

RADIO AGE

RESEARCH · MANUFACTURING · COMMUNICATIONS · BROADCASTING

46-224



JULY

1947

THEME TOWER
RCA Exhibition Hall



RCA Communications' new world-wide automatic tape relay radio system speeds Radiograms.

New wings for words around the world!

Radiograms "Via RCA" to and from overseas points now are processed by automatic machines which speed your messages through such gateway cities as New York, London, San Francisco and Manila, without delay.

This advanced technique in international radiotelegraphy is the result of wartime research and development. It gives to private messages the same speed, accuracy and dependability which were attained through its world-wide use by the U. S. Army Communications Service during the war.

RCA Laboratories—one of the world's foremost centers of radio and electronic research—is continually pioneering and advancing radio communications in service to the Nation and the public.

When you buy an RCA Victor radio or television receiver, Victrola radiophonograph, or phonograph record, you are getting, thanks to RCA research and engineering, one of the finest products of its kind science has achieved.

Radio Corporation of America, RCA Building, Radio City, New York 20. Listen to the RCA Victor Show, Sundays, 2:00 P.M., Eastern Daylight Saving Time, over the NBC Network.



At RCA Communications, "Package Sets" contain an automatic sending and receiving unit for a foreign gateway city. Messages, in tape form, received through these machines, are ready for quick delivery or immediate transmission to any part of the world.

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



RCA COMMUNICATIONS, INC.

A SERVICE OF RADIO CORPORATION OF AMERICA

RADIO AGE

RESEARCH • MANUFACTURING • COMMUNICATIONS • BROADCASTING • TELEVISION



COVER

Revolving Theme Mast in the RCA Exhibition Hall, Radio City, portrays the history of the Radio Corporation of America with an array of miniature models on a spiral ramp.

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

RADIO CORPORATION OF AMERICA

RCA Building, New York 20, N. Y.

DAVID SARNOFF, *President*

LEWIS MACCONNACH, *Secretary*

ARTHUR B. TUTTLE, *Treasurer*

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NBC TELEVISION STATION WNBW, WHICH OPENED IN THE NATION'S CAPITAL ON JUNE 27.

Outlook for the Radio Industry

Television, FM Broadcasting, Industrial Electronics on Verge of Broad Advances, RCA President Tells Radio Manufacturers — He Says Economic Readjustment Now Underway Will Result in a Stronger, Healthier Industry

POINTING to unlimited opportunities for expansion of the radio industry, Brigadier General David Sarnoff, President of the Radio Corporation of America, in an address at the annual convention of the Radio Manufacturers Association in Chicago on June 12, said that the future of the industry is to be found not only in standard broadcasting, but also in television, FM (frequency modulation), industrial electronics and foreign trade.

Television alone with its vast possibilities for home, theater and industrial use represents opportunities, he said, that will enable the radio industry to achieve new records on an unending road of progress. He added that he foresees the ultimate fusion of sound broadcasting with television, and that the 36,000,000 homes now equipped with radio will find new pleasures in sightseeing and attending events by television.

Opportunities Are Challenging

Calling attention to the fact that since the first of the year economists have warned of a business decline, General Sarnoff said:

"A readjustment already is underway. Certainly we need to adapt ourselves to its requirements by a reasonable appraisal of current conditions, by constant efforts to effect economies in costs of production and selling and by improving our products. This readjustment of viewpoint and operations will result in a stronger and healthier industry.

"Radio, by its very nature, is in the vanguard of science. The possibilities that lie ahead in television, radar, electronics, and other products of radio technology present opportunities that are challenging and real. As long as our industry continues to foster research and create new products and services for the public, we need not fear for its future.



BRIG. GENERAL DAVID SARNOFF

"We stand on the firm foundation of a great industry, built by many years of pioneering, production, and service to the public. We began as pioneers in a wilderness of economics. We have moved up and down with changing business cycles, weathered worldwide political storms, and not only survived, but emerged stronger than before. And we are still pioneering.

"Radio manufacturers and merchants are in a far better position today than they were at the beginning of broadcasting. We have learned in the hard school of experience the practical lessons of production and merchandising.

Three New Markets

"Today, the radio industry is on the threshold of three great new markets—FM, television, and industrial electronics—while the older markets for standard broadcast receivers and combination instruments are still fertile. For instance, radio-phonographs and phonograph records are in greater demand today than ever before."

Technical and economic conditions which retarded the growth of

FM during the war and in the early post-war period now having been removed, the outlook appears bright for this branch of the industry, General Sarnoff said, in urging whole-hearted cooperation of all who can contribute to its progress.

"The measure of its success will be determined largely by the quality and variety of the programs transmitted over FM stations," he said. "I believe that the fullest benefits to the public and the larger opportunities for sales will come only when programs now broadcast by standard stations and networks are permitted to be sent simultaneously over FM stations. Let us hope that present-day restrictions, which forbid this, may soon be removed."

Television, General Sarnoff asserted, is a service designed not only for the home, but also is destined to have great implications for the theater, the motion picture studio and the entertainment film, and last, but not least, in the manifold processes of industrial life.

Television Opportunities

Television, therefore, he pointed out, offers the radio industry a combination of opportunities: first, to make transmitting and receiving sets; second, to equip theaters; and, third, to manufacture for industrial applications. He declared that there is no need to wait for television on a national scale to receive the benefits it already affords to city-wide, or local communities. He described the small town as "a natural television stage".

"The belief that a local television station cannot be erected and operated without a large investment is wrong," he continued. "Television programming can be started by local stations, in a small way, with a minimum of facilities, and expanded as receiving sets and commercial sponsors increase. In the meantime, until networks are available, films of live shows and news-

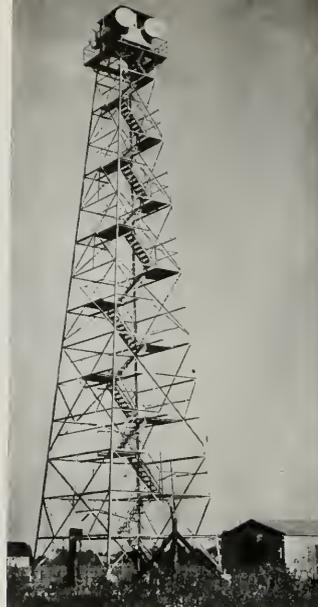
reels can be flown to stations throughout the country to add to their program variety. Like the many independent local broadcasting stations, which are successful and profitable, television stations also will thrive upon local talent and community service."

Dispelling several false notions regarding television, General Sarnoff said that television will not reach the homes over wires, but definitely will be broadcast through the air and the programs will be free to the "looker" as sound broadcasts are to the "listener".

50,000 Television Sets in Service

"The argument that television must offer a continuous flow of Hollywood extravaganzas is false," he continued. "The great attraction of television is timeliness. Many of its programs are seen as they happen; they are both entertainment and news.

"Our reports, since production of postwar television receivers got underway, reveal a tremendous public interest, and therefore a vast potential market extending the length and breadth of this land. Today, it is estimated that approximately 50,000 television receivers are in service, and this figure is rising daily. As rapidly as additional television transmitters go on the air, new areas will be opened for the sale of receivers. Manufacturers now have in production



approximately fifty of these transmitters for which licenses and construction permits have been issued by the FCC. Many of these transmitters are scheduled for delivery in the present year. There are ten television stations in operation in eight cities, and the eleventh will go on the air in Washington, D. C., this month.

