperity to entire industries, he said.

With both black-and-white and color television, RCA's research costs were borne in the belief that television would become a "great new American art and industry," according to Mr. Anderson. RCA had faith that its money and research would eventually pay off in good will and in service to the public and the industry, he added.

Illustrating RCA's contribution to the television industry, Mr. Anderson told how, after World War II, various competitors were invited by Frank M. Folsom, President of RCA, to inspect the facilities of RCA's Camden, N. J., plant.

"At Camden," declared Mr. Anderson, "we handed our guests the blueprints for the manufacturing of our television receivers, complete with a bill of material, and we told them they were free to use them any way they desired. Then we took the entire party through our television plant and let them see what we were doing. We told them it was a job for an entire industry—not just one company.

"We got competition, all right. Several of the companies have told

us since that they never would have gone into television if they had not been so thoroughly sold at that first post-war meeting. Let us see what this good-will gesture did for the industry. Here are a few figures that tell the exciting story:

"On January 1, 1947, sets in use by the public numbered 16,476. By January, 1948, the total reached 189,000. On January 1, 1949, it was 1,000,000. January 1, 1950, it was 3,950,000. On January 1, 1951, the total was over 10,000,000!"

## Results Available to Industry

Mr. Anderson said that, of course, RCA had benefited from this, through the sale of large quantities of television sets and by supplying a mounting quantity of tubes and parts to competitors in the radio-electronics field.

"In addition," he said, "we have

the satisfaction of knowing that the results of our twenty years of research in television have been made available to American industry and to the American public at an exceedingly modest price."

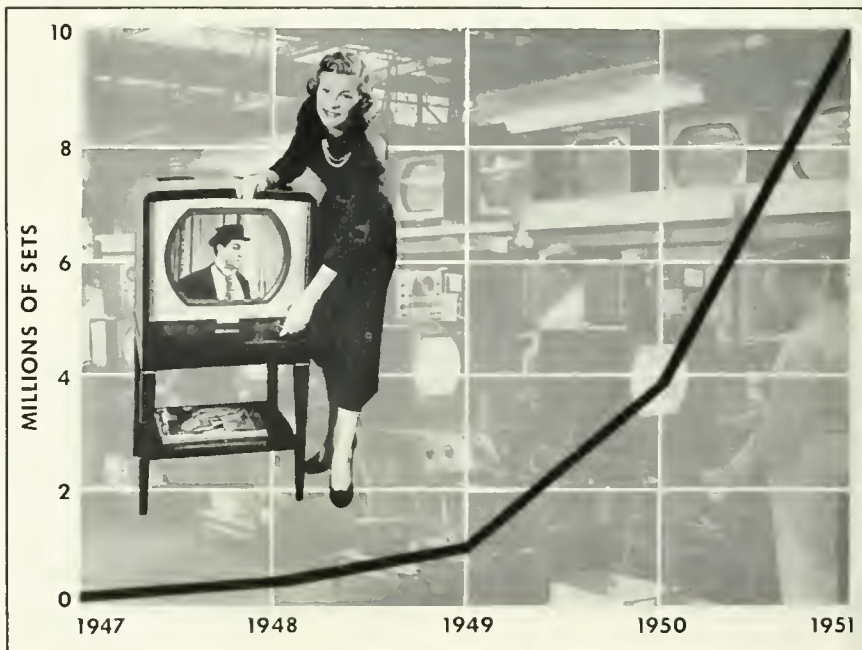
Mr. Anderson recalled that when he entered the radio industry, some 29 years ago, the confusion and uncertainties, particularly with regard to patents and invention represented a far cry from today's flourishing vigor of radio, television and electronics.

"The blight on the budding radio industry," he declared, "stemmed largely from confusion over the ownership of inventions. Some of these inventions dated back to 1890 when radio's first dots and dashes emanated from Marconi's experiments.

"Others were the result of American and British initiative before and during World War I. Characteristic of the situation, as the United States Navy learned, was the refusal of many patent owners to exchange their inventions with others. By 1919 the uncertainty over rights had created almost a complete stalemate in radio progress.

