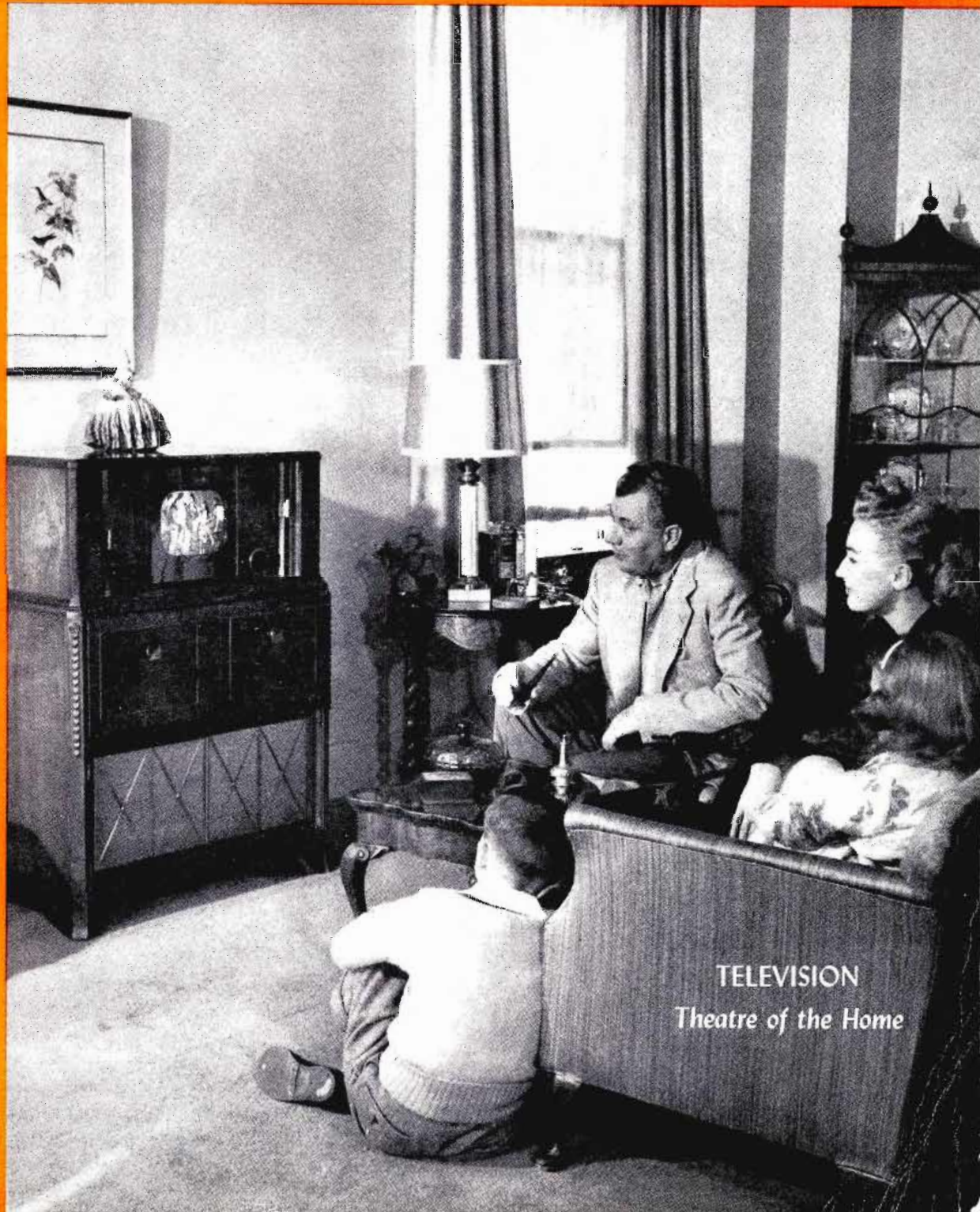


RADIO AGE

RESEARCH · MANUFACTURING · COMMUNICATIONS · BROADCASTING



JANUARY

1948

TELEVISION
Theatre of the Home



At RCA Exhibition Hall, radio, television, and electronics are on parade in thrilling exhibits.

"World's Fair" of radio-electronic wonders...RCA Exhibition Hall

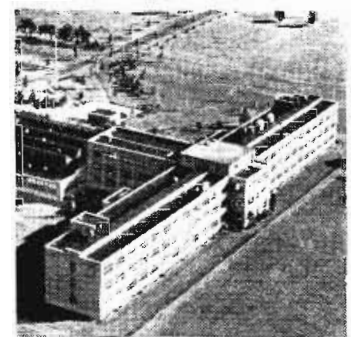
100,000 visitors every month—that's how people have responded to the new and fascinating RCA Exhibition Hall in Radio City, New York.

Like a "World's Fair," this is a place where you can watch, and even operate, many recent developments of RCA Laboratories. Television, radio, loran, the electron microscope, and other scientific achievements . . . you'll find them "on show," and thrilling to see.

For instance: step on a platform and televise yourself, see yourself in action on a television screen. Watch radio

waves heat steel red-hot in a jiffy. Hear new RCA-Victor recordings. Take home a souvenir message from globe-encircling RCA Communications—see Radiomarine's radar and how the NBC Network operates to bring its "Parade of Stars" to your home.

Conveniently located in the heart of Radio City—at 40 West 49th Street—RCA Exhibition Hall is open 11 a. m. to 9 p. m. daily. Everyone is welcome, there is no admission charge. *Radio Corporation of America, RCA Building, Radio City, New York 20, N. Y.*



RCA Laboratories, Princeton, N. J., a great research center, and "birthplace" of many of the radio-electronic achievements shown at RCA Exhibition Hall. Research conducted here is reflected in the fine quality in any product bearing the names RCA, or RCA Victor.



RADIO CORPORATION of AMERICA

RADIO AGE

RESEARCH • MANUFACTURING • COMMUNICATIONS • BROADCASTING • TELEVISION



COVER

As television receivers roll off production lines in increasing numbers, more and more family groups are added to those who already rely upon television programs as an important source of home entertainment.



Services of RCA are:

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

VOLUME 7 NUMBER 2

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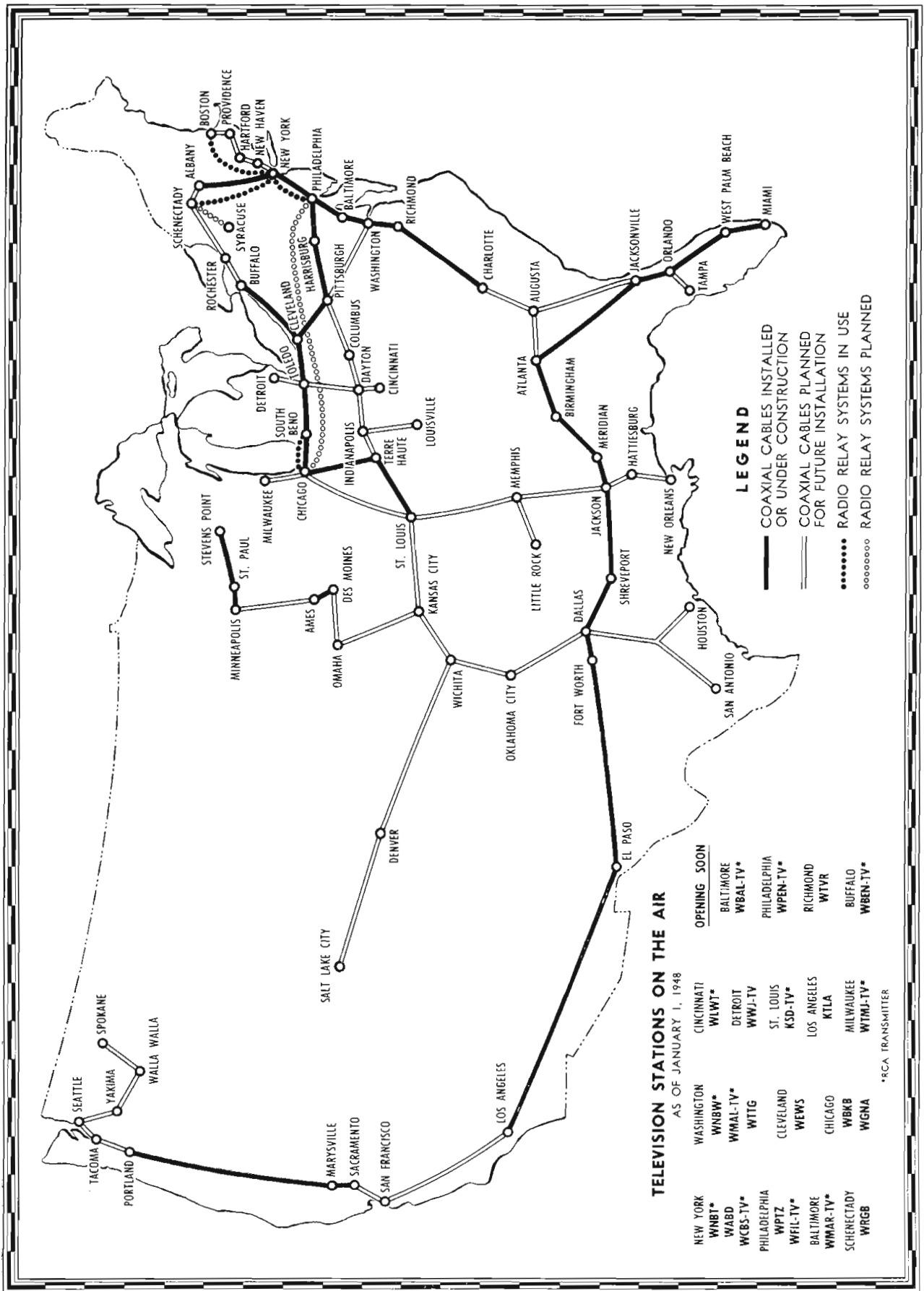
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RADIO CORPORATION OF AMERICA
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PRESENT AND PROPOSED TELEVISION NETWORKS OF RADIO RELAYS AND COAXIAL CABLES.

Radio Review... and a 1948 Preview

Television: A Fast Growing New Industry In The United States — Its Increasing Influence Becomes a Major Economic And Social Force.

by DAVID SARNOFF

*President and Chairman of the Board
Radio Corporation of America*

TELEVISION, a fast growing new industry in the United States, is the spearhead of radio progress. So strong will be television's impact as a major economic and social force in 1948, that I believe it will make this new year one of the greatest in the history of radio, as a science, an art and an industry.

Scientifically, television reached a stage of development in 1947 where it provides highly satisfactory results. Favored by the American competitive system of private initiative and free enterprise, television in the United States leads the world in every phase of its development.

Industrially, television in 1947 established a firm base for accelerated manufacturing activities, and in the coming year production should expand substantially.

Economically, television—in addition to its importance in manufacturing and employment—is introducing new methods of merchandising and marketing. It is an advertising medium with an unparalleled appeal to a daily increasing audience.

Culturally, television is creating new art forms for the presentation

of entertainment, education and news. Its possibilities in these fields are unlimited.

Progressive radio men—scientists, industrialists and broadcasters alike—now think in terms of both sound-and-sight; they plan in sound-and-sight. Television charts their future—it will be the dominant factor in the Radio of Tomorrow.

Political Conventions to be Telecast

The Republican and Democratic National Conventions and the presidential campaign in 1948 will be outstanding events on the air—in both sound and sight. The largest number of broadcasting stations ever assembled to cover national conventions will be linked with the microphones in Philadelphia where ace news commentators will be on duty to describe the proceedings for listeners around the world.

Television was one of the main reasons why Philadelphia, with three video stations capable of being linked by coaxial cable and radio relays with other cities for network operation, was chosen as the site of these political conclaves. Millions of people along the Atlantic Seaboard from the Potomac to the Adirondacks and New England, will be within viewing range. Television, as a new means of vote-getting, will go into action on a



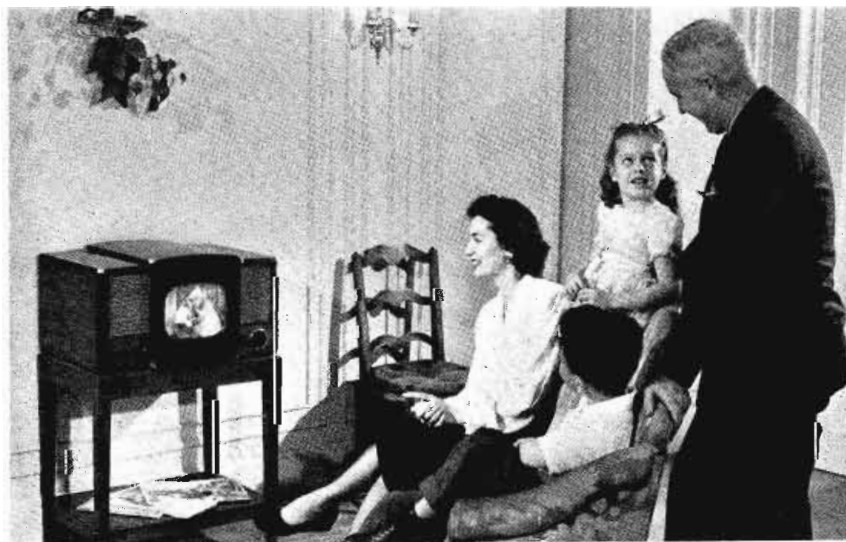
DAVID SARNOFF

broad front. Before the polls close on the 1948 presidential election, television will reach substantial areas in at least twenty-one States having more than two-thirds of the national total of electoral votes.

Television is likely to do more to revolutionize politics than sound broadcasting did. Political candidates may have to adopt new techniques to benefit from visual radio; their dress, their smiles and gestures, all will be important. How they look, as well as what they say, may determine, to an appreciable extent, their popularity. The eyes of the public will be upon them.

Measuring Television's Growth

Factors creating the promising outlook for television in 1948 include: an increasing number of



TELEVISION PROGRAMS HAVE A UNIVERSAL APPEAL TO ALL MEMBERS OF THE FAMILY, WHATEVER THEIR AGES.

[RADIO AGE 3]

TELEVISION IS HERALDED AS THE "MEDICAL LECTURE HALL OF THE FUTURE", IN WHICH OPERATIONS CAN BE WATCHED AS SURGEONS EXPLAIN TECHNIQUES.

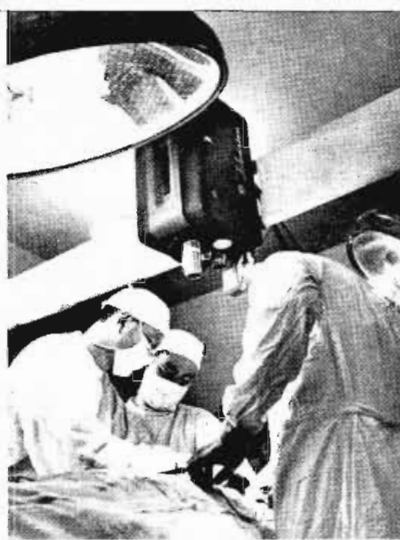
television stations throughout the country; a vastly enlarged audience; the establishment of cable and radio relay facilities linking stations into inter-city networks; the general improvement of programs; increased advertising support; and vigorous competition, as the new industry takes form on a nation-wide scale.

There are now 18 stations on the air with regular television programs. In 1948, it is estimated that there will be approximately 50 television stations in operation; there may be more.

A television network now links Washington, Baltimore, Philadelphia, New York and Schenectady. In November, a radio relay link was opened between Boston and New York, so that programs can be picked up along that route. Congress and the White House, through this television network, can on special occasions be viewed by hundreds of thousands of people throughout the East. Congress was televised for the first time on January 7, 1947, when President Truman addressed a joint session. He again was seen over a seven-station network in the first telecast from the White House on October 5. The World Series of 1947 was another "first" telecast. Such events together with football, basketball, hockey, parades, dramas of the Theatre Guild, and other programs of national interest, emphasize the value of a television receiver in the home.

Between 150,000 and 175,000 television receivers are in use. By the end of 1948, a total of approximately 750,000 is foreseen, and it may reach 1,000,000. By that time, it is estimated that the New York area will have 400,000 sets; figuring six viewers to each receiver, the New York audience will be about 2,400,000.

Based upon the progress to date, within a year television measured in consumer prices will approach the status of a \$500,000,000-a-year industry, and it will grow in size with the years. For the first two



years of commercial television — 1947 and 1948 — it is estimated that the American public will spend approximately four times as much for television receivers as it did for broadcast receivers during the first two years of sound broadcasting — 1921 and 1922.

Television is built upon the deep and firm foundations of sound broadcasting, which gradually will be fused with sight. It will be supported by advertising. Already those who have a television set in the home are responding to its tremendous appeal and to the service which it offers in entertainment, news and education. In ever-increasing numbers, people sitting comfortably at home are becoming eye-witnesses to news as it happens, to history as it is made. For example, the first royal wedding ever to be broadcast also was televised when Princess Elizabeth and Lieutenant Philip Mountbatten, Duke of Edinburgh, were wed on November 20. Throughout the London area, the event was telecast, and the films, flown across the Atlantic, were televised the next day in New York.

New Uses of Television

Opportunities for television extend into many fields aside from the home. It has tremendous educational possibilities in the school as well as for home extension courses. It brings the radio teacher into view, permits the use of demonstrations and illustrations, and gives the blackboard a new dimension.

Theater television too has great potentialities because it adds timeliness and heightens dramatic appeal. Several demonstrations of its

effectiveness were made during 1947. Warner Bros. Pictures Inc., and Twentieth Century-Fox Film Corporation are cooperating with RCA Victor in a program of research to study the development and uses of large-screen television for the motion picture industry.