"New York, Philadelphia, Washington, Schenectady, Detroit, Chicago, St. Louis, and Los Angeles,

"AUTOMATIC RADIO RELAY STATIONS, EITHER ALONE OR IN COMBINATION WITH THE COAXIAL CABLE, SHOW GREAT PROMISE FOR SPEEDING THE EXTENSION OF TELEVISION PROGRAM SERVICE THROUGHOUT THE NATION."

with television stations already on the air, represent links in eventual nation-wide television networks. The first of these networks should be in operation before 1950. The East will see the West, and the West will see the East. Television will project pictures across the prairies, over the mountains and into the valleys."

Fusion of Sound and Sight

General Sarnoff said that it is natural today for the manufacturer as well as the broadcaster to wonder what effect the ever-increasing interest in television will have upon his established business. In looking to the future as he foresees it, he stated:

"What the ultimate effect will be upon the balance sheet and income statement of an established radio manufacturer or broadcaster will depend upon his courage, wisdom and action. The blacksmith, who remained at the anvil, found that his forge went out, but the blacksmith who turned his shop into a garage prospered. In television, as in other fields of American industry, the dynamic forces of competition will definitely assert themselves.

"While I foresee the ultimate fusion of sound broadcasting with television, this, it is evident, will take years to achieve. Nevertheless, it is destined to come in radio, just as the combination of sight and sound came in motion pictures.

"Indeed, the time may come when an important broadcast program that we cannot see will seem as strange as a movie that we cannot hear. This does not mean that such a development is around the corner. Programs limited to sound and prepared through the techniques of



"TELEVISION CAMERAS ALREADY HAVE SCANNED THE CONGRESS AND THE PRESIDENT OF THE UNITED STATES."

sound broadcasting alone will continue to serve the millions through many hours of the broadcasting period when the eye cannot be riveted on the television picture."

In discussing the great possibilities of theater television, General Sarnoff said:

"Television, essentially, is a picture in motion. And there are motion picture people quite alive to the promise of television in the theater as well as in the home. Their theaters may soon be open to television equipment developed for service of the theater screen. These leaders of the film industry are among the few who did not shut their ears to sound, which came just in time to open a new vista for the then silent movies.

Television as a New Art Form

"There are many more, however, who are strangely indifferent to the new art—or perhaps they are waiting until television delivers itself on a silver platter to the motion picture industry. They have the know-how, the experience, and the talent for picture making, and their pride is understandable in view of the huge box-office they have experienced. But they tend to shut their eyes, as they once shut their ears, to another momentous electronic development—sound on film. They measure the impact of television on their own industry by comparing the entertainment values of the theater screen with the programs they see on the present television set. They are greatly mistaken. Television promises to develop an art form of its own, and the immediate impact of television on theater attendance will come from the timeliness and dramatic interest of the event that television will bring to the home.

"But it would be folly to suppose that television will ever supplant the theater any more than radio has supplanted the concert hall or the opera house. Broadcasting greatly multiplied the audiences for both. Television can do as much for the movie theater. Time will tell whether a failure to face the facts is the best possible protection of studio investments and the theater box-office.

"In its technical aspect, television



"TELEVISION IS AN IDEAL ADVERTISING MEDIUM, UNSURPASSED IN ITS SIMULTANEOUS APPEAL TO THE EYES AND EARS OF MILLIONS OF PEOPLE."

as a method of simultaneous distribution of motion pictures to the theater may revolutionize the trade structure of the motion picture industry.

"Furthermore, it brings into view a new method of booking to theaters the action of live talent, vaudeville, drama, opera, sports and other events, simultaneously distributed to hundreds of thousands of movie theaters."

There are interesting indications, he continued, that as television transmitters begin to spot the country, progressive independent producers will see their opportunities not alone in terms of the present twenty thousand theaters, but of the many millions of homes that may be eventually equipped with television. It may even be that such independent television production, financed by the same methods that presently exist in the movies, may flow to the theaters in full-length form, after exhibition on the air, instead of vice versa. That, he admitted, is projecting thoughts considerably into the future.

"But this much is already evident," he added: "the newsreel theater of today could readily become the television theater of tomorrow.

"With the camera as well as the microphone focused on the stage, television can be expected to become a vastly greater means for the discovery of talent than sound ever was.

"It was radio and electronics that gave the film its voice. It will be radio that will equip the theater with a television eye. I believe that television can be as great a boon to the theater as sound was to the silent picture."

Television Aids to Industry

General Sarnoff warned the manufacturers not to permit their enthusiasm for home and theater television to obscure the great possibilities of industrial television.

"The television eye makes it possible to see anything, almost anywhere," he declared. "It can be used to observe dangerous chemical processes. It can be put into blast furnaces to permit the study of the flame. Television brings a camera eye into mines and tunnels. It can be lowered into tank cars as well as into the depths of the sea. Fishermen may drop a television eye over the side to locate schools of fish and oyster beds. Explorers will scan marine life and the geology of

the ocean floor. Wrecks at any depth will be observed from the decks of ships without endangering divers.

"Television presents a panoramic view. I envisage factory superintendents at their desks overlooking their outlying plants, even those in distant cities, through television. Centralization of inspection is made possible; the assembly line can be observed at one or at many points, thus facilitating visual control of all operations. Coordination along the line is made possible; the delivery of parts can be watched and properly timed; movement of the belt can be regulated for utmost efficiency and work performance can be surveyed and time-studied.

Display Window for Nation

"I foresee the department store manager at his desk, yet with his eye on the entire store. Intra-store television will present dramatic visual displays of merchandise. Seated in comfortable viewing salons, that may be known as 'teleshops', shoppers will see fashion shows and the goods on sale in all departments. By pushing buttons, executives will watch the functioning of their organizations. Television will provide a display window to the entire nation; people will shop by television and then telephone their orders."

In addition to industrial television, General Sarnoff pointed to industrial electronics as a relatively new field which already indicates

a continued growth and rapid expansion of incredible proportions. He said that it shows a promise of becoming one of the largest economic factors in the radio industry, for electronics, born of radio, is no longer the exclusive servant of electrical communications. In fact, wherever heat and precise control are needed, radio-electronics comes into use, at the same time enhancing the meaning of safety in industry.

The radio industry, having had its production facilities greatly multiplied by the war, now must expand its markets both at home and abroad, General Sarnoff said in pointing out that on the ever-broadening international horizons there are endless opportunities for radio throughout the world. The radio manufacturer has every reason to be interested in and to promote world peace and world trade, he said. He urged the manufacturers to push on to new ventures, to encourage research, to create new methods, new devices and new services.

Science and National Security

Recalling the "unbelievable inventive and production records" of the radio industry in supplying the United States and its allies with radio-electronic equipment during World War II, he added:

"Today, with the world praying for peace, we find ourselves in completely new areas of thought and action. We must keep these changed

conditions constantly in mind as we plan for the future. It is of extreme importance, as we apply the new developments of radio and electronics to peacetime pursuits, that we do not lose sight of the continued relationship of science and industry to our national security. Radio research and invention, and every new instrument should be constantly evaluated to determine their application to the strength and security of our country, as well as to its commercial progress."