"It was that year, at the sugges-

*(Continued on page 31)*



IN FOUR YEARS THE TELEVISION SET INDUSTRY HAS INCREASED ITS ANNUAL OUTPUT MORE THAN 35 TIMES.

# Home Study Television Course Offered to Industry

*RCA Institutes Makes Texts Available to Meet Growing Shortage of Technicians.*

As a major move to circumvent the rapidly developing shortage of trained television servicemen, RCA Institutes, Inc., one of the nation's oldest electronics training schools, has announced that it will open to the industry a highly-specialized, field-tested Television Home Study Course for training television servicing technicians. The course will be limited to working members of the radio and television industry, but previous service experience is not required. Unemployed independent radio and television servicemen are also eligible. Enrollments are now being accepted.

Developed jointly by the RCA Service Company and RCA Institutes, Inc., for use in training company technicians, the course resulted from 14 months' study in the field, according to General George L. Van Deusen, President of RCA Institutes, Inc. Revised and amplified, it is now being made available to the entire radio and television industry.

Representing a combination of practical "how it works" information with pre-tested "how to do it" techniques, the course is planned to extend the work potential of the existing manpower pool by supplementing the knowledge and improving the techniques of servicemen now on the job, Gen. Van Deusen said.

## *Meets Special Need of Industry*

"Designed to meet the special needs of the servicing industry, this Television Home Study Course emphasizes practical, pre-tested installation and servicing functions, and presupposes that the student is actually working in the industry," he said. "Its purpose is not only to make servicemen, but to make better ones."

In addition, General Van Deusen added, the course makes possible the rapid conversion of installation men into service technicians, and represents supplementary training which makes practicable the hiring of inexperienced trainees.

CORPS OF DRAFTSMEN WORKED FOR MONTHS IN LAYING OUT DIAGRAMS AND ILLUSTRATIONS FOR THE HOME STUDY COURSE.



GENERAL G. L. VAN DEUSEN (LEFT), PRESIDENT OF RCA INSTITUTES, INC., RECEIVES HOME STUDY LESSON NO. 1 IN TELEVISION FROM BERNARD GROB, WHO DIRECTED PREPARATION OF THE TEXTS.

Approved by the New York State Department of Education, the Study Course consists of 10 lesson units, the first of which is mailed to the student upon enrollment. Each unit contains a home assignment which covers the material presented. Completed by the student and returned to the RCA Institutes, Inc., the assignment is reviewed and graded by a qualified instructor. The assignment is then returned to the student with appropriate comments and advice, and the next unit is furnished to the student.

The first lesson was made available to the RCA Service Company, for incorporation in its technician training program, in October, 1949. Today, thousands of RCA technicians take the Course.

A detailed course outline, together with further information regarding tuition rates and enrollment forms are available on request from the Home Study Division, Room 300, RCA Institutes, Inc., 350 W. 4th St., New York 11, New York.



A BATTERY OF SOUND EFFECTS RECORDS WAS REQUIRED TO RE-CREATE THE FIRST ATOMIC BOMB BLAST FOR THE "QUICK AND THE DEAD" PROGRAMS, NOW AVAILABLE ON RECORDS.

## "Quick and the Dead" Radio Dramas Recorded

"The Quick and the Dead," NBC's dramatic documentary radio series on the atomic and hydrogen bombs, has been recorded by RCA Victor in all three speeds—33-1/3, 45 and 78 revolutions a minute.

"The Quick and the Dead" stars Bob Hope in the role of an American taxpayer eager to learn about nuclear fission when he discovers that he is contributing substantially to the support of the atomic energy program. His questions are answered, in layman's language and through the use of dramatic flashbacks, by William L. Laurence, New York Times science reporter and two-time Pulitzer Prize winner who explained the atom to the public in 1945.

Other stars appearing in "The Quick and the Dead," which won great critical and popular acclaim, include Helen Hayes in the role of Lise Meitner, the German woman scientist who first split the atom, and Paul Lukas as Professor Albert Einstein. Many of the other voices are those of the scientists and military men who took part in creating the bombs.

Highlights of "The Quick and the Dead" include the re-enactment of the explosion of the first atomic bomb in the New Mexico desert. Special sound effects in NBC's largest broadcasting studio resulted in an accurate re-creation of the explosion.