Industrial television is a field in which electronic "eyes" can aid in processes and production. Whenever sight is needed, or wherever the eye plays a part in industrial operations, entertainment, news, merchandising or advertising, television is ready to serve. Department store television will facilitate shopping tours as housewives look in and then phone their orders; the air will become a convenient show-window for an unprecedented number of buyers shopping in comfort, regardless of weather or time of day.

Twenty-seven Years of Progress

As television was being enthusiastically welcomed into the family circle, radio sound broadcasting celebrated its 27th year in 1947. More than 36,000,000 American homes are equipped with at least one radio receiver, and many of them have three or four. Five million automobiles carry radios and millions of portable sets are in use. Conservative estimates place the total of receiving sets in the United States at more than 65,000,000.

New broadcasting stations placed

PEOPLE AT HOME ARE BECOMING EYE-WITNESSES TO NEWS AS IT HAPPENS, TO POLITICS AS PRACTICED, TO SPORTS AS PLAYED, AND TO HISTORY AS IT IS MADE.



in service since V-J Day bring the total to well over 1,700, or almost twice the number in operation before the war. Construction permits and pending applications would raise the total above 2,000.

FM (frequency modulation) continues to demonstrate its value to the public and to the radio industry. Operating in the higher frequencies of the radio spectrum, FM is noted for its excellent tonal quality and offers comparative freedom from static and other interference.

More than 300 FM transmitters have gone on the air since World War II, and 700 construction permits have been issued or await action by the Federal Communications Commission. Further, FM has been adopted as the standard method of transmission and reception of the sound in television.

Industry-wide progress in FM broadcasting, however, has been slowed perceptibly by restrictions which forbid musical programs now broadcast by standard stations and networks to be transmitted simultaneously over FM stations. It is hoped that these restrictions may soon be removed. FM will then move ahead more rapidly.

New Records in Production

It is estimated that in 1947, more than 16,000,000 radio receivers and 185,000,000 electron tubes were manufactured by the radio industry as a whole, while the allied phono-

RCA EXHIBITION HALL, 36 WEST 49TH STREET IN RADIO CITY, NEW YORK, IS A MODERN "WORLD'S FAIR" OF RADIO.



TELEVISED DRAMAS, PLAYED BY STARS OF THE BROADWAY STAGE, BRING THE THEATRE DIRECT TO THE HOME.

graph industry turned out millions of disks.

These statistics, revealing new records in production, illustrate the tremendous industrial and commercial activities which thrive upon sound alone, providing employment to hundreds of thousands of persons and information as well as entertainment to all America. Now, with sight added to sound, the potentialities of radio service to the public are greatly multiplied.

International radio-telegraphy also has continued its advance. During 1947, many wartime developments were harnessed to commercial service with the result that world-wide radio is now rapidly becoming mechanized to handle traffic at increased speeds. Space pulses with radiograms and voices every hour of the day and night. So effectively does radio span the hemispheres that recently chess champions in New York played with experts in the Argentine, and at no time did it take longer than 21 seconds for the moves of each player to be known across the 5,400 miles. Again mindful of sound-and-sight, those present who watched the games looked ahead to the day when such contests would be played by television, the teams seeing each other and watching every move as clearly as if facing each other across the chessboard, rather than across the equatorial belt.

Another important advance is that of radar, which is proving highly effective in peace as a new aid to navigation. Shipboard radar apparatus is now being built on a production line basis. Radar is in

service on vessels in the Atlantic, the Pacific and the Great Lakes, as well as on America's inland waterways.

Progress likewise has been made in perfecting the RCA air navigation and traffic control system known as teloran. Employing radar and television techniques, the complete teloran system will be demonstrated in operational flight tests conducted by the U. S. Army Air Forces at Washington, D. C., in the near future.

Meeting the Challenge of Speed

Ultrafax, a combination of television, radio relay and photography, represents another revolutionary advance in communications. Developed in RCA Laboratories, ultrafax can handle documents, letters, printed pages and messages at the rate of a million words a minute. It can transmit photographs, maps, and other illustrations at the rate of 30 pages a second. Speed, speed and more speed, is the challenge to electronics!

Through radio and the continued development of electron tubes to perform a myriad of tasks in communications and industry, scientists and engineers are successfully meeting each challenge that leads to new advances.

In radio, pioneering never ends; it continually calls for initiative, faith and exploration in unknown fields. The scientists and research men of the industry who throughout 1947 blazed new trails, true to the traditions of radio, are to be congratulated upon their achievements. Especially to be commended are workers on the production line through whose craftsmanship the finest radio and television apparatus in the world is made available to the American people. Further, through the efforts of manufacturers, engineers and broadcasters it is possible for the radio voice of America to travel afar and bespeak freedom, friendship and peace.

TREND IS TO "MINIATURES"

In Seven Years, Small Tube Performance Has Won Over Larger Counterparts in Television, FM and Other High-Frequency Services



By L. W. Teegarden

Vice President in Charge of Tube Department, RCA Victor Division

A "MINIATURE" revolution has taken place in the tube industry. Beginning in 1939 when the RCA Tube Department developed four "jeep-size" electron tubes for use in a novel "personal" radio, miniature tubes—in size no bigger than a child's thumb—have taken their place beside conventional receiving tubes in many categories of use, have opened up new possibilities in the design of electronic equipment, and are bringing exceptional efficiency to television, FM, and other high-frequency services.

Today, a large portion of the RCA Tube Department's production facilities is assigned to miniatures. In the Tube Department's Design Laboratories about 90 per cent of all new receiving-tube development is on miniatures—the result of in-

sistent demand from designers and manufacturers of electronic equipment.

Fifty-seven miniature tube types, almost all of them RCA developments, are now offered commercially by the Tube Department.

Representing the strongest trend in the tube industry today, miniatures are confidently predicted to be the dominant receiving-tube class of the future.

Miniature tubes are small, rugged, dependable, and have excellent performance characteristics and life. They are manufactured at costs comparable with older types, and promise even lower manufacturing costs. In addition, the miniature structure having short, direct leads and, consequently, low electrical losses is capable of providing efficient performance at the ultra-high frequencies.

Waste Space in Tubes Eliminated

Miniature tubes owe their small size to a vigorous departure from traditional tube design. First, the size of the glass bulb was greatly reduced to eliminate all waste space inside the bulb. Second, the large phenolic base of conventional tubes was replaced in the miniature by a radically designed, new, glass-button stem with the wire leads from the electrodes inside the bulb extended through the glass-button to form the base pins. Produced by positioning the wire leads in a circle

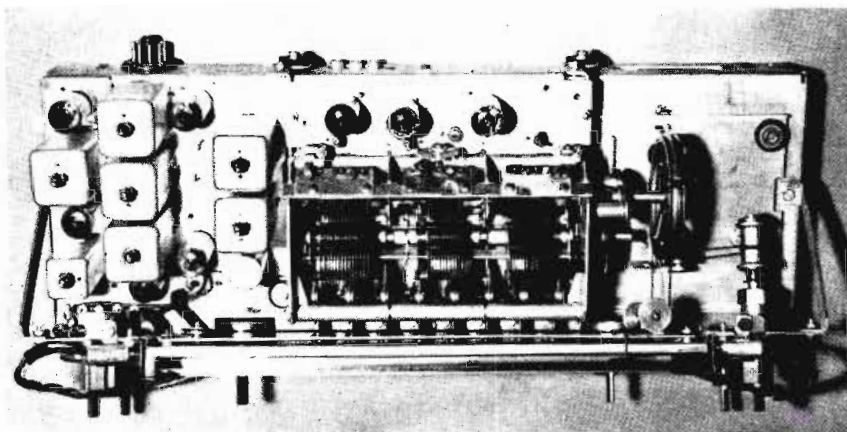


MINIATURE TUBES MADE POSSIBLE THE COMPACT "PERSONAL" RADIO.

and melting glass rings down around them, the glass-button stem efficiently insulates the leads and forms a perfect seal for the tube.

Though originally designed for use in small "personal" radios, miniatures arrived just in time for the greatest war of movement in history. Fifty million of the new small tubes saw service on land, sea, and in the air with every branch of the Armed Forces. The "handie-talkie", and "walkie-talkie"—tiny and efficient receiver-transmitters using miniatures—brought a new mobility to the infantry and paratroops. Miniatures were used in tank transmitters and receivers, in radio-equipped cars and trucks, in gun-directing mechanisms, aviation communication equipment, airborne and ship-borne radar, and guided missiles. Other equipments designed around miniature tubes included beacons which were dropped from aircraft to signal the way to targets and rendezvous points, and mines controlled and activated by electronic equipment in warheads.

Subjected to the most gruelling tests and trials imaginable, the new tubes came through with an amazing record. Their remarkable performance is indicated by the experi-



ALL TUBES USED IN POPULAR CRESTWOOD COMBINATION RCA VICTROLA PHONOGRAPH, FM AND AM MODELS ARE MINIATURES.

ence of one landing operation when a large number of walkie-talkie equipments saw continuous service for 45 days of combat. Tube failures were less than one tube per 100 sockets for the 45-day period.

With the ending of hostilities, a rosy peacetime future dawned for the miniature tube. A tremendous backlog of demand for new designs in home receivers had been built up, and a mass market eagerly awaited the new FM and television receivers.

In the Design Laboratories of the RCA Tube Department work began,

ventional glass and metal tubes.

In the design of the new radio-phonograph combinations, many featuring FM, and in television receivers, the happy combination of small size and excellent high-frequency performance of miniature tube types has been of major importance. Greater flexibility in the design of AM-FM radio-phonograph combinations, is possible because of the smaller and more compact radio chassis design made possible by miniatures. Because of the extreme versatility of the new small tubes—which are the equal of con-

possible today's compact, table-model video set. One very popular television receiver, for example, uses 15 miniature tubes out of a total of 30.

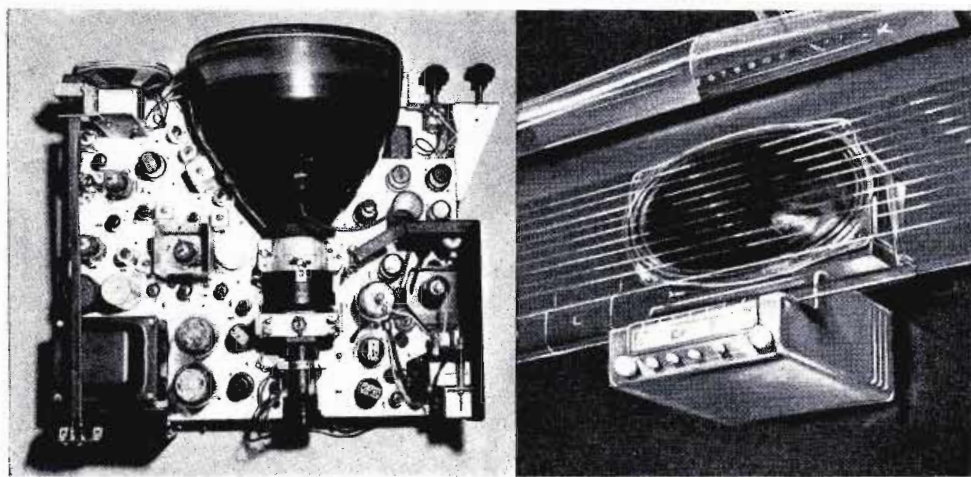
Miniatures are especially appropriate for use in automobile radios because the small size of the tubes permits more compact and efficient design. For the same reason, and also because of their superior high-frequency performance, miniatures are used in mobile police communications equipment, and in electronic telephone equipment in taxicabs and other vehicles.

Widely Used in Aircraft Service

In aircraft service, miniatures are used in compact and lightweight receivers and transmitters, in navigation aids, altimeters, radar, and control devices.

Miniatures have been finding increasing use in industry. The small size and efficiency of miniature thyratrons, voltage regulators, as well as standard broadcast types of miniature tubes, work to advantage in important industrial applications.

Developed originally in 1939 by the RCA Tube Department to meet the need for small tubes which could be used in a compact, personal radio receiver small enough to be slipped into an overcoat pocket, miniature tubes have gone on to demonstrate a remarkable adaptability to general receiving-tube use. Revolutionary in their effect, miniatures promise higher performance and lower costs for tomorrow's electronic marvels.



HALF OF THE 30 TUBES IN RCA TABLE MODEL TELEVISION RECEIVER ARE MINIATURES, RESULTING IN INCREASED EFFICIENCY OF OPERATION ON VERY HIGH FREQUENCIES, AND SAVING OF SPACE.

USE OF SMALL TUBES HAS GREATLY REDUCED THE DIMENSIONS OF AUTOMOBILE RADIOS AND IMPROVED THEIR PERFORMANCE IN BOTH PRIVATE CARS AND COMMERCIAL VEHICLES.

and has since continued, on the development of suitable commercial counterparts of miniatures built for specific wartime equipment. In the two years since the ending of the war, acceptance of miniature tubes has exceeded all expectations as the combination of small size and excellent high-frequency characteristics dovetailed neatly with the requirements of electronics designers and manufacturers.

To the design of compact, portables and table-model radios, miniatures brought a new flexibility and efficiency. The possibilities for this type of receiver are illustrated by the RCA "personal" radio where the use of miniatures requires only one-fifth of the space necessary for the equivalent complement of con-

ventional tubes at standard broadcast frequencies and superior in high-frequency operation—many home combination units use the same miniatures for both the AM and FM bands, permitting savings in receiver costs.

In the design of television receivers to operate in the new higher-frequency channels, miniature tubes are particularly suitable for uses such as radio-frequency amplifiers, converters, and oscillators. In addition, because of the large number of tubes required in a television receiver, the use of miniatures makes

CEMENTING CERAMICS INSULATION IN MINIATURE TUBE MANUFACTURE CALLS FOR STEADY HANDS AND KEEN EYESIGHT.



[RADIO AGE 7]

STYLING SELLS SETS

Successful Stylist Is Not the Impractical Dreamer But the Man Whose Ideas Appeal to Critical Eyes of Customers.



By H. M. Rundle,
*Industrial Designer,
RCA Victor Division.*

THERE are many fantastic notions concerning the allegedly dreamy-eyed, fantasy-minded industrial designers whose responsibility it is to put the eye-appeal into merchandise. Actually, styling is hard work and a tough business—and it's just as much business as it is art, for its only justification is to provide the icing that sells the cake. The truly successful stylist is not the one who creates the most furore with his streamlined designs, but the one who, in cold dollars and cents, has increased his company's sales and profits by his work.

The Chinese have a proverb: "One Picture is Worth a Thousand Words!" That in a nutshell is the theme and success of industrial designing, for it is the visual attrac-

tion of merchandise that establishes the sales beach-head. The millions upon millions of words poured forth yearly by salesmen and advertising and promotion copy cannot compare with the eloquent sales talk of one well styled radio. It speaks for itself in a language the customer understands. Unless our RCA Victor radios present an eye-luring picture, our customers will never get close enough to the instruments to appreciate their technical and engineering excellence.

Merchandising is Important

Not too many years back, designing was a backrunner in industry, the product's afterthought. Today, however, there is an awakening in industry to the realization that the appearance of merchandising is no less important than the engineering. At one time, in the radio industry, the chassis was completed before any thought was given to the model's styling. And with the chassis components in the same relative positions they had been in for more than twenty years, the stylist had his sketching hand tied behind his back. He had little or no chance of styling anything fresh and different. Today, however, we try to begin with the model's styling and appearance, and there is smooth teamwork between styling and engineering to determine how the com-

ponent parts can be merged into better looking and more functional radios.

Sales Appeal of Good Design

Another factor in earlier days was that there was no full realization of the real merchandising power of good design. Today, styling and product appearance write their own ticket, for they are a vital part of merchandising, and we know today that the public appreciates, wants, and will pay for styling. Mr. and Mrs. Consumer pay for it everyday in the clothes they wear, the cars they buy, their furniture, radios and other commodities.

A typical example of this is the RCA Victor Globe Trotter portable. Our experiments with anodized aluminum convinced us that we had a strikingly novel medium for a radio set. Its cost was comparable to competitive cloth-covered wood-case merchandise. This RCA aluminum portable was definitely ahead of the market, and we felt that its dress-up justified an appreciably higher price. The Globe Trotter went on the market with our conviction that the buying public would appreciate and pay for its sound, functional good looks. It was a winner from the start, and in actual dollars has brought into the company's treasury more than three times as much as our best pre-war portable.

With radio manufacturers numbering in the hundreds, it is easy to see the important part styling plays in attracting the consumer to any particular manufacturer's mod-

THESE SIX ILLUSTRATIONS REPRESENT SUCCESSIVE STEPS IN STYLING THE POPULAR RCA "GLOBE TROTTER" PORTABLE RADIO. LEFT TO RIGHT: 1) ORIGINAL SKETCH SHOWING ENCLOSED DIAL AND "NO DOOR" IDEA; 2) FIRST COMPLETE MODEL MADE OF WOOD AND COVERED WITH CONVENTIONAL FABRIC; 3) WOOD HAS BEEN



[8 RADIO AGE]

els. Frankly speaking, the average layman does not immediately select his radio instrument on an engineering or technical basis. He is not equipped to do so.

In every major industry, including radio, there is a handful of top manufacturers, each proclaiming in its advertising and promotion, its particular instruments to be the finest in point of engineering. Certainly one has the edge over the others, but RCA Victor's Golden Throat, the Silent Sapphire, Eye Witness Television, and the other engineering miracles, though real and important features, are invisibles that must be demonstrated to establish their superiority. For this reason, the cabinet styling must be the invitation to the customer to test the engineering advantages in order to start the sales ball rolling.

Styling Provides Eye Appeal

That, then, is the object of industrial designing—to find the right ingredients to give a model a striking eye appeal. Artistic taste is a heredity-and-environment intangible. Each of us is influenced by background, upbringing, experiences, and surroundings, and no two tastes are exactly alike. The ingredients for successful styling come with experience and a never-lessening awareness of the constantly changing taste and design patterns.