Concluding his address, General Sarnoff said:

"We go out to face new problems and changing conditions. By the application of intelligence, seasoned with the wisdom of experience, by courage and cooperation within this industry, manufacturers and broadcasters alike can focus on new opportunities for progress.

"The radio industry along with other industries naturally is affected by political, social and economic conditions, at home and abroad. All of us can make constructive contributions toward the improvement of these basic factors. And given a reasonable measure of stability in these larger fields of human endeavor, I believe that our industry may look to the future with confidence."

"THE SMALL TOWN IS A NATURAL TELEVISION STAGE. LOCAL MERCHANTS WILL FIND TELEVISION AN EFFECTIVE MEANS OF ADVERTISING. DRAMATIC GROUPS, COUNTY FAIRS AND COMMUNITY SPORTS EVENTS WILL ENLARGE THEIR AUDIENCES."



"WHEREVER HEAT AND PRECISE CONTROL ARE NEEDED, RADIO-ELECTRONICS COMES INTO USE."

[6 RADIO AGE]



DISPLAYS WITHIN THE RCA EXHIBITION HALL ARE VISIBLE FROM THE STREET THROUGH A GLASS FRONT 200-FOOT LONG.

RCA EXHIBITION HALL

Panorama of Radio, Television, Radar, Global Communications, Electronic Equipment and Newest Home Instruments Revealed as Permanent Exposition is Opened to Public in Radio City

THE RCA Exhibition Hall, latest addition to New York's showplaces for citizens and out-of-town visitors, opened its doors May 14 to the first group of spectators who, since that day, have continued to throng the exhibits from morning to late evening. Before the lights were put out on the opening day, more than 5,000 guests had inspected the various animated displays which portray the widespread worldwide activities of the Radio Corporation of America.

Behind the Hall's 200-foot window front at 36 W. 49th Street, in Radio City, is displayed the wonders of modern electronics—radio, television, radar, global communications, electronic equipment and home instruments—an exposition combining the gadgetry of The World of Tomorrow with the pagantry of Hollywood.

The entire main floor of the Exhibition Hall, from its 30-foot high laminated ceiling to its carpeted floor, is visible from the street. In its high windows can be seen giant models of RCA tubes containing miniatures of radio and television receivers, sewing machines, and other electronic equipment.

At the left end of the main floor,

a 12-foot high plexiglass map of the U.S., shows in bright lights the radio network of the National Broadcasting Company. By flicking buttons on an accompanying keyboard, the affiliated stations light up separately, while another push-button brings in on a loudspeaker the network program being broadcast at the moment.

Highlights of Broadcasting

The story of the stars who have made radio a favorite entertainment medium is told through a series of miniature wood-carvings mounted on four revolving stages at one side of the network map. Seen through viewing windows, the miniatures depict the highlights of 20 years of broadcasting. Above the stages, today's radio stars are reproduced in full-color caricature on large projection screens.

One of the most popular features of the RCA Exhibition Hall is the television display. A person may stand before a television camera mounted on a movable boom and be televised from several angles, while his image can be seen on four viewing screens in front of the display. Moreover, he can satisfy his own curiosity about his telegenic quali-

ties by watching—at the very moment he is being televised—his own image on a viewing screen suspended from the ceiling.

The privilege of hearing "the music you want when you want it" is offered at a recording exhibit. From a printed list, a visitor may request and hear over one of two personalized amplifiers, the music of well-known recording artists on RCA Victor Red Seal and popular records.

RCA Communications circuits which girdle the world are portrayed in neon tubing on a large wire-screen map of the two hemispheres. In front of the map, a keyboard identifies the terminal points of the communications circuits. Pressure on a button lights up on the map the route of the radiotelegraph circuit to a particular city. At the same time, a dummy message intended as a souvenir appears on a radio-teletype machine. The simulated message, in dot-and-dash code, is also seen and heard respectively on an adjoining oscilloscope and loudspeaker.

Ship's Bridge Reproduced

The display of the Radiomarine Corporation of America is centered in a reproduction of the bridge of a ship in New York Harbor. This exhibit contains models of the latest radar, loran (long range navigation), and radio-telephone equipment. And the story of RCA Institutes, one of the foremost



AN EXHIBITION HALL VISITOR EXAMINES A HUGE REPLICA OF THE TELEVISION KINESCOPE PICTURE TUBE.

training schools for radio engineers, is told in a photographic panorama, showing scenes from classrooms and laboratories.

Models of the RCA Laboratories at Princeton, N. J., together with examples of some of the products that have resulted from the company's research activities, such as the image orthicon, antennas, and microphones, are shown on an illuminated mural.

Two large display platforms in the center of the main floor contain the newest in home instruments and electronic engineering products. Television receivers, console combinations and personal radios are present in a variety of cabinet models and finishes. Full-sized electronic devices which are set up for demonstration include an electronic sealer, an oscilloscope, and a metal-detector.

Progress of Radio Portrayed

One of the most spectacular displays in the Exhibition Hall is a Theme Mast, lighted and constantly revolving, which rises for nearly three floors from the concourse level of the Hall. On this mast the history of the Radio Corporation

of America is depicted in terms of miniature models on a spiral runway extending the entire 50-foot height of the column.

At the foot of the ramp leading down to the concourse level a public lounge furnished with comfortable chairs and conveniently located television and radio receivers, is available to visitors. Part of the lounge is devoted to an ultra-violet mural showing RCA's world-wide facilities and services. Next to the mural an electron microscope enables visitors to examine specimens of chemicals, bacilli, and other sub-microscopic matter.

Beyond the electron microscope is the entrance to a small studio, seating 84 persons, where daily showings of current film subjects serve to demonstrate RCA sound and projection equipment. The studio also is wired for the transmission of live talent radio and television shows.

The remainder of the concourse space is occupied by the administration offices and executive quarters.

The RCA Exhibition Hall is to be a permanent feature, open daily to the public without charge.

AMERICAN TELEVISION SHOWN IN ITALY

THE first demonstration of an American television system on the Continent of Europe was conducted by the Radio Corporation of America at the Milan International Fair, which opened on June 14 at Milan, Italy, during the celebration there of the 50th anniversary of Marconi's invention of radio.

The latest RCA mobile television pickup units, studio equipment and receivers were dispatched to Italy for the event. Other modern radio-electronic services and products, including the RCA electron microscope, sound and theater equipment, FM (frequency modulation) transmitters, police FM equipment, shipboard communication units, air navigation aids and marine radar apparatus also were exhibited.

In announcing the company's participation in the tribute to the inventor whose genius inspired scientists and laymen of all nations, Meade Brunet, Vice President of

RCA and Managing Director of the RCA International Division, said: "Striking evidence of the greatness of Marconi can be found in the significant steps of progress which have emanated from his initial success in spanning the Atlantic with radio signals. Television offers particular proof of his inspirational genius. It was an immense satisfaction, therefore, to demonstrate the magic of RCA sight-and-sound broadcasting for the first time in Europe in his native Italy."

The Milan International Fair, a century-old event, is generally regarded as the most important fair in Western Europe. Its visitors in years past have numbered hundreds of thousands.

Arrangements for the RCA exhibit, Mr. Brunet said, were made by G. A. Biondo, President of the Telonda International Corporation, RCA distributor in Italy. Michael J. Ranalli, Television Sales Man-

ager of the RCA International Division, was in charge of the television demonstration, which included pickups of major events at the fair and the showing of American films.