The building of the first atomic chain reaction at Stagg Field, Chicago, is also featured in "The Quick and the Dead," as is the story of the bombing of Hiroshima.

The momentous events which preceded President Truman's instruction to the Atomic Energy Commission to build a hydrogen bomb are also described in the documentary.

"The Quick and the Dead" concludes with a description of the peacetime uses of atomic energy for mankind's benefit.

"The Quick and the Dead" was written and directed by Fred Friendly and produced by NBC's News and Special Events Department under the supervision of William F. Brooks, vice president in charge of public relations.

## Television Goes Abroad

(Continued from page 15)

For this six-week sojourn, the technicians used two mobile TV units to cover such colorful spectacles as the dances of Sevilla and Aragon reviews of the Moorish Guards, and the Spanish ballet. In addition, a special demonstration was given in the palace of Generalissimo Francisco Franco.

Demonstrations conducted in Bermuda and London also have been included in the itinerary of these peripatetic crews, who have found that junketing from country to country with several tons of video equipment, and producing programs in strange locations, is not an easy task.

Describing the function of an image orthicon tube to bewildered and somewhat suspicious customs officials; installing transformers to compensate for undependable power supplies; outlining problems to local electricians, whose willingness to help is sorely handicapped by their inability to speak English; explaining to eager newsmen in a few "simple" sentences just how television works—these are some of the minor problems confronting these travelling crews. Although the men regularly encounter hard work and minor crises, the completion of a successful assignment brings a degree of satisfaction which more than compensates for the strenuous life they lead.

## Bolivar Statue Unveiled By Electronic Device

An electronic device, especially constructed for the occasion by RCA Communications, Inc., was used to unveil, by remote control, the refurbished statue of Simon Bolivar at ceremonies in New York's Central Park on April 19.

Following his scheduled address to be transmitted here over an RCA shortwave radio circuit, President German Suarez-Flamerich, of Venezuela, sent signals from his desk in Miraflores, the Presidential Palace, in Caracas. His push-button signals caused the electronic apparatus to light up and to unloosen the shroud covering the statue at its new location facing the Avenue of the Americas.



USING RCA MORILE-RADIOTELEPHONE UNITS, INSTALLED IN EIGHT TRUCKS OF CUBA'S LARGEST EXPRESS FIRM, DRIVERS CAN RECEIVE INSTANT INSTRUCTIONS FROM HEADQUARTERS.

ONE DISPATCHER CAN DIRECT MOVEMENTS OF ALL RADIO-EQUIPPED TRUCKS.



## Cuban Firm Adopts 2-Way Radio

EXPRESS trucks equipped with RCA mobile radio units are making their first appearance in Latin America. Installed in eight vehicles of Cuba's largest express trucking firm, *Trafico y Transporte, S.A.*, the RCA Fleetfone units proved successful in their initial tests.

Before the installations were made, valuable time was lost by drivers who had to stop frequently to telephone the main office for further instructions. With the RCA radiotelephone units, however, an expressman can, in a matter of seconds, give his location and receive his next assignment without moving from the driver's seat. This new method of operation has made it possible for *Trafico* to serve

many more customers in a quicker and more efficient manner.

*Humara y Lastra*, RCA distributors in Cuba, planned the mobile radio network that eventually may connect the firm's Havana office with *Trafico* trucks in every part of Cuba. The installation consists of a Fleetfone 250-watt fixed station transmitter, located in the Company's headquarters; a nondirectional VHF antenna, erected atop a 100-foot mast on the main office building, and Fleetfone units for the vehicles themselves.

The initial installations have proved so beneficial to the Company and its customers that plans are in progress to equip many more of the fleet of 125 trucks in a similar manner.

## NBC to Present History of Navy in TV Series

A television history of the U. S. Navy from the period immediately preceding World War II and leading up to the present — the first of its kind — is to be produced by the National Broadcasting Company, in cooperation with the Department of the Navy, beginning later this year.