To give you a picture of the stylist's problems and functions, let us trace step by step the birth of a new instrument to be added to the RCA Victor line. Management and

Sales have decided, let us assume, to include a new table model radio in the line, and that information, together with general data as to engineering specifications, price range and so on, are forwarded to the styling department.

Design Must Be New

Starting from scratch, the stylist must come up with something fresh and different. It is not enough to make revisions on already accepted models. Furthermore, it is a complete waste of time to dream up creations so outstandingly different that they attract crowds of startled and perhaps admiring observers but few customers.

Personally, I believe that styling, after furnishing all the vital attributes of good taste, freshness and attractiveness, must also furnish a surprise element. I am convinced that more merchandise is sold on the customer's expressed or mental "Oh's and Ah's" and "My, isn't that smart looking!" than by salesmen's orations on technical advances. When I speak of surprise, I mean it not in the sense of shock, but in the sense of providing the buying public with something just a little bit different and unexpected, as with the "Personal" and "Globe Trotter" portables which start to play immediately when opened.

Model Begins on Sketch Board

The hypothetical model whose development we started out to trace begins to take shape on the sketch boards, nebulously and doodle-like, with ideas being batted back and

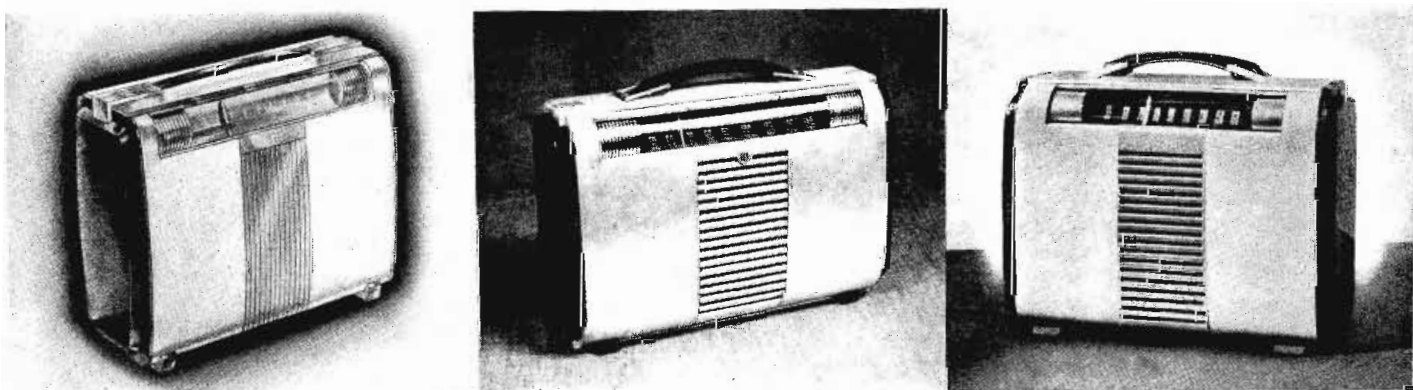
forth. Slowly, the doodling gives way to a series of quasi-definite ideas and sketches that finally evolve into finished sketches by the process of elimination and revision. There is no way to estimate the number of rough sketches that may be required before the modified and finished ones evolve. And always, the ideas are channelled by the technical and engineering specifications and the contemplated cost and price range. Normally, we would come up with two to seven variations of the model. These are submitted for consideration and approval to various administrative, sales, and merchandising executives. With their final approval, the sketches are ready for the mock-up or model stage.

First Models Are Complete

Our completely - equipped model shop turns out exact models of the designed cabinets, completely finished, even to the various wood finishes and decorative trim. Every detail must be included to give us a model representing exactly what we have in mind and to let us visualize what the customer will see. These mock-ups are expensive but the cost is paltry beside the returns from a winning model.

When the mock-up is ready, the real tearing-down process begins, for only with the three-dimensional mock-up do the hidden faults and blind spots appear. The model is studied from all angles and tastes, and given a meticulous going over. The changes to be made may be basic and drastic, or minor, but the

REPLACED BY ALUMINUM; 4) REVISED SKETCH WITH ENCLOSED DIAL RESTORED; 5) ACTUAL MODEL OF ALUMINUM PORTABLE SHOWING CHANGE IN SPEAKER LOUVRE, AND, 6) CURRENT VERSION OF "GLOBE TROTTER."



minor ones are no less important. The expression of good taste is a complete picture, with all components merging to form that picture. One small detail may throw the entire model out of balance.

There is no way to average the time that may elapse between the rough sketch board and the production line. Some models are inspired and cover the distance with no obstacles; others take more time. But time is not the important factor in a new model—perfection is. And we do not refer to perfection in the artistic sense alone. Styling is never completely free-handed, for it must always adhere to practical engineering and production requirements. The radio cabinet, for example, plays a vital role in the tone quality of an instrument. RCA Victor's exclusive Golden Throat Tone System is a product of balanced acoustical characteristics in speaker, amplifier and cabinet, each factor designed with the requirements of the other two in mind.

Styling Must Be Practical

Another reason that styling can never be free-handed dreaming is that it also must suit the conveniences of the customer. A cabinet door, for example, might, as a dream creation, swing open in a novel way, but the stylist must consider if it will cost the householder valuable living room space to allow space for that door when open. Nor will a model sell, no matter how strikingly styled, if, let us say, the tuning dials are inconveniently

placed, or the hardware is not functionally efficient. Every detail of every exterior item must, of course, contribute to the appearance of the set, or it may become the "sore thumb" that will hinder sales. But equally important, items that are functional, such as knobs, hinges, drawer pulls, and handles, must retain absolute functional efficiency, an essential that can never be sacrificed for styling. Oftimes the design details are as hard to resolve as the main theme of a new model.

Stylists Follow Accepted Taste

In the creative sense, the stylist is free, limited only by his own imagination and, naturally, the precepts of accepted taste. And in these days of constantly changing fashions, designs and interior decorations, the industrial designer must recognize the direction and set the pace; he cannot lag behind, for the only dated merchandise that will sell are food and antiques.

New style homes and apartments, technical advances producing new and varied materials to work with, exposure of millions of our potential customers to foreign tastes, designs, and patterns during the past war, new finishes, veneers, and bonding materials, and other influences of our ever-changing world, all contribute to present the stylist with a rapidly changing design pattern, with which he must keep pace to create radio merchandise that will be modern, inviting, and easily blended with home design.

No man can put his finger on

HEADS INSTITUTES



MAJ. GENERAL GEORGE L. VAN DEUSEN, FORMER CHIEF OF THE ENGINEERING AND TECHNICAL SERVICE, OFFICE OF THE CHIEF SIGNAL OFFICER, AND COMMANDER OF THE EASTERN SIGNAL CORPS TRAINING CENTER AT FORT MONMOUTH, N. J., IS PRESIDENT AND A DIRECTOR OF RCA INSTITUTES, INC., OLDEST RADIO SCHOOL IN AMERICA.

public taste and know, irrefutably, that he is right. The best a stylist can do is estimate and gauge it to the best of his ability, aided vitally by his alertness to and knowledge of changing taste patterns. One ruthless satisfaction to the stylist in his work is that he does not have long to wait for customer verdicts.

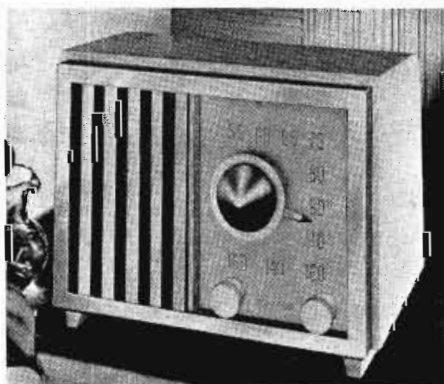
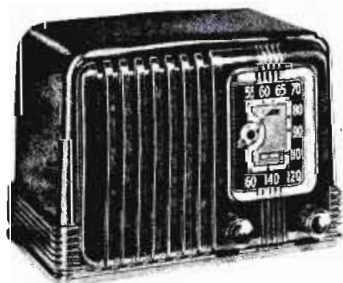
The Chinese have another proverb: "What is good speaks loud; What is bad shouts!"

CEREMONIES OPEN NEW BROADCAST FACILITIES

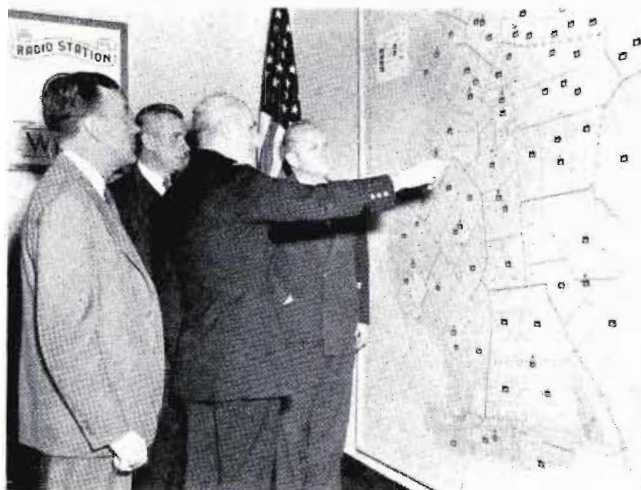
A modern broadcast studio erected in Paris for the convenience of foreign radio and press correspondents in communicating with the United States was opened recently for regular service by Radio France, with RCA Communications, Inc., cooperating in the ceremonies.

Prior to the completion of the new studio, on the Rue Montmartre in Paris, foreign correspondents using the Radio France-RCA program circuits had been limited to the use of the French Government's studios which were not always available on short notice. The Montmartre studio will be accessible 24 hours a day.

PRE-WAR TABLE MODEL AND ITS LATEST STYLIZED COUNTERPART, ILLUSTRATING THE TRANSFORMATION ACCOMPLISHED BY IMAGINATIVE STYLING. BOTH CABINETS HOUSE SIMILAR TYPE CHASSIS BUT ELIMINATION OF THE GINGERBREAD LINES, NEW TYPE DIAL AND TUNING NOW HAVE CREATED AN INSTRUMENT OF BEAUTY AND CONSUMER APPEAL.



[10 RADIO AGE]



INSPECTOR F. A. BURNS EXPLAINS OPERATION OF TWO-WAY FM RADIO SYSTEM TO POLICE COMMISSIONER A. W. WALLANDER (RIGHT) AND OTHERS.



RADIO MESSAGES TO AND FROM PATROL CARS CRUISING THROUGHOUT BROOKLYN ARE HANDLED BY THESE DISPATCHERS AT POLICE HEADQUARTERS.

FM RADIO FOR POLICE

Extensive Two-Way System Installed by RCA in Brooklyn Includes 150 Vehicles which Cover Borough's 120 Square Miles

ONE of the country's most extensive FM two-way police communications systems was inaugurated in Brooklyn last November with New York's Mayor William O'Dwyer pressing the button which formally put into service the main short-wave transmitter at Brooklyn Police Headquarters and a fleet of approximately 150 radio equipped police cars and other department vehicles.

Manufactured and installed by RCA, the new system will increase the efficiency of policing one of America's most congested traffic areas, covering about 120 square miles and populated by more than three million people.

The installation of the station equipment and the design and construction of a special three-position control desk were under the direct supervision of Inspector Francis A. Burns, Acting Superintendent of Telegraph for the Police Department, with the assistance of Captain Wm. J. Kanz and Patrolman Herbert Bennet.

The new police radio station, which has been assigned call letters WRQP, operates on a frequency of 39.58 megacycles. Patrol car transmitters operated on two frequencies: 39.38 megacycles for cars cruising in the eastern portion of Brooklyn, and 37.22 megacycles for those in the western part. Operation on different frequencies permits cars in either section of the

Borough to call headquarters at the same time, thereby making it possible for twice as many messages to be transmitted simultaneously by the mobile units as would be possible otherwise.

Three Operators on Duty

To help handle a large volume of messages, the Police Department designed a special dispatcher's desk which permits three-position operation. The central position is outfitted as a master monitor control capable of receiving both east and west signals. The control position at the left side of the unit brings in messages from the western section only, while the right-hand position handles only calls from the patrol cars in the eastern section. This type of multiple operation eliminates the possibility of having one frequency unattended.

A self-starting electric clock is built into each control panel. When the control equipment is turned on, an indicator lamp illuminates the clock face. Another indicator lamp illuminates the small station call letter panel when the operating switch is placed in the "talk" position. The call letters are illuminated on all the positions at the same

time, informing all operators that the transmitter is in operation and preventing more than one person from transmitting at a time. Each microphone is used with a paracoustic baffle which makes it highly directional, and this in turn helps eliminate most of the extraneous background noises, permitting the speaker's voice to come through very clearly. The microphone is attached to the control desk by a flexible mounting which makes it possible to vary the angle of the instrument to almost any position desired by the operator.

Provision is made in the control desk for making connections to normal telephone lines for receiving and calling through the regular telephone company equipment. The desk is also tied into the police telegraph bureau switchboard, where two additional positions duplicate all the control functions of the new control desk, making it possible to handle radio communications with the mobile police patrol cars from a total of five stations.

The police cars are equipped with RCA mobile 30-watt transmitters.

INSPECTOR BURNS (LEFT), R. A. FURLONG, L. W. SMITH AND AL JOSEPHSEN OF RCA STAND IN FRONT OF 250-WATT FM TRANSMITTER AT BROOKLYN POLICE HEADQUARTERS.



[RADIO AGE 11]

LARGE SCREEN TELEVISION

Pictures of High Quality, 18 by 24 Feet, Projected by Advanced Optical System Developed by RCA Engineers.

COMPLETION and successful testing of an advanced reflective optical system for an experimental large-screen television projector in the laboratories of the RCA Victor Division, brings closer to realization the dream of "theatre" television in which the resulting screen image would equal present-day movies in size and brilliance.

In technical papers presented recently by Ralph V. Little, Jr., and I. G. Maloff, both of the RCA Victor Division, before the 62nd Semi-Annual Convention of the Society of Motion Picture Engineers, it was revealed that a screen image 18 by 24 feet—larger than the average motion picture screen—has been achieved with the new optical system. In addition, a screen highlight brightness meeting the professional motion-picture standards of seven to fourteen foot-lamberts, set by the S.M.P.E., has been realized with the new system. The result is a life-like television picture which in highlight brightness, resolution, and tone gradation faith-

fully reproduce on the giant screen every picture element represented by the incoming video signal.

Three major elements combine to make up a large screen projection television system. The first is the projection kinescope, or cathode-ray picture tube, which translates the video signal into a pattern of light and shadows on the tube face. The second is the optical system which collects the light rays from the face of the picture tube and directs them to the screen, properly focused, to form an image of the desired size. Third, is the screen on which the picture is seen.

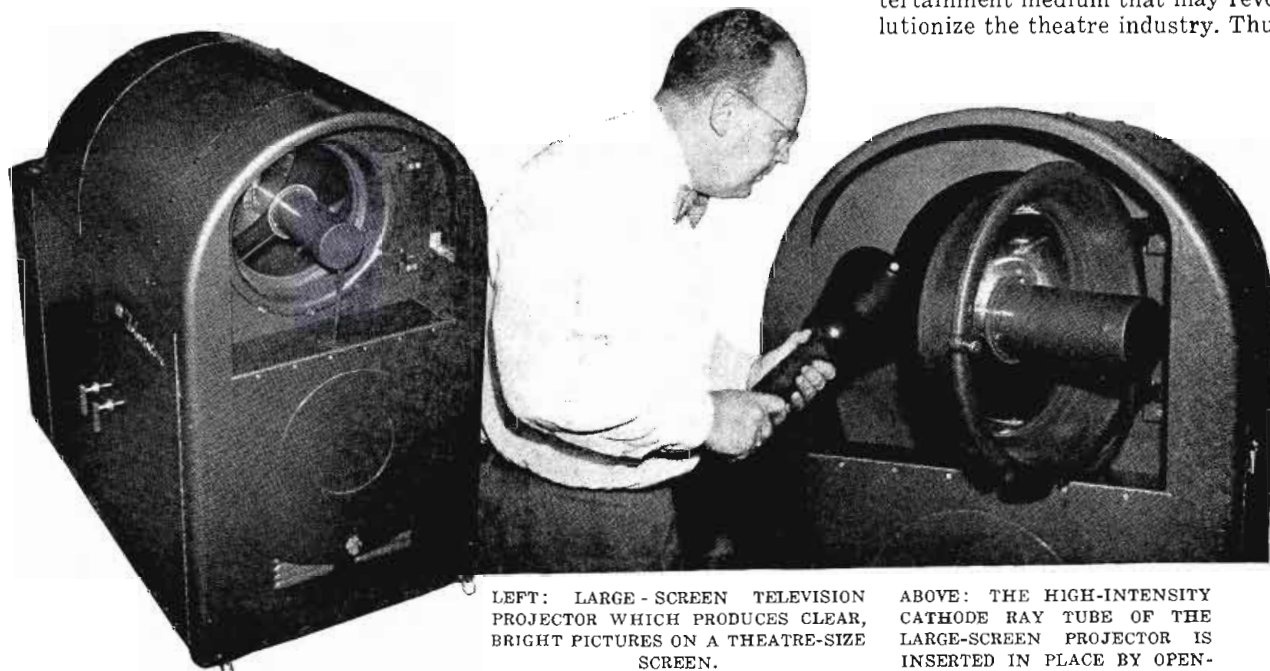
Largest Optical Unit of Its Type

RCA's new projector utilizes a 15-inch cathode-ray picture tube operating at 80,000 volts, and an optical system employing a 42-inch spherical mirror and a 36-inch aspherical correcting lens. This is the largest Schmidt-type optical system in the world with the exception of the 72-inch Schmidt telescope at Mt. Wilson, which is not yet in operation.