In connection with the announcement of the RCA television demonstration, it was disclosed that Dr. V. K. Zworykin, Vice President and Technical Consultant of the RCA Laboratories Division, Princeton, N. J., will deliver a paper on the progress of television before the Academy of Science in Rome, as a later phase of Italy's celebration of Marconi's genius.

An important feature of the RCA exhibit at Milan was the first European demonstration of American FM broadcasting apparatus. Relatively inexpensive in cost and operating on low-power, the FM transmitter was designed to be particularly suitable for continental operations.

"Scientific Method" Can Solve Social Problems

Jolliffe Tells Graduating Class at University of West Virginia That Thought Process of Scientists Should be Adopted by Civilization to Bring About Higher Order of Human Behavior

SOCIAL problems that threaten civilization with chaos and self-destruction can be solved by the same "scientific method" that has given the world so many of its material benefits, Dr. C. B. Jolliffe, Executive Vice President in Charge of RCA Laboratories, declared in an address before the graduating class of the University of West Virginia, at Morgantown, West Virginia, on June 2.

"Many of the causes and effects of social disruption are known," Dr. Jolliffe said. "What we need to do is to amplify this knowledge, develop it as a body of scientific fact, and formulate general laws by which human conduct can be guided and regulated.

"We must give authority and standing to the social sciences. When this is accomplished, we must accept the advice and counsel of the social scientist as readily as industrial management accepts the advice and counsel of the physical scientist. In this manner, and only in this manner, may we expect to bring about a higher order of human behavior."

Progress Slow in Human Relations

Man has made amazing progress, especially in the last three hundred years, in his unceasing fight to control and to utilize the physical elements of his environment, Dr. Jolliffe said. "But in the all-important field of human relations, where one would expect the greatest advances," he continued, "progress has been slow. This imbalance between material and social development has brought on a dangerous state in human affairs."

Pointing to the contention and disagreement among the economic and social elements of the United States, as well as those of the entire world, Dr. Jolliffe declared: "Confusion and uncertainty are characteristics of the times, and now—because of the reality of atom fission—we are fearful of



By Dr. C. B. Jolliffe

*Executive Vice President in Charge
of RCA Laboratories Division*

the future. We know that, for the first time, it has become possible for man himself to wipe out almost overnight the civilization he has built up so laboriously over the last three thousand years."

In explaining how science, which, it is granted, is responsible for our material progress, can overcome the faults of human behavior, he said: "This question is asked because most of us are inclined to overlook the simple concept by which science has achieved its growth and influence. This concept is a thought process known as the "scientific method", and it is my thesis that this method can be just as successful in dealing with social difficulties as it has been with material problems.

"Scientific method is nothing more than the art of thinking developed to the highest degree. It is the key to insight. By it, in my opinion, we will continue the rapid unfolding of material accomplishment and, in addition, achieve that high level of human understanding so necessary to lasting peace and prosperity."

Bacon Advocated Plan in 1620

Dr. Jolliffe recalled that it was Sir Francis Bacon who first advocated, in 1620, the discovery and

development of general laws of nature through disciplined observation and experimentation. In later years, he explained, Bacon's idea was expanded and improved by the process of imaginatively conceived hypotheses, checked and corrected by experimentation. While Bacon's system obtained conclusions by induction, he said, the later method involved deduction from general principles.

Develops Definite Conclusion

"Today's scientist employs both," Dr. Jolliffe said. "He observes, asks questions, formulates hypotheses, experiments, tests, checks, analyzes and finally, after giving consideration to all facts, develops a definite conclusion. This, in short, is the modern scientific method.

"We who live in the Twentieth Century can see, as none of our forebears could, the full sweep and power of science. It has relieved us of much burdensome toil. It has taught us how to utilize the earth's rich deposits of minerals in the production of innumerable comforts and conveniences. It has shown us how to harness the energy of coal, gas, oil, water, electricity and, now, of the atom. It has revealed new ways to health and physical well-being."

But with all this marvelous progress in science and industry, Dr. Jolliffe asserted, society is unprepared to deal with current problems in human relations. The coming of the machine and mass production, as a result of progress in the physical sciences, brought about significant changes in the social structure, he explained, and society has failed for the most part to adapt itself to the new conditions of living.

"In today's complex industrial civilization, man has lost his social stability," he continued. "The feeling of individual security is gone. Man does not understand his new social and economic functions and

(Continued on page 14)

Latest Models of RCA Victor Home Instruments



USES OF TELEVISION

The Video Art Promises Wide and Important Applications in Business and Education

THE use of television in the home as a service of entertainment and information is the application which is receiving the most attention in magazines and newspapers, but there are other uses of the video medium which hold great hopes for the future. Because television makes it possible to see people and things at a distance, to transmit events from one point to another and provide means of inspecting processes and services from a central vantage point, the art in its fully developed form should find uses in many fields of human activity. However, in this space only a few of the suggested uses can be outlined.

Television, for instance, could be a valuable adjunct in banking procedure. Obvious applications would



By Noran E. Kersta

*Manager, Television Dept.,
National Broadcasting Co.*

Latest Models of RCA Home Instruments

1—THE SOLITAIRE IS A POCKET-SIZE PERSONAL RADIO, HOUSED IN A PLASTIC CASE WITH GOLD-PLATED FINISH.

2—THE GLOBE TROTTER PORTABLE IS ENCLOSED IN A WEATHERIZED ALUMINUM CASE WITH PLASTIC ENDS AND HANDLE.

3—EQUIPPED WITH A RECHARGEABLE BATTERY, WHICH ELIMINATES THE COST OF DRY-BATTERY RENEWALS, THE ESCORT PORTABLE MAY ALSO BE OPERATED FROM HOUSEHOLD LIGHTING OUTLETS.

4—TABLE MODEL RECEIVER INCORPORATING FM AND STANDARD BROADCASTING. IT IS FINISHED IN WALNUT VENEER AND EMBODIES A SLIDE RULE DIAL FOR EASY TUNING.

5—MODEL 641TV IS A FIVE-IN-ONE INSTRUMENT. INCLUDED IN THE CONSOLE CABINET ARE A TELEVISION RECEIVER WITH A 10-INCH PICTURE TUBE, FM, STANDARD BROADCAST, SHORTWAVE AND AUTOMATIC VICTROLA PHONOGRAPH.

6—LATEST RCA VICTOR CONSOLE TELEVISION RECEIVER WITH 52-SQUARE INCH PICTURE SCREEN AND SLIDING TAMBOUR DOORS.

7—VICTROLA RADIO-PHONOGRAPH, MODEL 711V2, WITH FM FACILITIES. PANEL AT LOWER LEFT ENCLOSES GENEROUS RECORD STORAGE SPACE.

be the instantaneous transmission of signatures from the teller's cage to a central identification file where an endorsement, as it appeared on a screen, could be compared instantly with the original. Also, a television camera directed on the patron could project the scene to a "photograph identification section" for even more foolproof and positive identification.

When television expands to equal the coverage of sound broadcasting today, it is logical to prophecy that the ten-year-old youth of the next generation will know more about the world, its industries, its governments and its peoples than his grandfather knew in his entire lifetime. With this promise as a start, we progress to the next obvious thought: "educational television."