The series, according to Sylvester L. Weaver, Jr., NBC vice president in charge of television, represents NBC's first major effort to establish a pioneering pattern for presenting history by television. In commenting on the project, Under Secretary of the Navy Dan A. Kimball said: "Navy and NBC technicians are preparing to screen literally hundreds of thousands of feet of official Navy film to pick out the very best for presentation to the American public. Much of this film, for security reasons, has never before been exhibited. NBC's television techniques plus the technical skill of the Navy Photographic Center should be able to combine to produce a memorable series."

In his announcement of the series, Weaver said: "This new project represents the first major attempt by television to tackle the problem of presenting contemporary history on a comprehensible, dramatic basis."

Based primarily on Captain Samuel Eliot Morison's "History of U. S. Naval Operations, World War II," commissioned by President Franklin D. Roosevelt, the series will utilize films made by the U. S. Navy in all its activities, including sea, air, Marines, submarine, amphibious sea and land operations and related operations with other services.

Weaver announced that the network would set up a special unit to coordinate and produce the new project and that Henry Salomon, Jr., (Lt. Comdr., USNR) who assisted Capt. Morison in the six-year preparation, production and writing of the "History," would be in over-all supervision of the content. Salomon, as Capt. Morison's first assistant, participated in many of the major naval operations as a historical observer.

# "Shoran" Used in Korea

*Highly Accurate Electronic Bombing Aid of World War II  
Now Pin-Pointing Enemy Objectives in Far East.*

SHORAN, the bomber pilot's distance-measuring "yardstick", which won distinction in the closing months of World War II as one of the most dramatic contributions of electronics to America's military strength, is being used in Korea, according to press dispatches from Fifth Air Force Headquarters.

Invented by Stuart W. Seeley, director of the Industry Service Laboratory of RCA Laboratories Division, and developed by scientists and engineers of the Radio Corporation of America as an outgrowth of the study of television "ghosts", shoran makes it unnecessary for airmen to see the target in order to make a pin-point strike. The system was used with devastating effect in "blind" bombing over European battlefields, where it was credited with uncanny accuracy in spotting targets at distances up to 250 miles, and under any condition of visibility, night or day.

Shoran, like radar, employs the

echo-timing principle in which distance is measured by the elapsed time between transmission of a radio-wave pulse and the receipt of its reflection. In the military application of shoran, the bomber transmits individual signals to two widely separated ground stations whose locations in friendly territory are known with great accuracy. When the signals reach the ground stations, the pulses are retransmitted to the plane where special receivers and apparatus automatically compute the distance of the plane from each ground station. This information, together with the known distance between ground stations, determines the plane's location with respect to the target.

## *A Secret for Eight Years*

Although RCA began work on the shoran project in 1938, it was not adapted to military use until late in World War II, when development for the Army Signal Corps was completed. Shoran remained a

closely guarded military secret until 1946. First proof of its effectiveness in the last war came when shoran-aimed bombs demolished a 30-foot enemy bridge in Northern Italy which several runs by visual bombers had failed to destroy. Thereafter, it was widely used and with phenomenal results. Toward the end of the war in Europe, the amount of tactical bombing done in any area depended largely on the availability of shoran equipment.

Shoran bombing was employed not only against military targets, but with devastating effect against enemy personnel. On many occasions, rolling barrages of fragmentation bombs were laid down only a few hundred feet ahead of advancing Allied troops. Such barrages, delivered by planes completely hidden from the ground, had a tremendously demoralizing effect on opposing ground forces. Shoran is also well-suited for air support of landing operations, since planes equipped with the device can lay a barrage of aerial bombs precisely along a definite line, enabling air crews to release bombs at correct points for maximum impact along such a line.

## *Accuracy Shown in Field Tests*

During World War II, field tests made of shoran-equipped planes during photographic reconnaissance flights showed that the probable error often was not more than 50 feet, independent of altitude distance, and without the necessity of establishing control points (known absolute positions) in the area to be photographed.

Shoran equipment, including ground stations, can be readily transported by air and set up in a few hours. Equipment in the plane requires only one operator, who may be an existing crew-member such as navigator or bombardier. Each ground station also can be operated by one man, and two ground stations can furnish shoran service to a number of equipped planes within range.

Other possible military uses of the system include shoran navigation of remotely controlled planes, and shoran position-indication for precise dropping of air-borne troops, weapons and supplies.