The projection distance, or "throw" of the new RCA equipment is 40 feet. Although this is not sufficient to permit mounting of the projector in the theatre's regular projection booth, a throw of this distance enables the relatively compact equipment to be installed in the balcony of some theatres. Ceiling mounts are also possibilities, according to some authorities in the field.

Construction of the large 42-inch mirror for the new optical system, accomplished at the Camden, N. J., plant of the RCA Victor Division, necessitated the development of special machines and new techniques. The 36-inch aspherical correcting lens used in the equipment to overcome optical effects introduced by the spherical mirror, is made of glass—an inherently costly process. However, it is expected that eventually these lenses may be molded from plastics as are the smaller correcting lenses for home projection-television receivers. In addition to costing only a few dollars each, these plastic lenses, which equal the optical properties of glass lenses, offer the added advantage of being practically unbreakable.

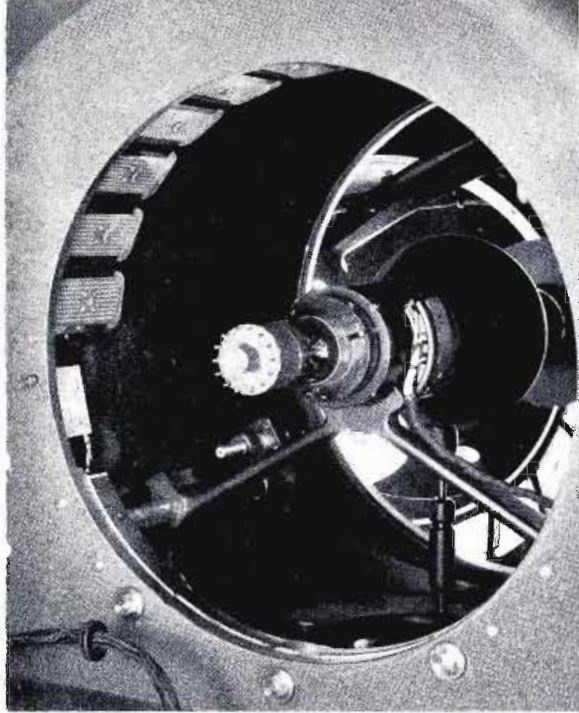
At present, the development of large-screen television is a race for ultimate perfection in a mass-entertainment medium that may revolutionize the theatre industry. Thus



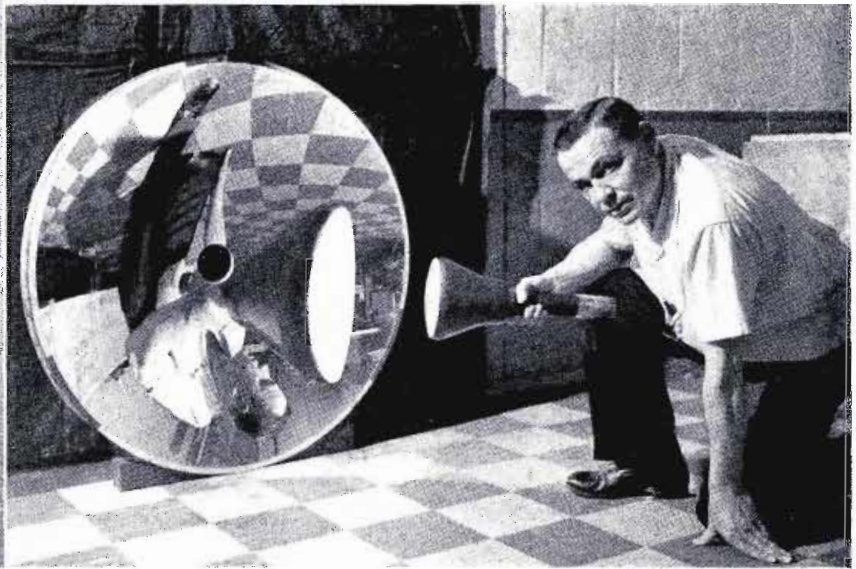
LEFT: LARGE-SCREEN TELEVISION PROJECTOR WHICH PRODUCES CLEAR, BRIGHT PICTURES ON A THEATRE-SIZE SCREEN.

ABOVE: THE HIGH-INTENSITY CATHODE RAY TUBE OF THE LARGE-SCREEN PROJECTOR IS INSERTED IN PLACE BY OPENING A DOOR WHICH ALSO ACTS AS THE TUBE SUPPORT.

[12 RADIO AGE]



FRONT OF LARGE SCREEN TELEVISION PROJECTOR SHOWING CATHODE RAY TUBE AND THE 30-INCH SPHERICAL MIRROR IN REAR OF OPENING.



THE MAGNIFYING POWER OF THE SPHERICAL MIRROR IS ILLUSTRATED IN THIS PHOTOGRAPH. I. G. MALOFF, RCA ENGINEER, HOLDS THE HIGH INTENSITY CATHODE RAY TUBE WHICH IS A PART OF THE OPTICAL SYSTEM OF THE THEATRE-TYPE TELEVISION PROJECTOR.

far, most of the major developments in this exciting new field have emanated from RCA plants and laboratories. Already widely demonstrated and hailed for its performance is RCA's experimental "auditorium-type" large-screen television equipment, projecting a 48-square-foot image on a six-by-eight

foot screen. Two of the auditorium-type equipments have already been delivered to Warner Brothers and 20th Century Fox, whose engineers are experimenting under joint research contracts with RCA, with a view to adapting the medium to the theatre industry.

Paul J. Larsen, chairman of the

S.M.P.E. Committee on Television, has forecast television on theatre screens within two years, providing all elements of the film industry cooperate toward that objective. Other leaders have joined with Mr. Larsen in hailing the new medium as a vital factor in the future of the theatre industry.

EMPLOYEES MAKE DOLLS FOR HOSPITAL PATIENTS

Following an annual custom started nearly ten years ago, girl employees of the Executive Offices of RCA in Radio City dressed dolls, made stuffed animals, and compiled scrap books for presentation this Christmas to the child patients in Bellevue Hospital, New York City.

Miss Elva A. Endres, of the RCA Treasurer's Department, who has been in charge of this activity for several years, reported that 50 employees completed 82 dolls, 14 stuffed animals, 27 scrap books and 24 games for the 1947 holiday. Dr. Laretta Bender, Senior Psychiatrist on the Bellevue staff, arranged for distribution at the hospital.



[RADIO AGE 13]

RADIOPHOTO STANDARDS

Uniformity in Machines and Methods of Transmission Would Insure Success in International Exchange of Pictures by Radio.

By S. H. Simpson, Jr., and
R. E. Hammond

*Program Transmission Service
RCA Communications, Inc.*

STANDARDIZATION seems to be necessary in our modern life. Imagine, for instance, how much nicer a Sunday on the highway would be if automobile bumpers were all the same height; and whoever thought so much argument would arise about fixing the length of women's skirts fourteen inches above the ground! In present day Radiophoto operations, too, standardization is a major objective.

Prior to World War II, RCA operated direct Radiophoto circuits between New York and London, Berlin, Moscow, and Buenos Aires, and from San Francisco to Tokyo. These circuits operated on standards recommended by the Cairo Conference in 1935.

During the war many additional direct Radiophoto circuits were established by commercial companies, foreign administrations and governments, by the U. S. Army, Navy, and the Office of War Information.

Wartime urgency and production difficulties forestalled progress in standardization and consequently, many types of Radiophoto machines were pressed into use. These machines performed well on their own networks but not when teamed with each other. Therefore after the war, when these circuits were taken over by commercial companies, they found it necessary to operate with four or five types of machines in order to cooperate with points throughout the world.

Fundamentals of Radiophoto

To operate a worldwide Radiophoto service on an economical and efficient basis, all transmitting and receiving centers must conform to the most desirable standard of operation. With the ever increasing tempo of today's business there is a serious need for adherence to standard methods which permit faster exchange of Radiophotos and which will enable the wire networks of Europe to be tied in directly with those of the United States.

Before the problem of standardization in Radiophoto communications can be understood, it is helpful first to understand something about the fundamentals of picture transmission and also about radio circuits.

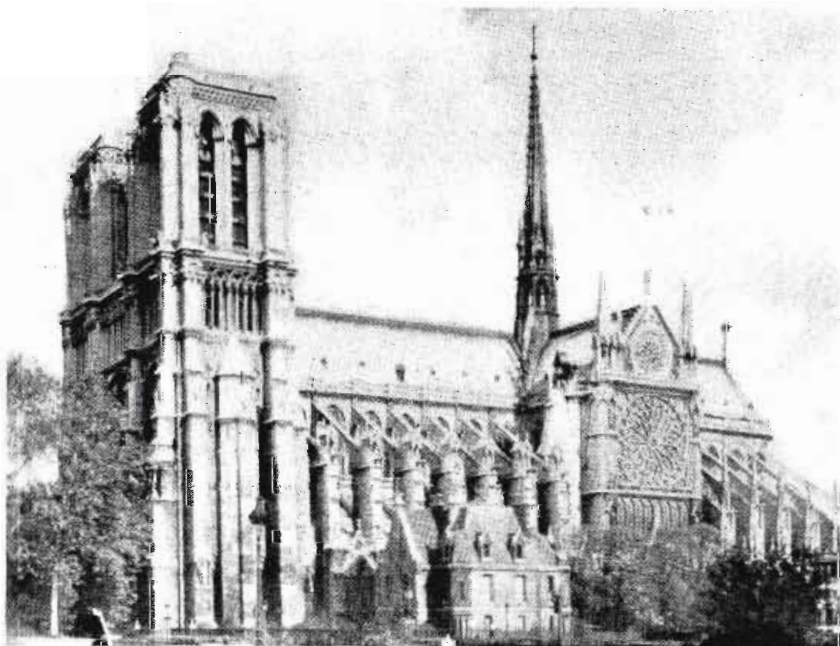
Basically, all picture transmission systems operate by breaking down the copy, which is to be transmitted, into small areas for transmission and then, after reception, building up these small areas to form an image of the original. In Radiophoto this is accomplished by mechanical means; in television, which is considerably faster, the process is performed electronically.

In Radiophoto the mechanism consists of a revolving cylinder and a scanner or recorder which traverses on a lead screw across the cylinder, like the tool holder on a lathe. In this manner the subject is scanned in a continuous spiral and the photoelectric cell in the scanner changes the light reflected from the subject into corresponding electrical currents. At the receiving end the same arrangement is used but the scanner is replaced by a pin-point of light which, as it is varied in brightness, exposes a photographic film or paper fastened on the rotating cylinder. One of the

PHOTOGRAPHS SENT BY THE EARLIER RADIOPHOTO SYSTEMS USED THE "VARIABLE DOT" METHOD OF TRANSMISSION, RESULTING IN THE HALF-TONE EFFECT SHOWN BELOW.



TODAY'S IMPROVED RCA RADIOPHOTO SYSTEM PRODUCES THE MUCH FINER DETAILS AND GREATLY IMPROVED CONTRAST EVIDENT IN THIS ILLUSTRATION.



[14 RADIO AGE]



PRINCIPAL ELEMENTS OF THE MODERN RADIOPHOTO SYSTEM ARE THE ROTATING CYLINDER, THE LEAD SCREW (CENTER ROD OF THE THREE) AND THE SCANNING OR RECORDING HEAD IN THE BLACK BOX.

phone into which we might whistle tones of various pitch or frequency. When the scanner is on a white portion of the copy being transmitted, a relatively low pitch is being sent out on the radio circuit and when the scanner sees a black portion, the pitch rises. Shades between pure black and white are represented by an intermediate pitch. This varying pitch tone when received at the receiving station is used to control the brightness of the recording lamp focused on the film or paper rotating on the cylinder. The choice of the upper and lower pitch tones representing black and white and referred to as "limits" has been fairly well standardized at 1500 cycles per second for white

and 2300 for black. The 800-cycle difference is about the same as that used for frequency shift telegraph keying so that ultimately the same equipment can be adapted for both telegraph and Radiophoto transmissions.

One might think that in such a Radiophoto system the speed of handling might be increased by merely increasing the speed of the rotating cylinder. This is true, however, only to a certain extent for there is another factor known as keying speed which is definitely dependent upon the radio circuit. In general the greater the detail or intelligence, the higher the keying speed and the better the quality of the radio circuit required for its transmission.

For analysis we can consider that the picture being transmitted is composed of very small areas or squares, each square equal in width and height to the width of a scanning line or about 1/100 of an inch.

(Continued on page 31)

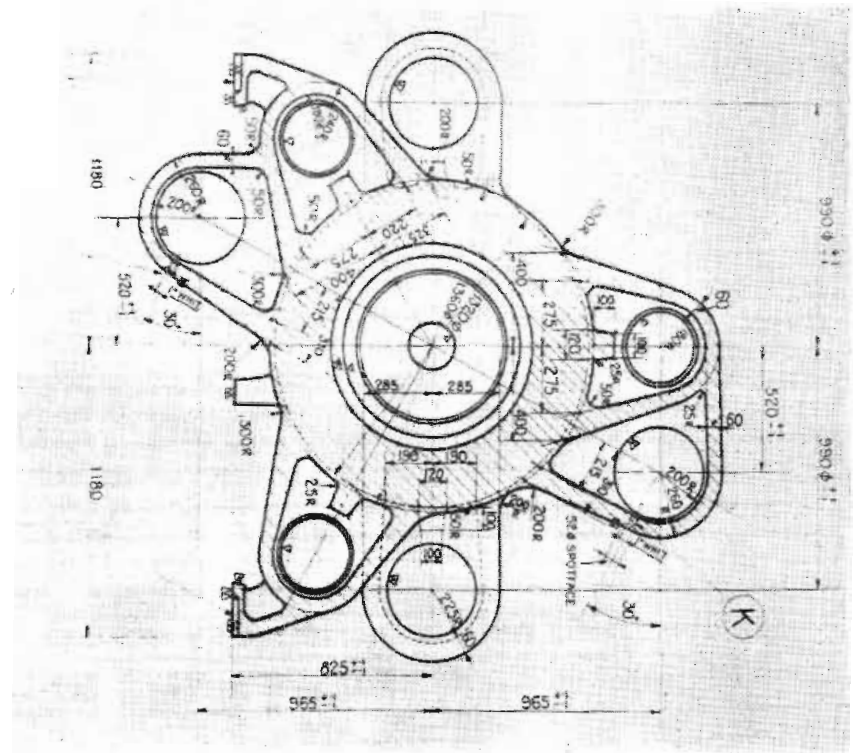
accompanying illustrations shows the elements of a Radiophoto machine — the rotating cylinder, the lead screw, and the carriage mounted on the lead screw which carries either a scanning or a recording head, depending on whether the equipment is for sending or receiving.

Once the copy to be transmitted is broken down into varying electrical currents the problem is to convey this intelligence over the radio circuit. In early systems the varying current from the scanner was used to control the length of a series of dots sent out by the transmitter. When the subject scanned was white, the dots were shortened to pin-points, and when the subject was black the dots were elongated until they almost overlapped. This Constant Frequency Variable Dot (CFVD) system, developed by RCA, produced a finished copy similar in appearance to the ordinary halftone used in newspaper reproduction and which, if viewed through a magnifying glass, would appear as a number of small dots of varying weight.

New System Evolved

While this system gave fairly good results, there was much to be desired and with the improvement in radiophone circuits, a new system known as Sub-Carrier Frequency Modulation (SCFM) was developed. The operation of this system can be understood if we think of the transmitter as a tele-

PRESENT RADIOPHOTO SYSTEMS CAN TRANSMIT AND REPRODUCE ILLUSTRATIONS SUCH AS THIS, RAPIDLY, CLEARLY AND WITHOUT DISTORTION.





SAMUEL RASHEVSKY, U. S. CHESS CHAMPION, STUDIES ONE OF THE MOVES IN THE MATCH WITH ARGENTINA WHICH WON THE GAME FOR HIM IN 34 PLAYS.

CHESS BY RADIO

Teams in New York and Buenos Aires Conduct Contest Over 5,400 Miles Using Automatic Tape-Relay Radio Circuits

MAKING use of a new type of automatic radio-telegraph service arranged by RCA Communications, Inc., chess teams of the United States and Argentina, separated by more than 5,400 miles, participated in an international match in which the moves of players on ten boards were reported back and forth instantaneously.

The match got under way November 7, between players of the Manhattan Chess Club, 100 Central Park South, and an Argentine team sponsored by the La Plata Jockey Club of Argentina, in Buenos Aires.

The event marked the first use in an international chess competition of the RCA technique of automatic teleprinter tape-relays, according to Maj. General H. C. Ingles President of RCA Communications.

He explained that the facilities set up in the Manhattan Chess Club and in the La Plata Jockey Club were capable of handling at least 400 messages an hour in each direction as the play progressed.

In the RCA teleprinter tape-relay system, a message is processed for

transmission only once—at the point of origin—and all relays through intermediate offices are ac-

EVERY MOVE OF THE AMERICAN TEAM WAS RELAYED INSTANTLY TO THE ARGENTINE CLUB OVER AN RCA TELEPRINTER TAPE-RELAY SYSTEM STARTING FROM THE MACHINE AT THE LEFT. INCOMING MESSAGES FROM BUENOS AIRES ARRIVED BY SIMILAR MEANS ON THE SECOND TELETYPEWRITER.

complished without manual reprocessing. This makes possible the unprecedented speeds of transmission.

At the New York end, messages were relayed from the chess club by teletypewriter to the RCA Communications Central Radio Office on Broad Street, where messages were received on tape for radio transmission directly to Buenos Aires. Picked up there by Transradio Argentina, the messages were automatically reconverted from perforated tape for delivery on a page printer at the La Plata Jockey Club. North-bound messages underwent a similar process.

The American team was headed by Samuel Rashevsky, United States champion, who faced G. Stahlberg, of the Argentine.