"Educational television" means the use of television in school systems, operated independently of public television broadcasting but closely integrated with established methods of learning.

Television in the Schoolroom

While educators have shown considerable interest in the role that can be played by television in school systems, their concern has been limited for the most part to the use of programs primarily intended for the general public but viewed through television receivers

installed in the classrooms. Although it is possible that such a plan might be developed successfully, it is likely that more specific and effective uses of television in education are in the offing.

A television-equipped school system, which originates its own presentations, designed to be integrated directly and scientifically into accepted curricula, would appear to possess more advantages. If, for example, a scientific experiment or demonstration were to be transmitted by television, a larger number of students could get a clearer conception of what was taking place than by any other mass teaching method.

Educators adopt new teaching methods slowly. After many years of sound broadcasting in this country, school systems only recently have begun to reveal progress in this field. The production of educational motion pictures for school use and their exhibition in classrooms are only in the starting stage. In view of this, it may seem somewhat ambitious to think of going directly to a complete television educational system. Nevertheless, some educators are busily studying the subject.

Could Help Teacher Shortage

It has been suggested that television might be used to compensate, in part, for the increasing shortage of teachers, a situation which is developing into one of the Nation's critical problems. Through television, a few of the recognized authorities in any subject could teach an unlimited number of students seated before television screens. And, because of the very nature of television, such teachings could be made more dramatic and the effect more lasting. Furthermore, greater efficiency in the outlay of educational funds would be realized when presenting a "one time" lesson, compared to the cost of present repetitive decentralized instruction.

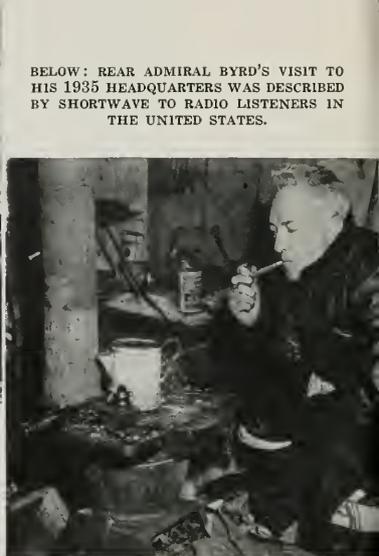
Another visionary but nevertheless logical application of television might be called, for want of a better name, "motion picture film production television."

As Hollywood operates today, a feature motion picture is produced

(Continued on page 25)



ONE OF THE ANTARCTIC CAMPS OF THE BYRD EXPEDITION FROM WHICH RCA PROGRAM SERVICE PICKED UP PROGRAMS FOR AMERICAN NETWORKS.



BELOW: REAR ADMIRAL BYRD'S VISIT TO HIS 1935 HEADQUARTERS WAS DESCRIBED BY SHORTWAVE TO RADIO LISTENERS IN THE UNITED STATES.

From Jungle to Antarctic

Wherever Broadcast Features Originate, Program Service of RCA Communications Reaches Out by Shortwaves and Delivers Signals to Networks



By S. H. Simpson, Jr.

*Manager,
Program Transmission Service,
RCA Communications, Inc.*

SINCE 1930, when the sound of London's Big Ben ushering in the New Year was first rebroadcast in this country, RCA Communications, Inc. has been serving the public through the use of its international shortwave facilities for the transmission and reception of program material.

During the war thousands of broadcasts were handled by our International Program Service, and, as a result, the listener at his radio was able to hear his favorite com-

mentators as they roamed the world from Alaska to Australia, from Chungking to Algiers, and, in fact, from almost every place where the American GI was stationed.

Stated briefly, the problem of the Program Service is to supply technical facilities and coordinate arrangements between foreign points and the broadcasters in this country for such pickups. A casual visitor to the program control room in 66 Broad Street, New York City, during an early morning news roundup, might well be astounded. In the space of a few minutes, Paris, Athens, Cairo, Jerusalem and Buenos Aires, are brought in by the mere flip of a switch!

Supplies Unusual Facilities

But even this is routine compared to some of the unusual facilities which the Service is called upon to furnish from time to time. Whether it be from a presidential train enroute to Chicago, a lone ship deep in the Antarctic ice floes, a submarine off the coast of California, or an expedition observing a solar eclipse in a dense South American jungle, the worldwide facilities of RCA can be relied upon to help

bring the story to the American fireside.

The story behind the broadcasts from the recent Byrd Antarctic Expedition illustrates the difficulties which must be overcome in picking up broadcasts from remote parts of the world. Carrying seventeen press and radio correspondents, the *USS Mt. Olympus* left Norfolk, Va., on December 2, bound for the south polar region with a rather inadequate 350-watt radio transmitter on board and a fervent hope that the plan to pick up a 2½-kilowatt transmitter, which was being flown to Panama, would not fail. Before the Canal was reached, initial tests had been conducted with the small transmitter, and despite its low power and the ship's limited antenna space, the RCA receiving station at Riverhead, L. I., was able to bring in a good signal. But all hands were relieved when the installation of the more powerful transmitter was completed a week after the *Mt. Olympus* sailed from Panama.

Handled Wide Frequency Range

To communicate with the *Mt. Olympus* from New York was in itself a problem. Not only was it necessary to handle the wide range of frequencies from 8 to 21 megacycles, but the vessel's bearing from New York changed consider-

ably, requiring the use of several antennas for adequate coverage. As a protective measure, Buenos Aires, Honolulu and San Francisco were alerted to relay programs from the ship if the direct circuit to New York proved unsatisfactory.

Most of the programs were short news spots covering everything from the first report of the tragic plane crash to what a penguin sounds like in Little America. A highlight of the series was an interview with Rear Admiral Richard E. Byrd aboard the aircraft carrier *USS Philippine Sea* while it was enroute to join the expedition already in the Antarctic.

A Paris-Antarctic Circuit

One of the most interesting international radio programs in connection with the Expedition took place on February 26, when Roger Goupillieres, American representative of Radio Diffusion Francaise, interviewed a member of the Byrd Expedition in Little America. The program was one of a series of broadcasts designed to bring to the people of France a view of American life. Frank Goring, Supervisor of RCA Communications' Program Operations, participated in the three-way conversation between New York, Paris and the Antarctic and explained in French how pro-

grams from the Byrd Expedition were being handled.

Despite the great distance to the south polar continent—farther from New York than Singapore—and the notoriously bad atmospheric conditions, American networks carried more than ninety broadcasts from Antarctica with remarkably few failures.

Unusual assignments are commonplace at Program Service headquarters. One day the American Broadcasting Company asked RCA Communications if it could pick up a program from the submarine *USS Segundo*. The network wanted to describe the action in a submarine during a crash dive. Preliminary tests carried on while the

submarine was on the surface went well, but nobody knew exactly what would happen to the radio circuit after a crash dive. The worry was largely wasted, for the actual program came through a bit weak but satisfactory.

Through a Veil of Secrecy

Through a veil of secrecy which provided practically no information, the RCA Program Transmission Service was recently called upon to furnish program service from a B-29 flying with General Kenney's Strategic Air Command group in a mock air attack on New York City. The only available information stated that the plane would be flying in from Fort Worth,

PROGRAMS FROM ALL PARTS OF THE WORLD ARE ROUTED THROUGH THIS MASTER CONTROL SWITCHBOARD AT RADIO CENTRAL OFFICE, 66 BROAD STREET, NEW YORK, TO AMERICAN BROADCAST NETWORKS.