BRIG. GENERAL DAVID SARNOFF, CHAIRMAN OF THE BOARD, RADIO CORPORATION OF AMERICA, IS PRESENTED WITH A CITATION FOR DISTINGUISHED SERVICE TO THE AMERICAN RED CROSS BY E. ROLAND HARRIMAN, PRESIDENT OF THE RED CROSS, AS GENERAL GEORGE C. MARSHALL (CENTER), WHO RECEIVED A CERTIFICATE OF MERIT AT THE SAME PRESENTATION CEREMONIES, LOOKS ON. GENERAL SARNOFF HAS BEEN SERVING AS NATIONAL CHAIRMAN OF THE 1951 RED CROSS FUND CAMPAIGN.

## UHF Converter for TV

(Continued from page 13)

President and General Manager of the RCA Victor Division.

In the statement, Mr. Buck also assured owners of two million RCA Victor television sets that, while such service from UHF stations is not expected before late 1952 or early 1953, a simple, high-quality converter will be made available so that telecasts can be received on ultra-high-frequency channels with quality comparable to those received from the very-high-frequency bands now in use.

Pointing out that every current television set, regardless of make, will require some modification to receive a UHF signal, Mr. Buck added:

"Our experiments at Bridgeport and in the laboratory have conclusively proved to us that the best way of accomplishing UHF reception on existing receivers, when UHF arrives, is by means of a converter.

"No receiver currently manufactured has provision for conversion to UHF without additional cost for equipment and installation, normally including the addition of a special outdoor antenna."

Other points made by the RCA Victor executive were:

Final approval of the new UHF channels as yet has not been given by the FCC.

Assignments of the new channels to stations cannot be made until such final approval has been given by the FCC.

Aside from delays which may be caused by shortages of critical materials, the time cycle required for construction and installation of transmitting equipment, and erection of transmitting antennas, is such that large-scale telecasts of UHF will not commence before late 1952 or early 1953.

When UHF broadcasts commence, RCA Victor, and, it is assumed, other manufacturers, will have available an adequate supply of high-quality converters for present VHF receivers assuring full-band reception of all the UHF channels without sacrificing any of the present VHF channels.

## Dr. Zworykin Receives I.R.E. Medal of Honor

Dr. Vladimir K. Zworykin, Vice President and Technical Consultant of RCA Laboratories, Princeton, N. J., received the 1951 Medal of Honor, highest award of the Institute of Radio Engineers, at the organization's annual banquet at the Waldorf-Astoria Hotel, in New York City on March 21. He was cited "for his outstanding contributions to the concept and development of electronic apparatus basic to modern television, and his scientific achievements that led to

fundamental advances in the application of electronics to communications, to industry, and to national security."

In accepting the award, Dr. Zworykin urged his fellow radio scientists to make electronics serve mankind through medicine. "The range of problems in medicine to which electronic methods could be applied," he said, "is remarkably broad, embracing both diagnosis and therapy. Increased emphasis on this objective would enhance the service of our profession to mankind and broaden the base of the electronics industry."

## Tri-Color Tube Details Revealed

COMPLETE information on the procedure to follow in building the tri-color television picture tube developed by the Radio Corporation of America for the reception of all-electronic, compatible color television, has been made available by RCA to other television receiving tube manufacturers.

This tube, acclaimed a "miracle of science" and recognized as vital for the complete development of a practical, all-electronic color television receiver, was first demonstrated publicly on March 29, 1950. A week later it was shown officially to members of the Federal Communications Commission.

Details disclosing for the first time the full technical characteristics and construction of the tri-color tube were contained in a bulletin prepared and issued by the Industry Service Laboratory of the RCA Laboratories Division.

This bulletin was the fourth issued by RCA making known to other manufacturers its progress and methods in developing an all-electronic, compatible color television system. Previous bulletins contained circuit details of RCA color television sets, demonstrated for the press and television industry in December at Washington, D. C.

The latest bulletin illustrated and described steps that may be taken to build engineering models, similar to the RCA experimental three-gun color picture tube of direct-

view type used during the Washington demonstrations.

It pointed out that a single-gun tube (one having but one emission source of electrons) may be built on the specifications provided, with relatively few modifications, and that many of the techniques used in making present black-and-white picture tubes also may be employed.