Other American players and their Argentine opponents were: I. I. Kashdan vs. M. Najdorf; A. S. Denker vs. Julio Bolbochan; I. A. Horowitz vs. H. Pilnik; A. Kevitz vs. H. Rosetto; A. S. Pinkus vs. C. H. Maderna; M. Pavey vs. Jacobo Bolbochan; G. Kramer vs. P. Michel; G. Shainswit vs. C. E. Guimard, and D. Byrne vs. J. Piazzini. Sidney F. Kenton Vice President of the Manhattan Chess Club, is captain of the American team.



Television for Harbor Pilots

Installation Aboard the "New Jersey" is First to be made Permanent on Seagoing Vessel.

THE first permanent television installation on a seagoing vessel has been completed aboard the Pilot Boat "New Jersey" which roves the area off Ambrose Light on two-week stretches while serving as floating quarters for New York and New Jersey Harbor pilots assigned to guide incoming and outgoing ships.

The installation, consisting of one of the latest models of RCA Victor home television receivers and a specially constructed antenna, represents a high degree of success in the 50-year efforts of the pilots' organization to offset shipboard isolation and its accompanying monotony.

First came the addition of wireless, which made it possible for the pilots to communicate from ship to shore and with arriving and departing vessels. Then, a few years later, came radio broadcasting. Today, many of the pilots carry their private sets aboard to maintain contact with doing on land.

"Now with television," one of the pilots remarked enthusiastically,

"we are able to see as well as hear what's going on."

While awaiting assignments to guide ships in and out of the harbor, it was explained, there are often as many as 35 pilots aboard the pilot boat. They divert themselves with card games, by relating tales of by-gone years and by listening to radio programs. The number aboard fluctuates as pilots of outgoing ships come aboard, and as pilots assigned to arriving vessels join the group.

Pilots Vote for Television Set

Purchase of a television receiver for the smoking lounge aboard the "New Jersey" was discussed for several weeks before being put to a vote of the membership of the United New York and New Jersey Pilots Association, according to Captain D. V. Jones, who arranged for the purchase. He said the proposal passed by an overwhelming majority since many of the pilots already had become television enthusiasts by having sets in their homes.

The installation was completed under the supervision of Robert Gray and Joseph Shuskus, of the RCA Service Company, Ford, N. J., after conducting tests in which good signals from the three television stations in New York were picked up aboard the pilot boat while it was cruising in the vicinity of Ambrose Light, some 20 miles from Manhattan.

To solve the problem of changing the ship's direct current power supply to alternating current for which the RCA set was designed, Gray and Shuskus installed a rotary converter. In addition, they made changes in the standard antenna layout to meet the special conditions of the shipboard installation.

The ability of the ship to circle to a 360-degree angle and to maneuver in any direction, it was noted, makes possible the pick-up of uninterrupted television signals from the three stations operating on Manhattan. All are received with equal sharpness.

Success of the installation aboard the "New Jersey" has led to speculation as to the eventual addition of television receivers by other craft plying the waters in range of television stations on the Atlantic Seaboard.

SCENE FROM THE TELEVISION VERSION OF "THE LATE GEORGE APLEY", BROADCAST BY WNBT FROM STUDIOS IN RADIO CITY.





NEW WIRE RECORDER PLAYS FOR 30 MINUTES USING CARTRIDGE WHICH SIMPLIFIES THE HANDLING OF THE SPOOLS OF WIRE CARRYING SPEECH OR MUSIC.

RECORDING SOUND ON WIRE

Design of New Instrument for Office and Home Permits Quick Change of Wire Spool and Accurately Controlled Playbacks with Tone of High Quality

A RADICALLY designed, lightweight wire recorder, which for the first time completely eliminates the complicated handling of the wire by utilizing a simple "plug-in" cartridge, is now being marketed by RCA. Not only is the instrument finding extensive use in business offices for many purposes, but also it provides the home with ideal, inexpensive means for recording favorite radio programs, family gatherings or the sounds of the baby's first words.

Housed in a streamlined, black plastic cabinet with disappearing carrying handle, the new recorder weighs less than 25 pounds with cartridge and microphone, and is simple enough to be operated by a youngster. Intended for use in offices, schools, studios, broadcast stations, homes, or wherever record of voices or music is desired, the recorder has only three simple controls, operates from any 110-volt A. C. power source, and reproduces both speech and music with excellent fidelity. An indicator light to show correct recording volume makes possible recordings of a professional quality, regardless of the skill of the user.

The "plug-in" cartridge, outstanding feature of the instrument, records up to half an hour of speech or music on its more than half-a-mile of stainless-steel-covered brass

wire, and may be operated to permit immediate playback without tedious rewinding. The "immediate playback" feature of the record is made possible by the unusual design of the cartridge, which contains not one, but two lengths of permanent wire, wound on four spools. Untouched by human hands, the wires wind, unwind, and rewind themselves, permitting the operator to record a speech or musical selection of any length up to 30 minutes, and to return to the exact starting point on the wire for immediate playback.

Has Accurate Timing Device

Another innovation in a low-cost recorder, is a timing device calibrated in minutes and fractions of minutes which permits the user to determine the exact locations of recordings on the wire. This feature eliminates guesswork in finding recordings on the wire and permits several short recordings to be made without the danger of overlapping.

Still another advance in the RCA wire recorder is its automatic "erasing" feature. Without requiring a separate operation to "clean" previous material off the wire, the recorder automatically erases previous sounds as a new recording is being made.

Up to this time, a problem in

wire recorders has been "wows" or wavering sounds due to the changing rate of speed with which the wire passes over the pickup, a condition created by the changing circumference of the spools as the layers of wire build up or decrease. Discarding the usual "take-up" spool method of driving the wire, RCA has introduced a feature new to low-cost wire recording equipment—an exclusive engineering design that passes the entire length of the wire over the electromagnetic pickup at a constant speed. This virtually eliminates "wows". In addition, by holding the wire firmly against the pickup, the RCA wire drive and cartridge design eliminates wire flutter and holds sliding to a minimum. In quality of sound, the recorder covers the dominant frequency range for music, viz., from 100 to 5000 cycles per second.

Offered as "Complete Package"

The new recorder is being offered as a "complete package", with all equipment for both recording and instantaneous playback included. In addition to the plug-in cartridge, the recorder-reproducer unit contains a three-watt high-gain amplifier, a constant-speed motor to drive the wire, a five-inch permanent-magnet speaker, and an electromagnetic unit. The RCA "Aerodynamic Microphone" which comes with the equipment, is complete with seven feet of cable and a plug for connection to the input jack of the recorder-reproducer. A connection is also provided for an external speaker for higher quality reproduction of music or for feeding the output of the amplifier to a larger auditorium-type speaker.

The ease of operation and high-fidelity features of the recorder make its usefulness practically unlimited in the educational field. Potential users include teachers of public speaking, speech correction, and foreign languages. Clergymen and other public-speakers will find the device ideal for rehearsing ser-

(Continued on page 31)

Electron Microscope Improved

Advances in Methods and Devices May Open Way to a More Detailed Study of Medical Problems.

IMPROVED methods and devices increasing the effectiveness of the RCA electron microscope as an aid to medical science, and opening the way for a more detailed study of cancer were described by research physicists of the Radio Corporation of America, at the annual meeting of the Electron Society of America, in Philadelphia on December 12.

Dr. James Hillier, of RCA Laboratories, Princeton, N. J., told of the experimental development of a new "double lens" providing an exceptionally high degree of light contrast in the photographing of viruses and internal structure of bacteria at electronic magnifications up to 200,000 times actual size.

"The enhancement of the detailed contrast is so great," said Dr. Hillier, "that information often can be obtained in thick specimens which ordinarily would give only a diffused blur on electron micrographs. As this work continues, it will have important bearing on the whole problem of virus infection,

enzyme action and, for that matter, even the study of cancer."

In a paper presented jointly by Dr. Hillier and S. G. Ellis, also a member of the research staff of RCA Laboratories, the scientists reported development of what they described as a high magnification viewer and a deflection focusing system.

Magnifies Up to 300,000 Times

The viewer makes possible direct observations of electron microscope images at magnifications from 200,000 to 300,000 times the dimensions of specimens. It was explained that this high magnification gives the operator the opportunity to detect defects which might ultimately spoil the micrograph. Such things as broken membranes or other flaws in the specimen can thus be seen for the first time with this device.

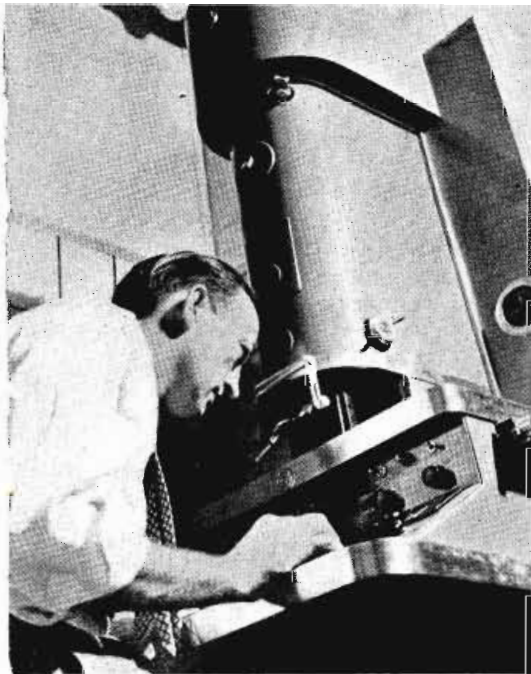
The simplicity of the new deflection focusing system was emphasized by comparing it to a range-finder employed in a conventional camera. The electron microscope specimen is alternately illuminated

from two directions with a result that if the instrument is out of focus the final image appears doubled; the two images being displaced in proportion to the amount that the instrument is out of focus. Thus, to focus with this system the operator merely adjusts the focusing control until the two images are accurately super-imposed.

This new method of focusing, it was explained, facilitates the operation to such an extent that even an inexperienced operator can obtain good images. Coupled with the high magnification viewer, this system is said to virtually eliminate the possibility of a poor image.

A further improvement in techniques was disclosed in a paper presented by Dr. Hillier in conjunction with E. G. Ramberg. This employs what is described as "dark field illumination" providing a high degree of contrast through which it may be possible to see fine structures in viruses and molecules which by conventional methods appear only in outline.

The scientists reported that the dark field images are obtained by using scattered electrons from the image, rather than a direct electron beam which is prevented from reaching the image by the use of diaphragms. It was disclosed that an RCA microanalyzer is used in this work to measure with complete accuracy the velocity of electrons leaving the specimen.



MAGNIFICATIONS UP TO 300,000 TIMES THE ACTUAL SIZE OF SPECIMENS ARE NOW POSSIBLE WITH THE ELECTRON MICROSCOPE (LEFT).

MICROGRAPH OF BACTERIA AS THEY APPEAR IN LOW CONTRAST WHEN VIEWED THROUGH CONVENTIONAL LENS OF THE ELECTRON MICROSCOPE.



SAME AREA OF BACTERIA AS OBSERVED WITH NEW EXPERIMENTAL DOUBLE LENS UNDER DEVELOPMENT BY DR. HILLIER.



[RADIO AGE 19]

Television Finds Its Public

In a Brief Time, Receivers Have Become Established as the Prime Source of Entertainment, Not Only in Homes, but in Hotels, Youth Centers and Church Recreation Halls.



By Dan Halpin

*Television Receiver Sales Manager
RCA Victor Division*

ON Nov. 3, 1946, RCA Victor's first postwar television receivers were placed on sale.

This single event was the culmination of years of research and development. Most immediately behind it was a postwar year of fact-gathering and planning. Comprehensive surveys had been made. The public's taste, buying power, and eagerness for television were studied, and then decisions were made. The various units—design, engineering, manufacture, field test, merchandising, promotion—rolled into action. And when the production lines were turning out receivers and franchised dealers had samples, then the curtain was drawn on T-Day and RCA Victor television receivers were on the market.

It was only a matter of weeks before television's public began to take positive shape. Our predictions were confirmed then that the television receiver purchaser was not confined to the well-to-do who could afford it as a "novelty". Middle-class families took to television just as enthusiastically. With the introduction of lower-priced receivers, the

home market broadened into an even wider income range.

The taverns, as had been indicated before the war, accepted television instantaneously, making programs available to another large segment of the public. Here was a low-cost extra attraction to offer customers, a means of bringing them sporting events and other entertainment. Hardly did a new television market area open before the entire tavern industry in that region was clamoring for television receivers.

Home Sales Unaffected

Some manufacturers veered away from the home television trade to service this market with receivers especially designed for such public places. RCA Victor maintained its policy of selling television receivers to all comers, without favor. Recognizing the American home as the largest market of all, this pioneer organization in television did not modify its receiver designs from those salable to and suiting the home or a home-like atmosphere. Yet, because of the brilliance and stability of images shown on our television receivers, a suprisingly

large volume of the tavern television trade naturally accrued to RCA. With the introduction of the big-screen (20 x 15 inches) console Model 648PTK, it became apparent that an even larger percentage of new club, hotel, restaurant and tavern business would be obtained by our company.

One of the important considerations which influenced the television receiver prospect—home or tavern—to choose RCA Victor was the company's dramatic departure from tradition—a courageous merchandising innovation—the RCA Victor Television Owner's Policy. Under this policy, the standard antenna and accessories were supplied and both antenna and receiver were installed by factory-trained technicians. They had to be right; they had to give satisfactory performance. A full year's service and maintenance of the receiver was also included in the nominal, flat fee charged according to the model purchased. Should the picture tube or any other part of the receiver require replacement during the year, this, too, was covered by the policy without additional cost to the customer. With such assurance, even the most skeptical could select an RCA Victor television receiver with confidence; the busiest of public places was assured that it could have RCA service when and if necessary.

As the market began to take shape, a new and particularly grati-



SOCIAL CENTERS WERE QUICK TO RECOGNIZE THE VALUE OF TELEVISION SETS IN SUPPLYING A VARIETY OF EDUCATIONAL AND ENTERTAINMENT PROGRAMS.

[20 RADIO AGE]

CLEVELAND RADIO DEALERS ATTEND A DEMONSTRATION OF NEW RCA VICTOR TELEVISION RECEIVERS.

fyng development appeared. Charitable, public welfare, civic, church, and veterans' organizations began to phone dealers and distributors, requesting information about television receivers. If this form of entertainment could attract such large masses to the taverns, they reasoned, why should it not work out to the same degree with boys' clubs, fraternal halls, parish halls, churches and synagogues, and other meeting places?

Developed Like Avalanche

Once it began, the idea developed into an avalanche. Veterans' organizations and religious, social, and civic groups were soon supplying hospital wards and sanitariums with television receivers to relieve the monotony of hospital life. Attendance at youth centers and boys' clubs, established to direct young people's energies into worthwhile activities, began to increase as these institutions installed television sets on which could be seen clean sports, decent entertainment, informative educational programs, and a variety of other fare designed to win audiences.

Greater attendance at parish houses and clubs followed installa-



tion of receivers. Fifty Philadelphia fire houses installed television. Many religious, charitable, and civic groups found that raffling off television receivers attracted as many quarters as raffling off automobiles—and at smaller investments.

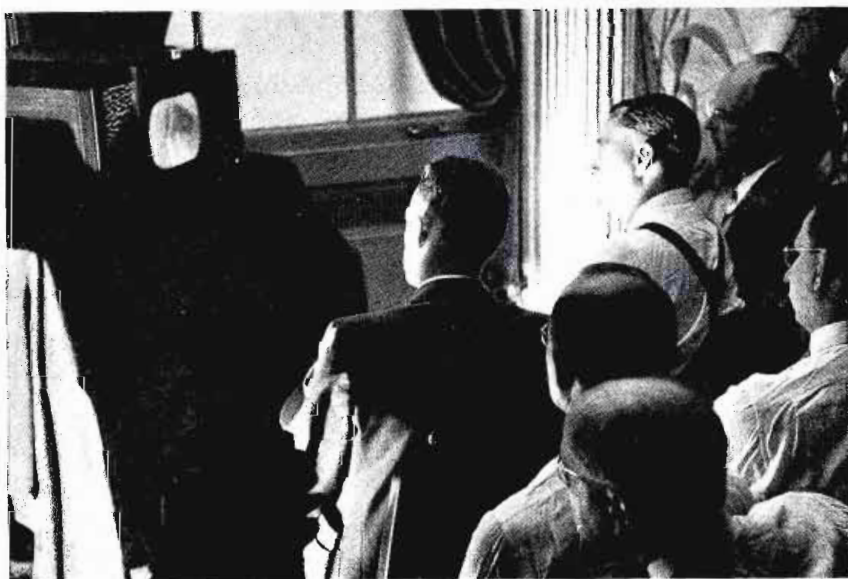
In Red Bank, N. J., ten receivers were placed in local boys' clubs by the Rotary Club. The First Methodist Church of Camden was presented a table model receiver by a parishioner so that the young people could see television in that wholesome atmosphere. Many parish houses and even convents are having television sets installed.

Educational institutions, too, are becoming an active part of the television public. Recently we explored the use of television in educational institutions in cooperation with Notre Dame University, supplying receivers for use in conjunction with the transmitting facilities of television station WBKB, in Chicago. Following this study, Rev. Archibald McDowell, C.S.C., moderator of the Notre Dame Radio Club, released a very enthusiastic statement.

Television in Classroom

"Television can prove particularly effective in conveying visual information of a not-easily-repeated nature to numerous classes at once," he said. "This could apply, for example, when one particularly well informed guest lecturer in a popular subject is available and his material requires visual support for proper presentation. It could also be used for expensive laboratory demonstrations and explanations, or where the demonstration equipment is delicate. Television as a regular tool of the classroom could assure greater uniformity in teaching and testing students and prove particularly valuable in guiding students in laboratory work."