SIGNALS ORIGINATING IN THIS CANVAS-COVERED TRANSMITTER AT BOCAUYVA WERE SENT SOUTHWARD TO RIO DE JANEIRO AND THEN RELAYED TO NBC OVER A PROGRAM SERVICE CIRCUIT TO NEW YORK.



BEN GRAUER DESCRIBES THE SOLAR ECLIPSE AT BOCAUYVA, BRAZIL, OVER A MICROPHONE LINKED TO NBC THROUGH AN RCA PROGRAM SERVICE CIRCUIT.

[RADIO AGE 13]





ROGER GOUPILLIERES (RIGHT), REPRESENTING RADIO DIFFUSION FRANCAISE, INTERVIEWS A MEMBER OF THE BYRD EXPEDITION IN A THREE-WAY CONVERSATION BETWEEN NEW YORK, PARIS AND LITTLE AMERICA.

York. But because of the little station's limited power and the absence of adequate frequencies there was some doubt that the signals would carry through. Transportation problems ruled out the possibility of shipping bulky materials for a suitable antenna, and weight limitations barred a higher powered transmitter. Arrangements were therefore made with Companhia Radiotelegraphica Brasileira in Rio de Janeiro to pick up the signal from the Bocayuva camp—400 miles north of the Brazilian capital—and relay it to New York.

The maneuver was a success and Grauer's colorful description came through clearly to NBC's network listeners.

"Scientific Method" Can Solve Social Problems

(Continued from page 9)

responsibilities. It is this confusion, this feeling of dependency upon unknown factors that causes him to join pressure groups and power blocs for his own, rather than society's gain. Lack of cooperation is characteristic of modern society, and the people are dissatisfied."

Modern sociologists agree that these weaknesses of human behavior all trace to our failure to develop the social sciences, Dr. Joffe said.

The first thing to be done in the effort to correct this situation, he continued, is to make people aware of the power of logic and reason to solve the economic and political problems of our times.

"This is a task that must be assumed," he said, "by our more progressive leaders of thought—men and women of education, government, the professions, industry, labor and the arts.

"In my opinion, the art of thinking should be just as much a part of the educational system as reading, writing, and arithmetic.

"A thinking people will insist upon a logical approach to any kind of a problem, whether its character is physical or social. It will resort less frequently to falsely conceived panaceas, quack nostrums, and to expedience."

Texas, and would operate on a certain frequency. Suitable frequencies for contacting the plane from the ground were selected and an urgent request given to the broadcaster to "get the information to the plane somehow!" At the scheduled test time the plane was heard calling RCA with a report that its shortwave receiver was in trouble. However, the operator said the program would be started at the stated time. The incoming signal was good and the stage was set. Program time arrived but nothing was heard from the plane. Anxious moments followed while the broadcaster filled-in from another location. Suddenly the missing signal came through from the plane and the broadcaster switched to that frequency just in time to hear the network's flying commentator say, "We now take you to an observer at the top of the RCA Building who will describe the scene from his vantage point!" It was learned later that a last-minute transmitter failure had ruined the show.

When the aircraft carrier *USS Leyte* visited Istanbul, Turkey, on May 6, NBC was anxious to pick up

its representative, John Donovan. Tests indicated that the *Leyte's* signals arrived in New York too weak for rebroadcasting, but RCA Communications, through its connecting company in Greece, was able to set up a relay through Athens. This booster station enabled NBC listeners to hear Donovan's eyewitness description of the American flotilla's arrival and reception at the Turkish seaport.

Roundabout Circuit Best

The staff of RCA Program Service demonstrates frequently that while a straight line may be the shortest distance between two points, it is not always the best route for radio waves to travel. This was proved recently. To bring to American radio listeners an on-the-spot description of the solar eclipse on May 20, NBC dispatched a mobile transmitter to the jungle village of Bocayuva, Brazil, site of the observation camp erected by the National Geographic Society. It was planned to use the mobile unit to transmit the commentary of NBC's Ben Grauer, direct to New

Television Caravan

Six Station Wagons Carrying Actors and Directors and \$100,000 of Equipment Are Telling the Story of Television to the Nation

UNDER the joint sponsorship of Radio Corporation of America and Allied Stores Corporation, a caravan of six jeep station wagons, carrying 12 persons, including actors and directors, and \$100,000 worth of television equipment, left Radio City, New York on May 12 to begin a tour which will carry the story of television into 22 cities across the country. At most of the communities visited, the fleet will bring to residents the first television programs they have seen.

When the caravan arrives in a city, a portable studio will be erected in the store and programs will be presented twice daily. Tele-

vision receivers will be located at viewing sites throughout the store, in special windows and in some instances in nearby buildings where larger crowds can be accommodated.

It is planned to arrange special broadcast programs in each city visited by the caravan, and also to promote the television presentations of the traveling staff by newspaper advertising. Whenever possible, local radio programs will be televised at the regular time of their appearance on the air.

The entire staff, under the general supervision of Samuel H. Cuff, long active in television station

management, and Louis A. Sposa, as production manager, will travel in the jeep wagons. To protect the sensitive electronic instruments and to prevent injury to the television receivers and associated equipment while en route, the floors and sides of the cars are lined with soft cellular rubber.

Cities on the itinerary are Reading, Harrisburg and Easton, Penna.; Jamaica and Syracuse, N. Y.; Paterson, N. J.; Grand Rapids, Mich.; Akron, Columbus and Cincinnati, Ohio; Tampa, Fla.; Lake Charles, La.; San Antonio and Dallas, Texas; Waterloo, Iowa; St. Paul and Minneapolis, Minn.; Boise, Idaho; Seattle and Spokane, Wash. and Great Falls, Mont.

BELOW: THE SIX-CAR CARAVAN AND SOME OF ITS PERSONNEL LINE UP IN RADIO CITY FOR REVIEW BEFORE SETTING OUT ON ITS TOUR OF 22 CITIES.

JOSEPH B. ELLIOTT (RIGHT), RCA VICTOR VICE PRESIDENT IN CHARGE OF HOME INSTRUMENTS, SHAKES HANDS WITH SAMUEL CUFF, TOUR DIRECTOR.