One of the steps described in today's bulletin lifted the veil on an achievement which has caused wide speculation in the industry. This was how RCA engineers succeeded in placing 600,000 phosphor dots of the primary colors, green, red and blue, in the screen assembly.

These diminutive dots are arranged in groups of three and so positioned that the electrons from each of the three electron guns in the base of the tube always strike the dots of its own color. The phosphor dot groups are so small and so close together that when illuminated by the electron streams they present a continuous, smooth, full-color picture.

Manufacture of the tri-color tube, the bulletin pointed out, is divided into two parts: (1) fabrication of a screen assembly which includes an aperture mask and a phosphor-dot plate, and (2) the building of this assembly together with electron guns into a metal envelope to form the finished tube.

The tri-color tube may be built in sizes comparable to those of present black-and-white television receiving tubes.

# Planning Industrial Mobilization

(Continued from page 8)

Profit and Loss statements. Furthermore, good planning obviates heavy post-war conversion costs which might involve so much economic disruption impairment of our national strength that any war we might win would entail a realistic losing of the peace. Incidentally, industry cannot recover the post-war reconversion costs from the Government.

We must also recognize, as part of our industrial mobilization planning, the problems of small business and conservation.

**Small Business:** Small business is an integral part of our economic life. It is the responsibility of big business to recognize this and take the lead in seeing that small business is provided its full share of Government orders. One means of accomplishing this is by subcontracting, thereby making available to small business the engineering know-how it may not have and cannot normally afford. Using the Government definition of small business as those firms which employ fewer than 500 persons, the RCA Victor Division has found that of the 4800 suppliers in 41 States with whom it did business in 1949, a total of 3771, or 79% are small business concerns. These suppliers received approximately 45% of our total dollar purchases. As examples of the importance of small business in supplying RCA Victor with some of its major commodities, it should be noted that 90% of our lumber and log purchases are from small companies, as well as 40% of our wire purchases. Over \$6,000,000 is spent annually with small business for cabinets.

These statistics cover our overall purchases — both commercial and Government. To determine the participation of small business in our Government orders, we analyzed one contract, and found that of the 119 subcontractors, 73% were small business, and that they received 45% of the total volume of purchases. The fact that the percentages in this sampling were consistent with our overall figures may indicate that we are running

at about the same rate in our purchases against Government contracts as we are in our overall purchases.

**Conservation:** It's perfectly obvious that any saving of critical materials redounds not only to the benefit of the company making the saving, but also to that of industry and of the nation. RCA is making a noteworthy contribution to this cause, both by substitution of other materials for those in critical supply, and through the campaign currently underway to eliminate waste throughout our plants. There are doubtless many more pioneers in this field. Conservation is truly "everybody's business."

Overall industrial mobilization planning presents many vital problems, and their satisfactory solution will take all the ingenuity we can jointly bring to bear on them. It is an all-hands job — both for those in Government and those in industry. Each of us should analyze and evaluate the factors involved, determine their application

to our individual activities, and adjust our plans and operations to the common cause.

If each of us promptly and realistically plans to do what he believes will best serve his company's interests, in 90 per cent of the cases, the nation's interests will also best be served. This means equitable participation, with no over-extending of individual companies, either financially or otherwise. Fineness of balance—support to the mobilization effort with simultaneous strengthening of our economy, and hence, our national strength—is an objective for which each of us must strive. It must be remembered that unless industries are operated for profit and kept in a healthy economic condition, there will be no one to pay the bill for the defense program. We cannot retain military strength without maintenance of economic strength. Only through the proper balancing of the two can we attain our real goal, which is the national strength to withstand any attack, be it military, political, or economic.

DR. E. W. ENGSTROM, (LEFT) VICE PRESIDENT IN CHARGE OF RESEARCH, RCA LABORATORIES, AND SIDNEY SPARKS, VICE PRESIDENT IN CHARGE OF COMMERCIAL ACTIVITIES, RCA COMMUNICATIONS, INC., RECEIVING CERTIFICATES OF COOPERATION FOR THEIR RESPECTIVE SUBSIDIARIES FROM MAYOR MACKAY STURGES OF PRINCETON, N. J., REPRESENTING THE U.S. ECONOMIC COOPERATION ADMINISTRATION. THE CERTIFICATES WERE IN ACKNOWLEDGEMENT OF TECHNICAL ASSISTANCE FURNISHED "TO THE PEOPLES OF THE MARSHALL PLAN COUNTRIES TO AID THEM IN MAINTAINING INDIVIDUAL LIBERTY, FREE INSTITUTIONS AND PEACE."