Father McDowell also predicted that television might be used as a



DOCTORS ATTENDING CONGRESS OF THE COLLEGE OF SURGEONS, WATCH AN OPERATION ON A TELEVISION SCREEN.

teaching instrument in reaching isolated audiences such as students confined to hospitals and groups in adult education centers and university extension courses. "Television as an educational and, hence, social force, cannot be overestimated," he concluded.

Television will eventually find its strength as an educational tool through pioneer explorations of this sort. But even today it is proving useful to schools through its normal intermingling of public service, educational, entertainment, and commercial programs. A school in Gloucester, N. J., installed an RCA Victor television receiver and told the pupils that those with the best marks and conduct each week would be invited to see the big football games. Who knows but that it may eventually replace the dunce cap and the rod as a means of stimulating good conduct in the little red schoolhouse!

Business establishments other than taverns have also been alert to the appeal of television and quick to take advantage of it.

Hotels Recognized Value Early

Hotels were among the early organizations to recognize the drawing power of television. The Statler chain, including the Pennsylvania Hotel in New York City, the New Yorker, also in New York, and dozens of others installed RCA receivers on their premises, with television sets going into club rooms and bars, restaurants, and even private suites. Guests registering at these hotels may request television equipped suites—and many do. Extra outlets were installed so that receivers could be moved from one location to another. Soon the hotels were advertising this extra service extensively through media reaching their most discriminating guests.

Country clubs and private clubs, likewise, have taken to television as an entertainment feature for members and as a means of stimulating interest in their cocktail lounges and main club rooms, with such service in many cases demanded by members.

Industrial plants are finding television a means of entertaining employees and visitors. That it has value as a public relations tool was dramatically demonstrated recently

when retailers in a mid-western city refused to handle a food product which had been forced to increase its prices. The manufacturer sponsored the televising of a series of major local sporting events, and its sales representatives invited the recalcitrant retailers to visit their main plant and see the television programs on receivers installed there. The retailers and their families accepted the manufacturer's hospitality, met the company executives, toured the plant, saw the games, ate peanuts and crackerjacks and drank soda pop—and developed such good will toward the supplier that the buyers' strike was promptly terminated.

Television Placates Customers

A Chicago currency exchange found that customers waiting to cash checks or pay utility bills were more numerous than it could handle promptly without installing another cashier window. Customers grew impatient and left. Considerable business was lost. After putting in a television receiver, the currency exchange found the customers actually reluctant to leave.

Last July, with postwar television eight months old, a check-up was made to determine the percentage of our receivers going into various types of "commercial" installations. We found that the national average then was 81.3 percent in private homes; 18.7 in public places. Local variations, however, were great. In Albany, 67.7 percent were in public places; in Brooklyn, despite what you may have heard about that much maligned borough, all but a mere 3.2 percent were in private homes. Since then, of course, as the number of receivers sold has increased, the percentage going into private residences has increased in proportion.

Television has found its public in homes, public places, hospitals, youth and adult social centers, business establishments, hotels, and churches. It has found its public and is serving that public well. And television's public, particularly that important segment reached through commercial-type installations, is repaying television for its service by stimulating a constantly widening circle of enthusiasts to bring the medium into their own homes.



Stuart Wm. Seeley

I.R.E. Award to Seeley For His Work in FM

Five RCA Engineers Elected to Fellowships in the Institute.

For his development "of ingenious circuits related to frequency modulation," Stuart Wm. Seeley, Manager of the RCA Industry Service Laboratory, has been named by the Board of Directors of the Institute of Radio Engineers to receive the Morris Liebman Memorial Prize for 1948. The Prize, which comprises the income from a donation by E. J. Simon, a Fellow of the Institute, in memory of Colonel Morris N. Liebman, who was killed in World War I, will be awarded Mr. Seeley at the annual I.R.E. banquet on March 24.

In making this announcement, the Board of Directors also revealed the names of five engineers associated with various divisions of the Radio Corporation of America who have been elected to Fellowships in the Institute. They are: J. B. Coleman, RCA Victor Division, Camden, N. J.; E. W. Herold and Dr. Albert Rose of RCA Laboratories, Princeton, N. J.; N. E. Lindenblad, RCA Laboratories, Port Jefferson, N. Y., and Robert E. Shelby, National Broadcasting Company, New York.

RCA AWARDS FELLOWSHIPS

Five Graduate Students Named By Education Committee to Receive Grants for 1947-1948



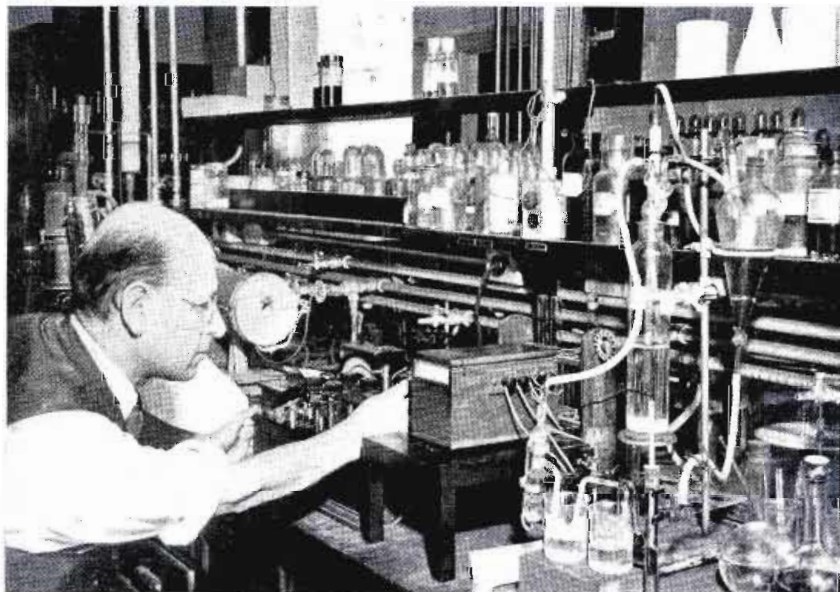
By F. H. Kirkpatrick
Educational Counselor
Radio Corporation of America

COLLEGES and universities, no longer afraid of science and the scientific method, have become the great centers for original research and investigation. They are all concerned with extending the experimental method. In spite of crowded conditions, inadequate equipment, and many other difficulties which beset our educational institutions, they hold the bright promise in terms of new developments and frontier studies in every science. Their graduates and research scholars represent the foundation stones upon which great scientific industries must rest. The unique strength of the colleges and universities is that they bring to-

gether the keenest and most competent of the young generation under circumstances which stimulate creative effort.

For the purpose of encouraging training of promising young students in American universities, particularly in the fields of radio and electronics, the Radio Corporation of America has made available a number of fellowships and scholarships. These were established by action of the Board of Directors, and the administration of the program was put in the hands of the RCA Education Committee. This Committee works under the chairmanship of Dr. James R. Angell, President Emeritus of Yale University, now Public Service Counselor of the National Broadcasting Company.

The National Research Council administers RCA Fellowships under grants made by RCA. The grants run from \$1,600 to \$2,100—the exact amount being determined by the RCA Fellowship Board—for graduate work in electronics during the academic year. Added grants of not more than \$600 for tuition, apparatus or extra expenses might be made to the institution where the Fellow works.



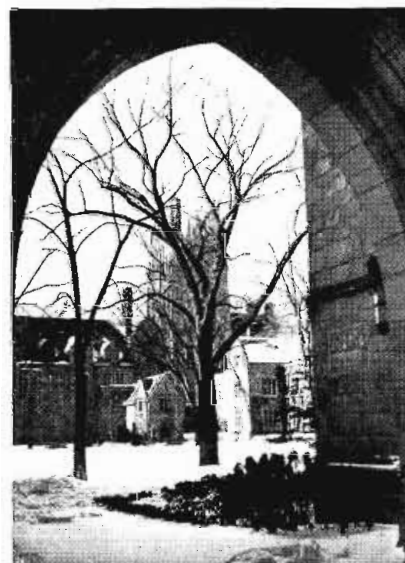
Five RCA Fellowships were awarded for the academic year of 1947-1948, and the following men are now in graduate study working toward the doctorate:

Arnold S. Epstein, B. S. in electrical engineering, Lehigh University: for continuation of graduate study at the University of Pennsylvania with special reference to selenium and other rectifiers as variable capacitors.

Willis W. Harman, B. S. in electrical engineering, University of Washington: for continuation of graduate study at Stanford University with special reference to the use of microwaves in certain cavity oscillators.

Arnold R. Moore, B. S. in chemistry, Polytechnic Institute of Brooklyn: for continuation of graduate study at Cornell University with special reference to electronic properties of semi-conductors.

Sol Raboy, A. B. in physics, Brooklyn College: for continuation of graduate study at Carnegie Institute of Technology with special reference to the properties of



COLLEGES AND UNIVERSITIES ARE GREAT CENTERS FOR ORIGINAL RESEARCH AND INVESTIGATION.

RCA FELLOWSHIPS HELP PROMISING YOUNG SCIENTISTS TO PREPARE FOR THEIR LIFE-ROLES AS RESEARCH SPECIALISTS IN RADIO-ELECTRONICS.

[RADIO AGE 23]

semi-conductors and their use as crystal counters.

H. Gunther Rudenberg, S. B. and M. A. in physics, Harvard University: for continuation of graduate study at Harvard University with special reference to operation and design of wide-band pulse amplifiers.

It is the purpose of RCA Fellowships to give special graduate training and experience to young men and women who have demonstrated marked ability in the general field of electronics, either as a branch of electrical engineering or as a part of the general field of physics. To be eligible, applicants must be citizens of the United States and must present evidence of skill and ability to do advanced work in electronics. Before beginning tenure on a Fellowship, they must have completed one year of graduate work in a university of recognized standing.

Study Electronic Problems

RCA Fellows are expected to continue work on scientific problems related to electronics, but the RCA Fellowship Board will consider applicants who wish to supplement mastery in one field by developing competence in a related field. Fellowships are awarded for study and research in this country, and the institution in which the Fellow works must be approved by the RCA Fellowship Board.

Members of the RCA Fellowship Board, appointed by the National Research Council, are:

F. E. Terman, Stanford University
L. P. Smith, Cornell University
Carl C. Chambers, University of Pennsylvania
W. G. Dow, University of Michigan
I. I. Rabi, Columbia University
R. C. Gibbs, National Research Council
F. M. Feiker, National Research Council

In addition to the young men selected under the sponsorship of the National Research Council, employees of all divisions of RCA are eligible for fellowship awards. An award was made this year to Mr. Harry J. Woll of the RCA Victor Division. Mr. Woll is doing ad-

vanced graduate study at the University of Pennsylvania and also plans to work for the doctorate.

RCA Scholarships were established for undergraduates in July, 1945. According to provisions governing the awards, a number of these scholarships are available for each academic year. Those eligible will include all students enrolled at colleges or universities specifically designated by the RCA Education Committee. Undergraduates in the field of the pure sciences, or in various branches of engineering, especially electrical, radio, and electronic engineering, are considered eligible as appointees.

Scholars in Nine Universities

Right now there are RCA Scholars in nine universities with their special interests centered upon a scientific career. These young men were selected by deans and faculty committees at their respective institutions on the basis of intellectual ability, academic achievement and scientific interest. They are:

John R. B. Whittlesey, at California Institute of Technology
John O. Kessler, at Columbia University
Francis F. Chen, at Harvard College
George C. Sponsler, at Princeton University
Ivan H. Sublette, at Purdue University
Nicholas L. Scheuer, at University of Minnesota
Myron E. Ferguson, at University of Washington
M. Berwyn Knight, at University of Wisconsin
Richard H. Genoud, at Yale University

RCA INCREASES COMMON DIVIDEND

At the conclusion of the regular meeting of the Board of Directors of the Radio Corporation of America held December 5 in New York, David Sarnoff, President and Chairman of the Board, announced that the following dividends had been declared:

On the outstanding shares of Common Stock, 30 cents per share,

payable in cash on January 27, 1948, to holders of record of such stock at the close of business December 19, 1947. The previous dividend on the Common Stock has been 20 cents per share.

On the outstanding shares of First Preferred Stock, 87½ cents per share, for the period from October 1, 1947 to December 31, 1947, payable in cash on January 2, 1948, to holders of record of such stock at the close of business December 15, 1947.

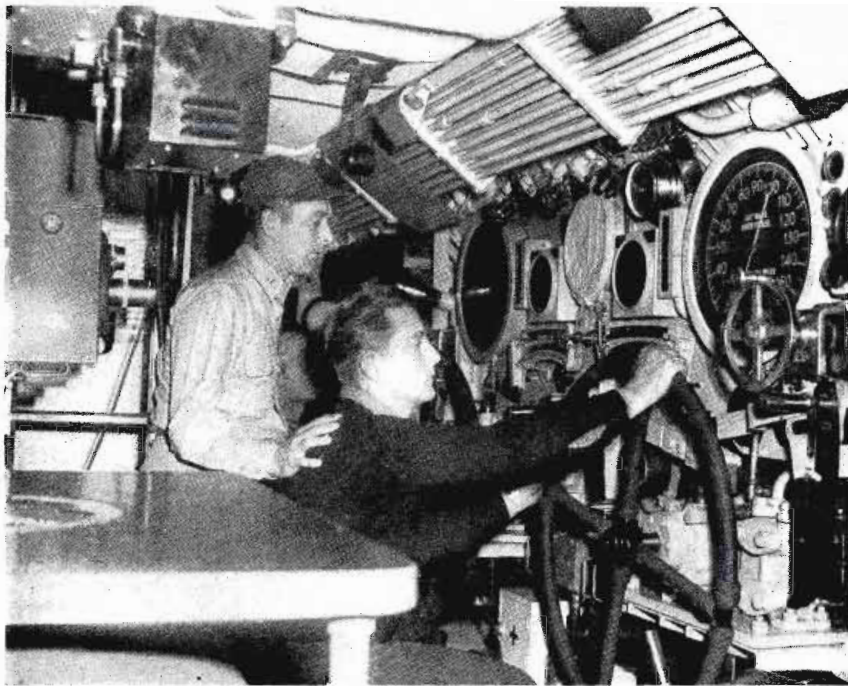
Royal Wedding Films On Air in Record Time

A new record in the transatlantic shipment and televising of motion picture films was set by the National Broadcasting Company on November 21 when its television network presented first pictures of the British royal wedding 29 hours after the films were taken. These were the first motion pictures of the wedding to be shown in this country. The previous record was set by NBC when it televised films of London's celebration of Memorial Day only 30 hours after the event occurred.

The wedding films were first televised at 1:10 p.m., on the 21st, a scant hour and 20 minutes after they had arrived by plane at LaGuardia Airport, and only 15 minutes after they were received at the NBC television studios in Radio City. The speed with which they were put on the air was made possible by the fact that they had already been processed for television before they left England. The showing of the films, most of which were made off the face of a television tube in the studios of the British Broadcasting Corporation, lasted 32 minutes.

Shown in the picture were highlights of the wedding celebration, including the colorful procession from Buckingham Palace down the Mall to Westminster Abbey, the recessional of the wedding party inside the Abbey, and the return of the royal couple to the Palace.

Copies of the pictures were made in New York and flown immediately to television stations KSD-TV, St. Louis, and WWJ-TV, Detroit.



THROUGH THIS TELECAST FROM A SUBMERGED SUBMARINE, THOUSANDS OF VIEWERS REALIZED FOR THE FIRST TIME, THE HIGH SKILL REQUIRED IN THE CREWS OF UNDERWATER CRAFT.

only give it a major tactical advantage in future wars, but will enable it to observe and report back to its own personnel, the progress of future battles with the speed of ether waves, Eiges pointed out.

Television to Train Recruits

Further reviewing the Navy's own use of television, he mentioned the atom bomb explosion at Bikini where, through the eyes of television, navy personnel, in perfect safety, watched the explosion at close range. He also commented on the Navy's plans to use television for the training of recruits, and predicted that television appears certain to become one of the most effective means of recruiting additional personnel. Television, he said, will bring recruiting messages into American homes and into places of public assemblage ordinarily not reached in recruiting drives.

By utilizing television as a public relations tool, Eiges pointed out, the Navy could create sympathetic understanding for its aims and ideas, not only in the American home, but also in the halls of Congress when major legislation is pending.

NAVY'S USE OF TELEVISION

Pictorial Reports to the Taxpayer and the Recruiting and Training of Personnel Can Be Made More Effective by Video Programs, Eiges Tells Naval Officers.

THROUGH the medium of television, the United States Navy can literally sail its fleets into the American home and give the American taxpayer an intimate, close up look at what his tax money is buying. This was the novel word-picture presented by Sydney H. Eiges, NBC vice president in charge of press, to a group of fifty high-ranking Naval officers enrolled in a public relations indoctrination course, in Washington.

Properly utilized in this and other ways, he added, television could become the most effective public relations tool available to the Navy.

"By television," Eiges said, "the Navy can take the American family into the depths of a battleship or submarine or into the crew quarters of a warplane and display the intricacies of their operation at first hand. By television, the Navy can transport millions of Americans, within the space of minutes, on a far-flung journey to Navy bases, docks, shipyards, hospitals and its other installations. In short,

by television the Navy can show the American taxpayer and his legislative representatives what the Navy is, does and needs in a manner more vivid and graphic, more intimate and effective, than that afforded by any other means of communication."

Special Facilities Urged

The NBC executive not only urged the Navy to set up special facilities for the study of television but to do so as quickly as possible, making use of the programming facilities available on television stations currently operating in this country. In this latter connection, he advocated that the Navy avail itself of the services of major advertising agencies now pioneering in television, pointing out that in this way the Navy would benefit from the agencies' technical and creative know-how at minimum and maximum efficiency.