6



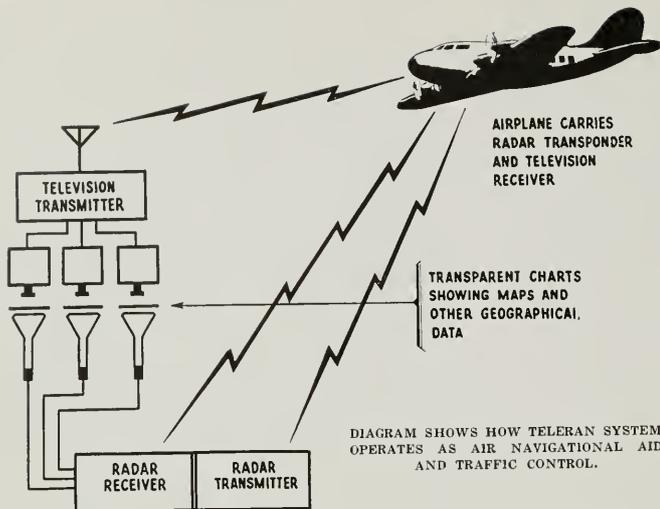
7

SCENES FROM THE RCA EXHIBITION HALL

- 1 One of the world's most famous trade-marks forms the central point of the RCA Victor display.
- 2 Arranged like a ship's bridge, the Radiomarine exhibit shows the latest loran, radar and direction finding equipments.
- 3 How radiograms are sent "via RCA" to all parts of the world is portrayed by neon tubing and flashing bulbs in the RCA Communications section.
- 4 RCA developments, which have played important roles in the history of radio, are depicted by models on the 50-foot Theme Mast.
- 5 From the main floor, a ramp leads down to the Concourse where the electron microscope and other devices are displayed.
- 6 A model of RCA Laboratories and miniatures of some of the products of research comprise a scientific display.
- 7 Visitors stand on a platform to be televised, while watching their own images on a television screen.
- 8 Hostess at the Information desk supplies guests with facts about the Exhibition Hall.



8



TELERAN DEMONSTRATED

*Laboratory Advances in Television-Radar Air Navigation System,
Installed in Flight-Simulator, Revealed to Public*

IMPORTANT laboratory advances in Teleran, the system of television-radar air navigation and traffic control under development by the Radio Corporation of America, were revealed in Camden, N. J., April 10, at the first simulated flight demonstration of the system.

Introduced at the special showing in a laboratory of the Engineering Products Department of the RCA Victor Division was an equipment installation in a flight-simulator, capable of duplicating all the maneuvers of a plane in flight. This enabled the guests, seated in an enclosed cockpit, to observe on a Teleran screen their "progress" over a simulated aircraft course approaching the National Airport at Washington, D. C.

The demonstration followed private showings for officials of the Army Air Forces, representatives of the Navy, the Aircraft Owner and Pilots Association, the Air Transport Association, and the Civil Aeronautics Administration. These exhibitions constituted the second of three major steps planned in the development of the Teleran

system. The first was a public demonstration, without simulated flight, held at Indianapolis last October. The third will consist of actual flight tests, scheduled to start in Washington, D. C., next fall.

Four new technical advances were demonstrated at Camden. These were: a new "storage orthicon" television pick-up tube espe-

cially developed by RCA for Teleran; a Teleran picture tube employing high intensity phosphors for greater image brilliance; an optical map-mixing technique which improves the composite Teleran image and simplifies insertion of additional information when required, and a time multiplexing system which provides for simultaneous transmission of images representing different altitude layers and selective reception of the proper image by planes in any one of these layers.

Instead of using actual radar for the demonstration, RCA employed projectors to simulate the small "pips" or spots of light which indicate the relative positions and courses of aircraft in a selected altitude layer. Air routes, terrain markings, and similar information were superimposed by means of specially prepared slides, resulting in a composite picture which was transmitted to the pilot's cockpit.

Each person using the simulator was in full control of the movements of the pip of light representing his own "plane" in the composite image presented on the Teleran screen on the pilot's instrument panel. He was free to maneuver out of the paths of other moving aircraft pips and glide smoothly past stationary obstacles, according to his handling of the flight controls in the simulator.

The new orthicon tube "stores"

TELERAN SCOPE ON INSTRUMENT PANEL OF PLANE, SHOWING AIR ROUTES AND TERRAIN INFORMATION SUPPLIED FROM GROUND STATION.





E. EBERHARD OF RCA TELERAN ENGINEERING DEPARTMENT HOLDS ONE OF THE NEW HIGH-INTENSITY TELERAN TUBES. BELOW IS A TYPICAL TELERAN IMAGE AS IT APPEARS ON THE TUBE FACE.

vides reproductions on the cockpit screen that are many times brighter than the original radar images, and clearly visible to the pilot in full daylight. The storage characteristic also gives to each light pip a polywog shape in which the position of the tail reveals the course of the aircraft it represents.

The optical map-making system developed for use at the Teleran ground station employs a partially reflecting mirror set at an angle between the radar screen and the television camera. The mirror transmits part of the light from the radar screen, at the same time reflecting to the television pick-up lens an image of the markings on

the transparent map which is mounted at one side. This method of mixing the map and radar images overcomes the "off-register" effect which had resulted from the fact that the radar screen is convex, while the map is flat.

The first civilian airport installations of ground surveillance radar, which will comprise one of the basic units of the Teleran system, are planned by the CAA for LaGuardia Airport, in New York, and National Airport, Washington, it was stated. The latter installation will be used in the initial flight tests of the Teleran system.

The demonstration was conducted by Loren F. Jones, Manager of Research and Development Projects of the RCA Engineering Products Department, who conceived the original idea of Teleran, and Dr. Douglas Ewing, Manager of the Teleran Engineering Department.

each individual image picked up from the radar screen long enough to scan it many times. Coupled with the light response of the new high-intensity phosphors, this pro-

Color Television for Theaters

Large Screen All-Electronic System Exhibited for First Time Before The Franklin Institute in Philadelphia

COLOR television pictures on a 7½-by-10-foot theater screen were shown publicly for the first time by Radio Corporation of America in a demonstration of its all-electronic color television system at The Franklin Institute, Philadelphia, on April 30. Color motion picture films and slides were projected with utmost realism.

Dr. V. K. Zworykin, Vice President and Technical Consultant of the RCA Laboratories Division, who demonstrated the new system to illustrate his address on "All-Electronic Color Television" before the Institute, said that the large-screen system employs the all-electronic simultaneous method of color television developed at RCA Laboratories, Princeton, N. J.

It was emphasized by Dr. Zworykin that, as remarkable as the advent of large-screen color television pictures appears, color television

must be regarded as still in the laboratory stage. Several years, he said, would be required for its development to equal the status of present black-and-white television.

In the electronic simultaneous color process, Dr. Zworykin explained, three separate images in red, green and blue are transmitted at the same instant over adjoining

television channels of the same band-width used in standard television.

Then, at the all-electronic receiver which features a new type of receiver-projector, the three color signals are applied to kinescopes, or picture tubes, one with a red phosphor face, one blue and the other green. The flickerless pictures formed on the face of each kinescope are projected by an optical system to the auditorium or theater screen, where they are superimposed in perfect registration to

LARGE SCREEN COLOR TELEVISION AS PRESENTED BY THE RCA ELECTRONIC PROJECTOR.

[RADIO AGE 19]



form a single image blended in the same colors as the original.

Dr. Zworykin, who recently received the Potts Medal of The Franklin Institute for his outstanding contributions to television, pointed out that color television is passing through a series of development stages similar, in many respects, to those that black-and-white television passed through in its progression toward perfection. He said that a great step was made in the advance of television when RCA developed the simultaneous all-electronic color system, which eliminated all mechanical parts and rotating discs.

Compatible With Present System

"This system is completely compatible with existing monochrome television and has other important advantages," he continued. "The transition from monochrome to simultaneous color television can be made at a time in the future when color television is ready, without obsolescence of the monochrome receiving and transmitting equipment. It can from that time be developed side-by-side with black-and-white television without fear of obsolescence of the latter and without loss of investment by the public, by manufacturers and by television broadcasters. The progress that has been made so far in color television—and it is not inconsiderable—has been due to the efforts of many men working in close cooperation."