# Scientific Research as a Factor in American Business

## Adult Educational Series Planned for Radio Network

(Continued from page 24)

tion of the Navy, that the Radio Corporation of America was formed, not only to provide America with an independent international system of communications but to make radio inventions available to industry. The founders of RCA created with it the first comprehensive availability of patents.

"During the next seven years, most of the uncertainty and confusion over patent rights were eliminated, and in 1927 a patent licensing policy was inaugurated whereby the principal inventions of radio became readily available to other manufacturers."

Mr. Anderson said that through RCA's policy it is possible and practicable for any manufacturer to obtain quickly, conveniently and economically most of the patent rights necessary for the production of virtually all kinds of radio and electronic equipment, and to do so on a fully competitive basis at an extremely nominal royalty rate.

### Valuable Rights of Licensee

He explained that under an RCA patent license a manufacturer obtains for a single rate these four distinct and highly valuable rights:

1. Rights to all patents owned by RCA at the time of the agreement.
2. Rights to all inventions made by RCA itself during the entire term of the agreement.
3. Rights to patents not owned by RCA, but under which it has a non-exclusive license and a non-exclusive right to grant licenses to others.
4. Rights to all inventions for which, during the entire term of the agreement, RCA may obtain a non-exclusive license that includes non-exclusive sub-licensing rights.

Mr. Anderson declared that it has been deemed necessary for the radio industry to have a liberal patent licensing policy which, as far as he knew, might not be adaptable to other industries.

"With this in mind," he asserted,

"I would like to point out that licenses issued by RCA do not restrict or limit competition. They contain no price fixing provisions, nor do they limit the licensee's production, sales or territory.

"There is no minimum royalty fee. Moreover, no licensee is required, as a condition of obtaining a license, to grant a license under his own patents to RCA or to anyone else; nor is a licensee required to release any alleged claim or right against RCA or anyone else.

"Our patent licenses stimulate competition. They render impossible monopoly and restraint of any branch of the radio business by RCA or others. They make it impossible for RCA or any of its licensees 'to put on the shelf' any radio invention and thus keep it from the public.

"If one manufacturer should fail to use a valuable invention, others almost certainly would use it in order to obtain an advantage over the non-user. That these licenses are in the interest of the public, and that the public receives great benefit from them is beyond reasonable doubt."

Mr. Anderson declared that the broad objectives of RCA's practical and basic research have created a business which is not only a business in itself but which supports many others. He concluded:

"That business is research—research and invention, made available to any responsible company in America. RCA has made a business of research and of making available the product of that research.

"As many of you know, we have publicly declared in the *Patent Gazette* of the Department of Commerce that all our patents on file are available on uniform and standard terms. It provides additional evidence of RCA's sincerity and willingness to make its discoveries available to industry and to the public. It also is good business and an important factor in keeping America in the forefront of progress."

Television's first major network experiment designed for adult education was announced on March 6 by the Alfred P. Sloan Foundation, Inc., and the National Broadcasting Company. At that time, it was revealed that Teleprograms, Inc., a non-profit corporation, had been set up for the purpose of bringing the adult education series to the American public.

In announcing the formation of Teleprograms, Dr. Arnold J. Zurecher, executive director of the Sloan Foundation, and Frederick W. Wile, Jr., vice president in charge of Television Production for NBC, stated that William Hodapp, formerly script editor and producer of WAVE, Louisville, Ky., would act as executive director of Teleprograms, and producer of the new series, 26 programs of which will be presented during 1951.