The Navy's own development of sea and air-borne television, which equips roving ships and planes with sensitive electronic eyes, will not

Lancaster Tube Plant To Be Expanded in 1948

Production of television picture tubes at RCA's Lancaster, Pa., plant is to be materially increased through an expansion program involving more than a million dollars. The announcement, made at the year-end by L. W. Teegarden, Vice President in charge of the RCA Tube Department, stated that a large number of automatic tube-making machines would be installed in a new building having an area of 40,000 square feet.

D. Y. Smith, manager of the Lancaster plant, revealed that 1,600 people were employed in tube manufacture at the start of 1948, some of the processes being conducted on a two- and three-shift basis.

ADVENTURES IN MARKETING

Successful Merchandising Calls for Faith in Products Manufactured, Ability to Produce Acceptable Goods, Frank M. Folsom, Executive Vice President of RCA Victor, Tells Harvard Students.

MARKETING, like so many other forms of human activity, calls for a large measure of faith—faith in the products we manufacture and faith in our ability to produce and sell them at prices the public can afford to pay.

Marketing is no coldly scientific process. Precise formulas and carefully conceived sales methods are helpful, but they do not provide the vision and the energy so vitally necessary to success in modern commerce. That is the contribution of individual leadership.

The human element in marketing is all-important. There is scarcely a successful business in America today that was not founded on the deep, underlying faith of one man, or a small group of men. American business has become great through private enterprise, initiative and freedom.

How this works is vividly illustrated by an episode in the life of David Sarnoff, President and Chairman of the Board of the Radio Corporation of America. As a young man, David Sarnoff worked for the Marconi Wireless Telegraph Company of America. In those days, radio was a new and not altogether



FRANK M. FOLSOM
*Executive Vice President in
Charge of RCA Victor Division*

certain means of transoceanic communication. In one or two isolated instances, purely as a scientific experiment, music had been transmitted by radio. But no one seemed to visualize the vast and varied services that radio could perform outside the magic of its dots and dashes.

But David Sarnoff was not an ordinary young worker in a new form of communications. He was enthralled by radio, with a boundless enthusiasm and faith in its

future. He was endowed with great vision and a love for work.

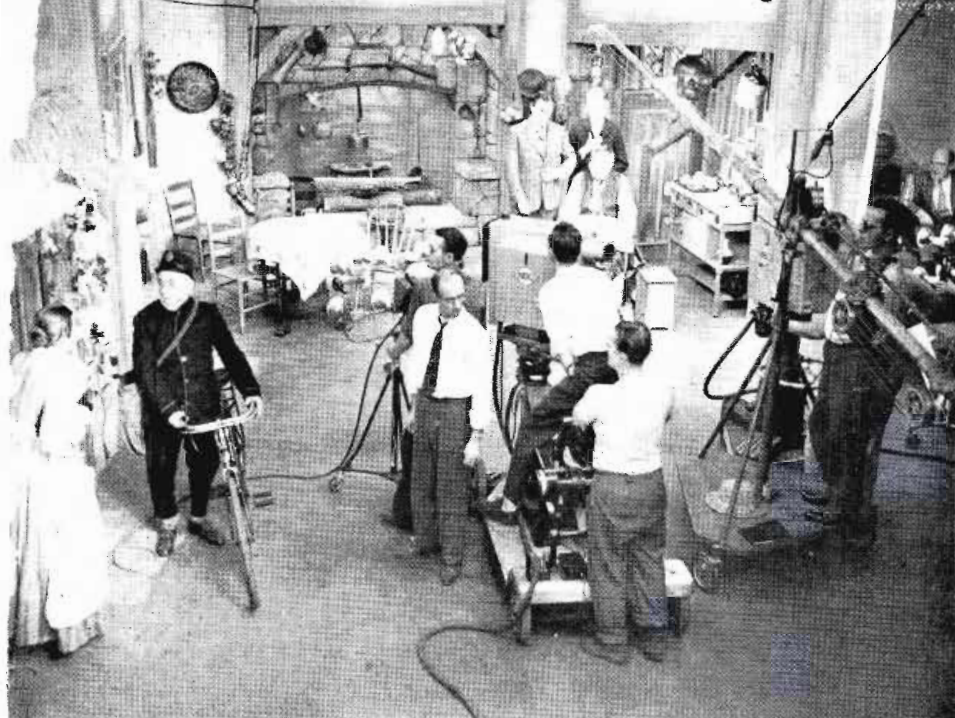
The romance of wireless entranced him. Its service in such disasters as the sinking of the steamships *Republic* and the *Titanic* fired his imagination. Presently he saw something in radio far beyond a mere message service. If the invisible waves could carry dots and dashes, why should they not carry spoken words and music? Inspired by this idea, he made an epoch-making suggestion—a proposal that revolutionized radio communications. He wrote a memorandum to officials of the Marconi Wireless Company—and I would like to quote from it, as written in 1916, four years before broadcasting began as a service to the public. Said Mr. Sarnoff:

"I have in mind a plan of development which would make radio a household utility in the same sense as a piano or phonograph. The idea is to bring music into the house by wireless. . . . For example, a radio-telephone transmitter having a range say of 25 to 50 miles can be installed at a fixed point where instrumental or vocal music or both are produced. . . . The receiver can be designed in the form of a simple 'radio music box' and arranged for several different wavelengths, which should be changeable with the throwing of a single switch or pressing of a single button. . . . Purchasers could enjoy concerts, lectures and recitals; baseball scores could be transmitted.

"Should this plan materialize, it would seem reasonable to expect sales of 1,000,000 'radio music boxes' within a period of three years. Roughly estimating the selling price at \$75 per set, \$75,000,000 can be expected."



TELEVISION RECEIVERS WITH KINESCOPE PICTURE TUBES IN PLACE MOVE DOWN PRODUCTION LINES AT RCA VICTOR ON THEIR WAY TO THE TESTING CHAMBER, THE LAST STOP BEFORE SHIPMENT.



IT WAS EARLY RECOGNIZED THAT THE MASTER KEY TO SUCCESS IN THE PUBLIC ACCEPTANCE OF TELEVISION WOULD BE GOOD PROGRAMS.

David Sarnoff's estimate wasn't nearly as rough as he thought. The Radio Corporation of America was organized in 1919, and broadcasting, which began in the autumn of 1920, expanded like wildfire in 1921. RCA's sale of home radio receivers—from 1922 through 1924—amounted to \$83,500,000!

Today, approximately 36 million, or 93 per cent of all homes in the United States have radio sets!

Today, the radio industry—with broadcasting as one of its major activities—contributes substantially more than one billion dollars a year to the national income. In 1946, the industry sold 15,000,000 radio sets and the rate of sales this year is higher.

Value of Research

So much for figures. Now I would like to stress the importance of scientific research. For no matter which field you enter, it is research that will keep your business alive and in step with progress. As a merchandiser, I can tell you from experience that research is the lifeblood of new products and services.

Never resist change or fear obsolescence, for they guarantee progress and improve service. So long as there are scientists, engineers and businessmen, there will be obsolescence. Otherwise, we would still be driving the horse-and-buggy, listening to the zither in-

stead of the phonograph, sailing instead of flying, listening to the radio instead of seeing television. Therefore, welcome obsolescence, for on its mossy stones you can step forward with science, in business and the arts.

Radio a Constant Challenge

The continued flow of new devices, new chemicals, new textiles and new products generally, makes adventures in marketing exciting. In radio, for example, we learn something new every day; it is a constant challenge to brains and to the aggressive spirit. Long after you get your degrees, you will find that you must continue your studies if you are to keep pace with progress.

To give you some concrete examples of marketing activities, let me turn to the RCA Victor Division for some practical views of our operations in merchandising and distribution.

We pick up where scientific research leaves off. Like most other manufacturers, our marketing functions begin with development and product design, then carry on through market research and distribution. Under these broad classifications are grouped such activities as engineering and styling, market surveys and analysis, sales methods and policies.

As an illustration of the import-

ance of product design in marketing, let me tell you of an important change in policy that is having significant results in the sale of radio sets. For many years prior to World War II, it was common practice throughout the radio industry to let the engineers design the chassis of new models and then ask the stylists to create cabinets to fit them. This practice was one of the reasons that put so many unattractive radio receiver cabinets into American homes.

Today, we first style the cabinet and then require the engineers to design a chassis to fit it. This reverse in procedure has resulted in outstanding advances in cabinet design, which, as any salesman knows, makes the job of merchandising that much easier.

RCA Victor is a strong believer in market research, in the benefits to merchandising of market surveys and analyses. But it accepts the results with caution. Faith in a new product can overcome precedents and open the way to new markets, even though it be a case of going where angels fear to tread. As we move along in this talk, I shall tell you about one merchandising achievement in radio that resulted from completely ignoring such a market survey.

Two-Step Distribution

Our organization is a careful student of distribution. It has to be, because of the diversity of its products. It makes use of all the various types of distribution, including direct sales, controlled outlets, factory-to-retailer, and factory-to-distributor-to-retail dealer—everything except mail order methods.

The bulk of our products, which include home radio, television and Victrola radio-phonograph instruments, phonograph records, and radio tubes, is handled by the factory-to-distributor-to-retail dealer method. This we call 2-step distribution. Our engineering products are sold directly to the user. Educational equipment is sold directly to the retail dealer with no intermediaries.

The distributors used by RCA Victor in our 2-step distribution are not merely warehousemen or jobbers. In effect they are factory representatives, and for this reason they get a higher percentage of profits than would be the usual case. All of our distributors are salesmen of the first order. They must be, because radio instruments require specialty selling. The salesman must know his product and be thoroughly familiar with the various ways of competing for the consumer dollar.

You may wonder why we favor 2-step distribution. It is more economical because it makes substantial savings in shipping costs. It relieves the manufacturer of the heavy financial burden of carrying his own inventory. It makes possible more even levels of production, thereby avoiding seasonal layoffs of employees. It does away with the necessity for the manufacturer to operate with a large, unwieldy sales staff, besides other important savings in selling costs.

There are those who argue against such a 2-step use of wholesale and retail outlets because, they say, it increases the cost of manufactured products to the consumer. RCA Victor has proved to itself, however, that this distribution method enables the production and sale of more goods than any other form. Most economists agree that national and even world prosperity are largely dependent upon the ability of manufacturers to produce and sell goods in ever-increasing quantities.

Another Form of Distribution

Another form of distribution—cooperative stores—is often pointed out as being more efficient. It may be in some instances, but I question its long range value. Cooperatives do little advertising. They do not stimulate a demand for goods. They do not promote new products or new services. So we do not believe that they produce the good results for our national economy that have come from more conventional and competitive ways of doing business.

Our company maintains a nationwide distributing organization. With three exceptions, the distributors are independent operators.

They do not have an RCA Victor franchise but they have a letter of appointment with a suggested and recommended territory. In accordance with practice in the radio industry, our distributors handle no competitive brands of radio instruments.

To keep a careful check on trends in distributions and to pass new developments on to its independent distributors, RCA Victor operates one wholly-owned distributing company, functioning in three markets—Chicago, Detroit and Kansas City.

The manufacturing time cycles in radio are so long that our merchandisers must plan future activities well in advance. We must be able to foresee what the public will want to buy at least a year ahead. The potential sales of each product must be determined and a sales budget established to guide our manufacturing activities.

A New Exploit in Marketing

One of the greatest marketing exploits in radio occurred in 1940, when a group of RCA Victor merchandising men decided to ignore the results of a survey and market analysis.

As early as 1922, David Sarnoff had instructed the RCA research staff to keep in mind the development of an individual portable radio receiver—one small enough to be carried like a camera. In 1940, the creation of miniature vacuum tubes and batteries, made this possible. Our engineers and designers came up with what is now universally known as the "Personal Radio". Merely lifting the lid causes it to operate; its tone quality is excellent.

But the marketing of this camera-type radio receiver presented new problems. We had to sell at least 25,000 units to amortize the costs of plant tooling, and we had to price the set at approximately \$20 retail.

No comparable radio product had ever been sold, so it was decided to run a market survey among dealers. The results were almost completely negative. Dealers agreed that the set was smartly styled, but they said that it "didn't look like \$20," and that the public "wouldn't pay that much for it." It had only four tubes, whereas a five-tube table model receiver could be bought

for as low as \$9.95. As a result of the survey, we were led to believe that most radio dealers, being unaccustomed to this type of product, might not be the best outlets for it.

Merchandisers Held Faith

But the merchandising group at RCA Victor did not lose faith. Here is the way they looked at the "Personal Radio".

It was new and novel.

A demonstration created the desire to own one.

It had a new and smart style, and could be featured in the most fashionable stores. Name personalities would be proud to own and use one, and their name or initials could be engraved upon its jewel-box case.

As a gift item, it was a natural.

It appealed to the impulse buyer.

It was easy to use, convenient to carry.

So the enthusiasm of our merchandising group won!

A comprehensive program of manufacturer, distributor and dealer activity was developed to cover all phases of merchandising with intensive advertising, sales promotion, publicity and initial exploitation in the metropolitan New York market. A careful distribution of sets to radio artists, columnists, and leading stage and screen personalities resulted in an exceptionally fine reception. Lucky owners found themselves demonstrating the sets to their friends and acquaintances at home and in fashionable meeting places. Such ideas as the use of this set in the musical, "Walk with Music", playing on Broadway, resulted in extensive interest and comment. Magazine pictures revealed that one was on the President's desk in Washington.

Backed by a generous advertising budget, including full page advertisement in several New York papers, the sales campaign featured a broad scale tie-up at the New York World's Fair. Remarkably enough, less than half of the original advertising budget allocated for this campaign was used, yet the first 25,000 radios were sold out in the first thirty days. Retailers, who originally turned down the opportunity to buy,

jumped on the band-wagon and the rush was on. With such acceptance, the question arose as to the next market to be opened. It appeared that the one additional major field where we could fully capitalize on the initial momentum generated by the New York campaign was Hollywood.

By that time, the early enthusiasm had generated into company-wide interest. RCA Victor executives were photographed in shirt sleeves loading the first freight cars for the Coast. The "red carpet" was out when the sets arrived in the West, and an intensive promotion campaign had been organized, in the best Hollywood manner. With the cooperation of the National Broadcasting Company and Warner Brothers, an exploitation campaign was started with practically every star on the Warner lot using this "Personal Radio" in still photographs for advertising and sales promotion.

Instead of selling only 25,000 "Personal Radios" during two summer months, we sold more than 225,000 in six months. Faith in the product, backed by the imagination and drive engendered by faith, turned the trick.

Television — A Merchandising Example

Now an even better example of modern merchandising can be found in television. Here again, the basic qualities of confidence and belief in an idea were the keys to success. In the late 'Twenties, Dr. V. K. Zworykin, now Vice President and Technical Consultant of RCA Laboratories, had joined the RCA staff of research engineers. One day, he went to David Sarnoff and told him about the iconoscope, or electronic "eye" of television.

Mr. Sarnoff listened intently for half an hour.

"It's too good to be true!" he exclaimed. "What will it cost to develop the idea?"

"Maybe about \$100,000," answered Zworykin.

"All right," said Sarnoff. "It's worth it!"

Since that day, many millions of dollars have gone into continual research and technical development of television. Yet there was no advance guarantee that it would be

practical for home use. But these two men—Sarnoff and Zworykin—had faith, and today their idea is well on its way to becoming one of America's major industries. I doubt if any new product, or service, has ever been brought out under more difficult circumstances than those that have beset the path of television.

Programs Key to Success

In the first place, the radio industry itself was divided as to the value of television as a new enterprise. Millions of dollars and extensive new facilities were needed, first for engineering research and development and, then, for manufacturing. Finally, as television neared readiness as a service to the public, rigid technical standards were established for its operation. And it was recognized that the master key to success in public acceptance would be good programs.

But these problems were only the beginning. No one had ever tried mass production of television receivers, which are many time more complicated than radio sets. Consumer likes and dislikes were unknown. The price of the first pre-war television sets was high—\$600—making difficult competition for the consumer dollar.

New sales methods had to be devised. Sales personnel and field service men for television did not exist. They had to be organized and trained. Manufacturers, distributors, and retail dealers had to learn from scratch how to handle this new product.

The broadcasters themselves were divided on the advisability of entering the new field. Relatively few television stations were on the air in the beginning, thus limiting the market for receivers. With few receivers, circulation was small and unattractive to advertisers. So, of necessity, program hours lacked variety and quality.

Nevertheless, television moved ahead in the years immediately preceding the outbreak of war in Europe. RCA, which pioneered the development of television, gained a limited, expensive but highly valuable, experience. Among other things, we learned that this new product required a marketing effort

far different from anything in sound radio.

Commercial research on the public's reaction and its willingness to pay for television indicated that extensive expenditures would be necessary to introduce it to the American consumer.

The impact of television on other phases of our business, such as broadcasting, home radios and phonographs, theater-sound recording and equipment business—all presented interesting commercial problems. It was felt, however, that as a new service, television would not displace the motion picture, supplant sound broadcasting, or seriously injure the radio or phonograph record business.

Instead, it presented a new business opportunity requiring courage to overcome obstacles. For example, television as a service to the public was launched originally in 1939 at the opening of the New York World's Fair. Sales of receivers by dealers were slow. Programs were limited and many so-called experts said receivers couldn't be sold. So we sold them.

We supplemented our distributor-dealer activity in the New York market with a group of direct sales specialists, who went out and worked with our dealers. Programs were improved and, in 1940, our factory output was being sold in New York week after week. Advertising and promotion were increased and indications were that television was actually on its way.

War Ended Activities

But with the outbreak of war, our commercial activities in television ceased. However, our pre-war television research and development were of extreme value in the war effort. RCA supplied more than 95 per cent of the television equipment used by our armed forces. When the war ended and we were able to resume peacetime operations, we found that our wartime scientific research and development were of great value in furthering the advance of television as a peacetime service to the public.

By November, 1946, our postwar plans were in operation and we soon began delivery of new television receivers to dealers and their cus-

tomers. Our basic marketing philosophy was two-fold!

First, we determined to build a product so good that the public would be surprised by its quality. Second, we determined to see that our product moved off the dealers' floors into the hands of satisfied customers. Prewar technical and commercial "know-how", though limited, was of priceless value in our planning. We knew that properly made and sold, the public would buy RCA Victor Television.

One major point, however, remained—the natural reservation people might have to the purchase of a new, relatively high-priced radio-electronic instrument for the home. Antenna installation, wiring, service and maintenance had, therefore, been done solely by dealers and radio service men. Television, as a new service, lacked the manpower to do this job efficiently on a broad scale. Even though we knew there were a few men qualified to do some of this work, we decided to provide a new solution.

Owner's Policy Introduced

The RCA Service Company, which for years has installed, serviced and maintained radio, sound and picture equipment in theaters and radio stations, provided a nucleus of television servicing manpower. Through this company, we developed what is called the RCA Victor Television Owner's Policy, whereby, with each set sold, we supply for a standard fee, the antenna and all necessary accessories, hardware, wire, etc., and install the antenna and receiver, plus a year's service and maintenance, including replacement of any part, if necessary.

The latter item was vitally important because the kinescope, or picture tube, alone retails for \$49.50. The fee for the policy ranged from only \$45.00 to approximately \$90.00, according to the list price of the set.

Marketwise, all our distributors and 99 per cent of our dealers welcomed this plan.

Consumer demand has far exceeded our most optimistic expectations. As a result, we have recently

doubled our production of television by opening additional plant facilities at Indianapolis.

Today, the FCC has authorized a total of 69 television stations, and 26 applications are pending. Already there are 14 stations on the air with regular television programs, and by the end of 1947, it is expected that there will be about 26 stations. In 1948, this number will show a substantial increase as transmitters become available.

Current Status of Television

By the end of 1947, it is estimated that there will be between 150,000 and 175,000 television receivers in the United States; by the end of 1948, about 750,000, and from there on the number will increase rapidly as mass production gets under way at an accelerated pace.

Television will be supported by advertising, for it is unsurpassed as an advertising medium having both eye and ear appeal. Therefore, the gradual fusion of sound broadcasting with television is destined to come, just as sight and sound joined in motion pictures.

Television also will become a coast-to-coast service, and possibly by 1950, there will be a nation-wide network in which stations will be linked by coaxial cable and automatic radio relay stations.

The additional applications of television are unlimited. It requires no stretch of the imagination to foresee how schools and colleges will use television, both in the classrooms and for extension courses. Several weeks ago, the Congress of the American College of Surgeons in New York watched surgical operations at the New York Hospital, while the members sat before television screens at the Waldorf-Astoria hotel. It was amazing how clearly the television camera pictured the operation and the movement of the doctor's hands as he explained his technique. Famous surgeons watched and commented that television might well provide the Medical Lecture Hall of the future.

Television, you can see, is not limited to entertainment. Some of you may be interested in manufac-

turing, and for you, industrial television, with its panoramic views of entire factories, of dangerous chemical processes, of mines, tunnels, and submarine operations, offers new opportunities in the modernization of industry. In manufacturing plants, television makes possible the centralization of inspection; the assembly line can be observed at one or at many points, thus facilitating visual control of distant operations. Increased coordination all along the line is facilitated; delivery of parts can be watched and properly timed, and the movement of the belt regulated for utmost efficiency. Industrial television and industrial electronics will offer new services.

We also foresee great possibilities for television in department stores. There the managers may sit at their desks, with an eye on the entire store. By pushing buttons, executives will watch the functioning of their organizations. Intra-store television will present dramatic visual displays of merchandise. Seated in comfortable viewing salons, which we call "telesites", shoppers will see fashion shows and the goods on sale in all department. Television will provide a display window to the entire nation; people will shop by television and then telephone their orders.

Future of Television

In my judgment, no other new American industry holds such a bright economic future as television. But with television will come new problems of obsolescence, new calls for merchandising genius, and new opportunities for trained business men to convert the products of science into practical services.

Television is the future of radio; it is a new tool for the alert and aggressive merchandiser. Now, in radio we have both sound and sight to market and to aid in marketing. Whether you enter the radio field, or some other industry or business, you will find radio and electronics ready to serve you and to help in marketing whatever product you sell from razors to radios, from sapphires to soap. Seeing is believing! And we are told that a picture is worth 10,000 words!

Radiophoto Standards

(Continued from page 15)

Thus if we are sending a checker-board of squares this size, we would have a keying speed of about 500 or 600 cycles per second on a modern Radiophoto machine.

If we are to reproduce a sharp picture with good detail at the receiving end, each of the little squares transmitted must be received and recorded with the same overall time lag or they will tend to make the scanning lines appear staggered and reduce the quality in the final copy. However, propagation conditions on long transoceanic radio circuits are seldom such that the dots arrive with the same lag. This is because the radio signal is reflected several times between the earth and the ionosphere—an electrical mirror some sixty to a hundred miles above the earth. Furthermore, the length of this path continually varies so that some squares travel a longer or shorter time than the average. Also, there is sometimes more than one path the radio signal can take depending upon whether there are two, three, or four reflections on the circuit. Thus, squares leaving the transmitter at the same instant may travel different paths and arrive at the receiver with different amounts of delay causing the resultant to be larger than the original square and reducing the sharpness of the recorded copy.

We can now see that the three variables requiring standardization are the diameter of the cylinder, the fineness of the line advance, and the speed of cylinder rotation. The product of cylinder diameter and line advance can be expressed as the "index of cooperation". As long as the index of cooperation on any two machines is the same, the machines will match, but if the diameters of the cylinders are different there will be an enlargement or reduction in the transmission process.

Large Cylinder Preferable

In the CFVD system a large diameter cylinder was preferable to permit photographic reduction of

the received copy to reduce the effect of the dot pattern and standardization was established on the 88 mm diameter cylinder. With the SCFM system, photographic reduction is not necessary and a smaller drum is desirable with a view toward reducing the keying speed.

Since European telephoto systems are standardized on a 66 mm. cylinder,—slightly less than 3 inches in diameter—the question arose as to the adoption of this size for Radiophoto. This cylinder, which accommodates 5 x 7 inch copy, was considered too small for the average Radiophoto material. Accordingly, a diameter of 70 mm. has been accepted as being the optimum size, since with a length of 300 mm. it will accommodate the standard American or European letterhead assuming there is some margin space on each side of the written matter.

As to choice of line advance, it is necessary to decide between speed of transmission and quality of detail for each is gained only at the sacrifice of the other. An effective compromise was arrived at by proposing a double standard of 3.97 and 5 lines per millimeter as an intermediary measure until further experience dictates which is the optimum.

More Standards in Prospect

Present radio circuit experience indicates that 60 revolutions per minute is the maximum for average conditions but under certain circumstances this may be increased to 90 or 100 r.p.m. Here again a double standard of 60- and 90-r.p.m. has been proposed as an interim measure. It is hoped that in the near future a machine having a cylinder diameter of 70 mm., a cylinder length of 300 mm., and a line advance of 5 lines per mm. will be accepted as standard for both Radiophoto and wireline use. This machine could then be run at slow speed for Radiophoto and at higher speeds on wirelines since a choice of cylinder rotational speeds is not difficult to provide.

RCA Restores Message Service to Germany

Radiotelegraph service between the United States and all parts of Germany has been restored, according to an announcement by Maj. General Harry C. Ingles, President of RCA Communications, Inc.

For the first time since the end of the war, he said, it is possible to exchange messages with the four zones occupied by American, British, French and Russian forces. Service was restored to some sections of the country soon after the occupation was begun in 1945, but it has been more than six years since all German cities could be served.

General Ingles said that the following rates would be effective for messages marked "VIA RCA": full-rate messages, 20 cents per word; deferred messages, 10 cents per word; night letters (minimum of 25 words), 8 1/3 cents per word.

Wire Recorder

(Continued from page 18)

mons and speeches; and physicians for recording psychiatric and other types of interviews. In business offices, the unit is ideal for recording conferences, especially where discussions are of a technical nature not easily handled by stenographers, and for recording sales talks which can then be mailed on the easily mailed plug-in cartridge for playback in distant branch offices.

In addition, a device called an induction transformer can be readily installed to permit the practical recording of telephone conversations. In this way, calls can be recorded in the absence of executives from their offices. The 100 percent accuracy of messages thus received is invaluable in contractual or financial matters transacted over the phone. The application also is useful to business men handicapped by deafness.

Other uses of the recorder include recording testimony of witnesses for court use; as a check on renditions by singers and instrumentalists; in commercial recording studios and in reporting newspaper on-the-spot interviews for newspapers.

[RADIO AGE 31]

1948

Television's Year

Television becomes a widening reality in 1948. An exciting promise is now an actual service to the American home. After twenty years of preparation, NBC Network Television is open for business.

When the Radio Corporation of America formed the National Broadcasting Company in 1926, its purpose was to broadcast better programs *in the public interest*—and that purpose continues to be its guiding policy.

Today, twenty-two years later, NBC has the most popular programs in radio. Outstanding in its contribution to the public welfare, the National Broadcasting Company has served the nation in war and in peace. Now, it has added a new service—Network Television—in the same spirit as that which first moved its parent company: public interest. NBC, in pioneering and developing this great new medium of information, news, entertainment, and education, is fully aware of its responsibility.

In 1948, NBC offers to the public the greatest medium of mass communication in the world—Network Television.

THE TELEVISION PICTURE LOOKS BRIGHT.....

NBC's TELEVISION NETWORK

In the East, four stations now make up the new NBC Television Network: WNBT, New York; WNBW, Washington; WPTZ, Philadelphia; and WRGB, Schenectady. WBAL-TV, Baltimore, and WBZ-TV, Boston, will be on the air shortly as NBC's fifth and sixth television affiliates.

In the Midwest, three NBC affiliates are independently engaged in telecasting operations: KSD-TV, St. Louis; WTMJ-TV, Milwaukee; and WWJ-TV, Detroit. It is anticipated that within the year these stations will be carrying network television programs originating in Chicago, where NBC will open its station. In addition, NBC will construct a station in Cleveland.

On the West Coast an NBC station is under construction in Los Angeles. It will serve as a focal point for the establishment of a western regional network.

The plan for 1948 and 1949: To add ever-increasing numbers of affiliates to these three regional networks, culminating in a coast-to-coast television network.

TELEVISION STATIONS

Today, nineteen stations are engaged in television operations throughout the country.

In addition to the stations now telecasting, fifty-four have received licenses and sixty-four more have applications pending.

Total: 137 stations in actual television operation; being constructed, or waiting for official approval from the Federal Communications Commission.

We confidently expect that the same NBC-affiliated stations which pioneered sound broadcasting will take the lead in bringing this great new medium of sight and sound to their communities.

THE TELEVISION AUDIENCE

One year ago there were 8,000 television receiving sets in the country. Today there are 170,000. Estimate for December, 1948: 750,000 sets.

With multiple viewers per set, NBC Network Television programs will be available to an audience of millions.

TELEVISION PROGRAMMING

Hundreds of thousands of viewers will remember these recent NBC Television programs among many others equally outstanding—

IN DRAMA . . .

Kraft Television Theater is the first regularly sponsored dramatic series on NBC Television.

The Theatre Guild series brings the greatest art of the New York theatre to viewers distant from Broadway.

On the American National Theatre and Academy series, comedy, drama, farce—the whole scale of the theatre—is brought to viewers as it is played.

IN SPORTS . . .

NBC Network Television has pioneered in bringing major sports events to its audience—from the exclusive broadcasts of the Joe Louis championship fights against Conn and Walcott to the World

Series games of 1947. Today, one-quarter of NBC's current television schedule is devoted to sports.

IN SPECIAL EVENTS . . .

The Presidential Conventions in Philadelphia this coming summer will be comprehensively covered by mobile units of NBC's Television Network, bringing the faces and voices of political speakers into thousands of American homes. The campaigns that follow will receive equally emphatic coverage. Since the televising of President Roosevelt's speech at the World's Fair in 1939, special events television has risen from the status of a novelty to the position of a significant communications reality.

NBC's PROGRAM SCHEDULE . . .

In addition to extra hours for news and special events, a wide variety of programs can now be viewed on the new television network. Here is the current breakdown of each week's programming:

- 7 hours for women's programs
- 7 hours for sports events
- 3½ hours for variety shows
- 3 hours for dramatic presentations
- 3 hours for children's shows
- 2 hours for educational programs
- 1½ hours for quiz and round-table shows

Two months from now the number of telecast hours will jump from twenty-seven to thirty-five a week. Still more hours will be added as the number of receiving sets increases and more stations join the network.

TELEVISION AND THE AMERICAN ECONOMY

ADVERTISING

Like standard radio broadcasting, network television will depend for the expansion of its facilities and programs on advertising. As advertising has built the wide range of radio's broadcasting schedule, so it will make possible an increasing wealth of fine programs on television.

Today, 18 of the country's large advertisers are sponsoring NBC television programs—about half of them on the entire television network. Some two hundred other advertisers are currently sponsoring programs on the twenty-odd individual stations throughout the country.

ECONOMIC FORCE

It is NBC's belief that, within a few years, more than a quarter of a million people will be employed in the manufacturing and telecasting operations of the business alone. Available estimates point to television as a half-billion dollar business by the end of this year. This new industry will grow in size and service with the years.

THE FUTURE

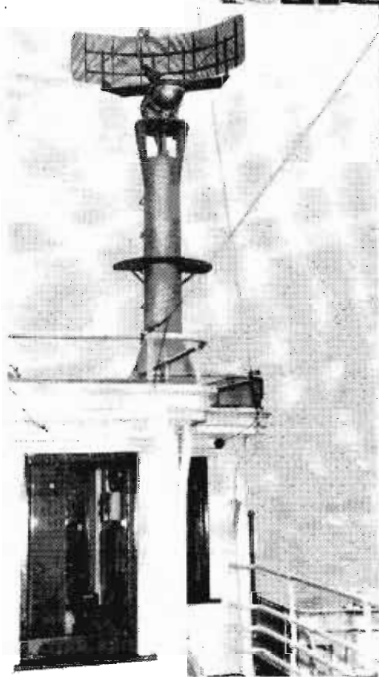
NBC's new eastern television network is only the beginning! But it is the beginning of a *working reality*. 1947 marks the end of television's interim period. 1948 signifies the appearance of television as a new force in the United States. *The greatest means of mass communication in the world is with us.*

NBC Television

NATIONAL BROADCASTING COMPANY, 30 ROCKEFELLER PLAZA, NEW YORK

A Service of Radio Corporation of America

Aboard Georgian Bay Line Ships you'll see **RADIOMARINE 3.2cm RADAR**



Radiomarine Radar Antenna installed atop the pilot house.

Captain Richard A. Harreutt, explaining to a passenger how Radiomarine Radar aids navigators.



The S.S. South American, Great Lakes cruise ship, equipped with Radiomarine Radar.

The S.S. North American and S.S. South American, lake cruisers of the Georgian Bay Line, provide an extra measure of safety for passengers, crew and ship with Radiomarine 3.2 cm Radar.

In fog, storms and darkness, in and out of heavily trafficked ports, Georgian Bay Line ships proceed on their 2100-mile round-trip pleasure cruise on the Great Lakes. With Radiomarine Radar aboard, the navigator sees clearly shore lines, other ships, entrances to locks, low-lying buoys and channel markers. Even when navigating a channel only 500 feet wide he sees water between the ship and the earthworks on the scope of a Radiomarine Radar.

Designed for Merchant Marine Service

From Radiomarine you get modern, postwar radar of advanced design and construction. Radar that meets the rigid all-weather requirements of present and future merchant vessels operating on the high seas, lakes or rivers.

We're in full production and making frequent installations. For prices and further information write: Radiomarine Corporation of America, Dept. 12-J, 75 Varick Street, New York 13, N. Y.

— YOU GET THESE ADVANTAGES with Radiomarine Radar —

- 12-inch viewing scope
- 86 square inches of picture area
- clearer, larger, steadier pictures
- sharp definition between closely spaced and low-lying objects
- true or relative bearings
- range 80 yards to 50 miles



RADIOMARINE CORPORATION of AMERICA

A SERVICE OF RADIO CORPORATION OF AMERICA



"Our American concept of radio is that it is of the people and for the people."

Freedom to LISTEN – Freedom to LOOK

As the world grows smaller, the question of international communications and world understanding grows larger. The most important phase of this problem is *Freedom to Listen* and *Freedom to Look*—for all peoples of the world.

Radio, by its very nature, is a medium of mass communication; it is a carrier of intelligence. It delivers ideas with an impact that is powerful. . . . Its essence is freedom—liberty of thought and of speech.

Radio should make a prisoner of no man and it should make no man its slave. No one should be forced to listen

and no one compelled to refrain from listening. Always and everywhere, it should be the prerogative of every listener to turn his receiver on or off, of his own free will.

The principle of *Freedom to Listen* should be established for all peoples without restriction or fear. This is as important as *Freedom of Speech* and *Freedom of the Press*.

Television is on the way and moving steadily forward. Television fires the imagination, and the day is foreseen when we shall look around the earth from city to city, and nation to nation,

as easily as we now listen to global broadcasts. Therefore, *Freedom to Look* is as important as *Freedom to Listen*, for the combination of these will be the radio of the future.

The "Voice of Peace" must speak around this planet and be heard by all people everywhere, no matter what their race, or creed, or political philosophies.*

David Sarnoff

President and Chairman of the Board,
Radio Corporation of America.

*Excerpts from an address before the United States National Commission for UNESCO.



RADIO CORPORATION of AMERICA

FREEDOM IS EVERYBODY'S BUSINESS