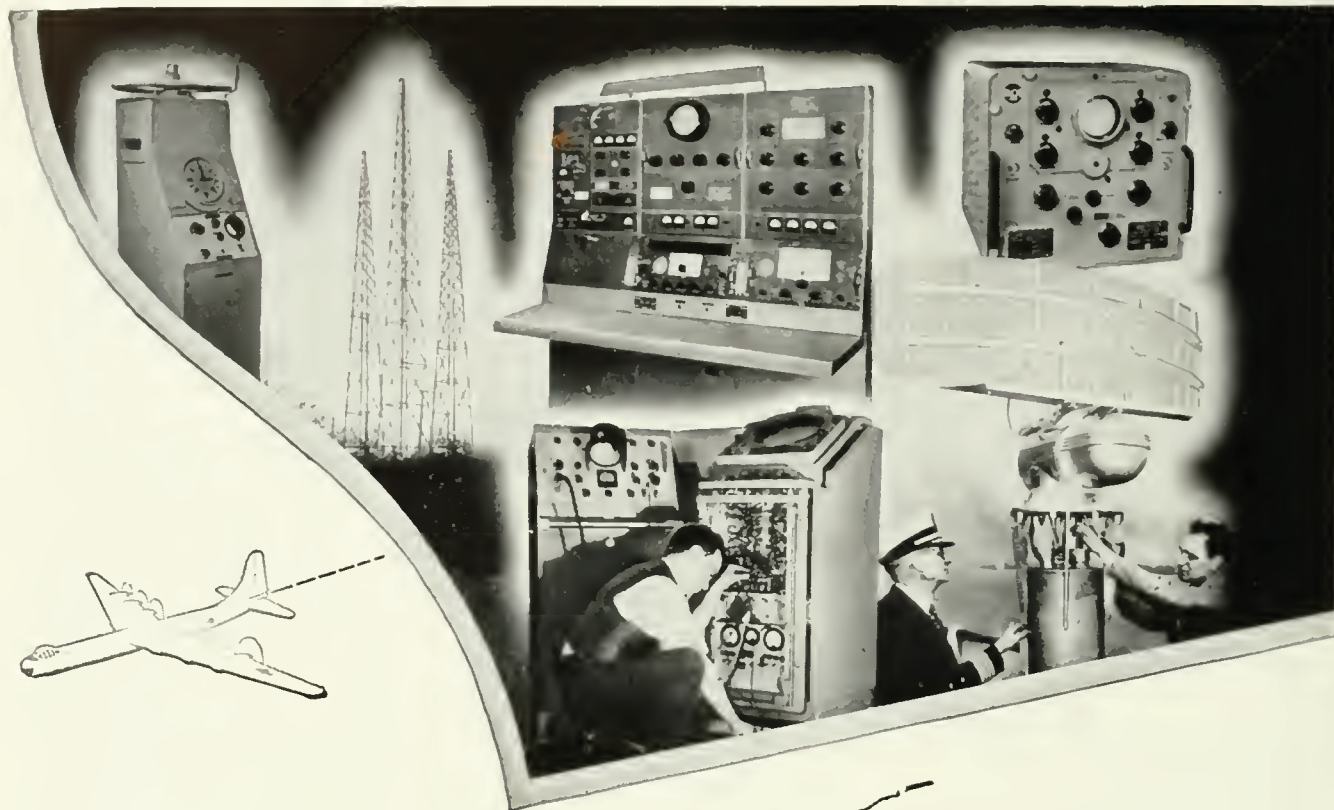
Serving on the board of directors of Teleprograms, Inc., are, in addition to Wile and Dr. Zurecher, who will be president, Theodore S. Replier, president of the Advertising Council of Washington, D.C., and William J. Driscoll, assistant vice president of the Chemical Bank and Trust Company of New York. This group will serve as advisors in the production and presentation of the series.

Concentrating primarily in the field of economics, the Sloan Foundation-NBC project will be devoted also to public issues involving both social sciences and natural sciences. Davidson Taylor, general production executive of NBC television, will supervise the entire project for the network.

### New Radio Circuit Opened

A direct radiotelegraph circuit was opened on April 18 between New York and Maracaibo, Venezuela's second largest city. H. C. Ingles, President of RCA Communications, Inc., has announced. This new circuit will supplement the existing New York-to-Caracas channel.

The channels are operated jointly by RCA and the Venezuelan Ministry of Communications.



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