In presenting the demonstration, Dr. Zworykin said that development of this large-screen color tele-

vision system was the result of cooperative efforts of several research groups at RCA Laboratories. He said that specific credit should be accorded to the following members of the staff: R. D. Kell, Television Section Head, and his associates, for developing the principles of the system; Dr. D. W. Epstein, Cathode-Ray and Optics Section Head, and his associates, for designing and building the receiver-projector; also, for contributing to the optical design of the unit; Dr. F. H. Nicoll, Research Engineer, for developing the necessary special projection kinescopes; Joseph Ford, of the Drafting Department, and R. A. Marple, of the Model Shop, for assisting in completion of the apparatus, and A. C. Schroeder, K. R. Wendt and G. C. Sziklai, of the Television Section, for contributing to the development of the flying-spot color pick-up unit.

Incorporates "Flying Spot"

Dr. Zworykin disclosed that the pick-up unit used in the demonstration incorporates the electronic "flying spot" which has been under development for nearly ten years. In this system, he explained, the flying spot of light is created on the screen of the kinescope by the electron scanning beam.

The light from this spot is projected through color slides or films, scanning the entire surface of the scene or object, point by point. As the light beam, then tinted with color, emerges from the film or slide, it passes through a series of filters which separate respectively

the red, green and blue portions of the color in the beam.

Each color then is reflected into photocells which change the light values into electrical signals for transmission to the receiver. The flying spot method, he added, assures perfect picture registration by permitting the transmission of the three color values of each picture element simultaneously.

Tube Advances Outlined

Dr. Zworykin revealed that the special projection kinescopes used in this large screen color television system owed their brightness and effectiveness, in large part, to improvements achieved by RCA since development of the original kinescope.

"Some of these improvements, such as the design of electron guns to operate at higher voltages and to yield smaller, sharper dots, and the development of efficient phosphors, with a wide range of color, have been practically continuous," Dr. Zworykin said. "Other important contributions of relatively recent date, are the use of metal backing for the fluorescent face of the tube and the utilization of an improved optical system."

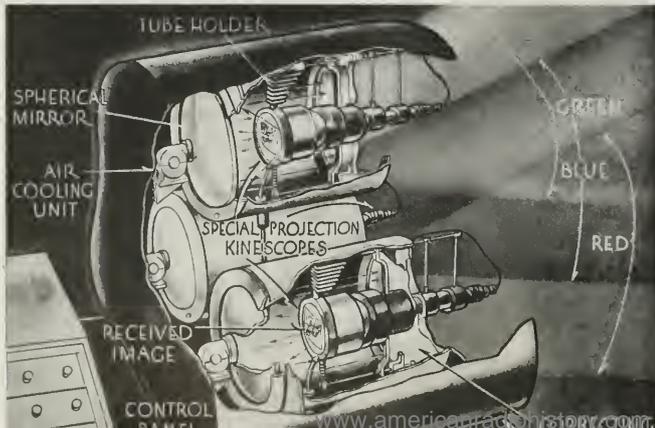
Television of theater-screen size in life-like colors represents "a spectacular advance in the art of sight-and-sound broadcasting, and holds fascinating prospects for the future," declared E. W. Engstrom, Vice President in Charge of Research of the RCA Laboratories Division who cooperated with Dr. Zworykin in the Philadelphia demonstration.

"The purpose of this demonstration," Mr. Engstrom explained, "is to make known to the public the latest advance in RCA's program of all-electronic simultaneous color television development, first introduced in October, 1946.

"At that time, we demonstrated two stages of our laboratory timetable when we televised still pictures from color slides and motion pictures from color films on a home-receiver screen 15 x 20 inches," said Mr. Engstrom. "The next step was disclosed in January 1947, at Princeton, when RCA transmitted live-action studio scenes in color

(Continued on page 29)

THIS DRAWING SHOWS HOW THE THREE PROJECTION KINESCOPIES ARE ARRANGED WITHIN THE LARGE SCREEN ELECTRONIC COLOR PROJECTOR.





THE 28TH ANNUAL MEETING OF RCA STOCKHOLDERS HELD IN AN NBC STUDIO, RADIO CITY, NEW YORK.

RCA STOCKHOLDERS MEETING

Net Profit After Taxes of Radio Corporation of America for First Quarter of 1947 Amounted to \$4,680,065 — Earnings Per Common Share for the Quarter Equal to 28 Cents, Compared with 17 Cents for First Quarter in 1946

NET profit, after taxes, of the Radio Corporation of America for the first quarter of 1947 was \$4,680,065, representing an increase of \$1,519,841, or 48 per cent, over the same period in 1946, Brigadier General David Sarnoff, President of RCA, announced at the 28th Annual Meeting of stockholders held on May 6, in a studio of the National Broadcasting Company at Radio City. Profit for the first quarter of 1947—before Federal Income Taxes—amounted to \$7,919,065.

Earnings per common share for the first quarter of this year amounted to 28 cents, as compared with 17 cents per common share for the first quarter in 1946.

Consolidated gross income of RCA during the first quarter of 1947 amounted to \$76,560,096, compared with \$48,972,924 for the same period last year. This represents an increase of \$27,587,172, or 56 per cent over the 1946 figure.

General Sarnoff pointed out that over the past ten years, RCA paid more than \$60,000,000 in dividends to its stockholders. Of this amount, \$32,300,000 was paid to holders of preferred stock and \$27,700,000 was paid on the common stock. He said that during the same ten-year period the net worth of the Corporation was increased by \$39,000,000, and is now in excess of \$100,000,-

000, thus revealing the increased strength of the Corporation, its growth and its increased value to stockholders.

"When RCA began operations in 1919", he said, "it employed 457 people. On May 1 of this year, RCA personnel numbered 40,600. Of this number, 60% are men, and 40% are women.

Wage Increases Granted

"To meet the increased costs of living, the Radio Corporation of America has from time to time granted general wage increases to its employees. The average weekly take-home pay for hourly paid employees in our manufacturing unit was \$48.53 in April of 1947, an increase of 74% over April, 1941. The rates we pay are comparable to those paid by other manufacturers engaged in similar work. Since V-J Day, the increases granted by RCA to its employees amount to approximately \$24,000,000 a year.

"The complex labor problems, which are part of present-day operations, have been solved by collective bargaining with the thirty-seven separate unions representing our workers. There were no strikes in the RCA."

RCA operations cover all phases of radio—research, engineering, manufacturing, broadcasting and

world-wide communications, General Sarnoff pointed out.

"Reconversion of the RCA Victor Division's manufacturing facilities from wartime to peacetime operations was practically complete in 1946," he declared. "Attainment of full-scale production now depends chiefly upon an uninterrupted flow of materials.

"Despite scarcities that still plague production, all of our manufacturing plants had a substantial increase in output during the first four months of 1947. Public demand continues very good for our Victrola radio-phonographs, phonograph records, television receivers and the new RCA FM receivers. We are making delivery of FM as well as standard broadcast transmitters, and are in production of television transmitters for which we have substantial orders."

Reporting continued demand for RCA products in foreign countries, he said that the distributing organization of the RCA International Division has been expanded. Subsidiary companies in Brazil and Argentina have revealed increased activities, and in Mexico RCA anticipates augmented business through the opening of a new phonograph record plant.

"While the research facilities of the RCA Laboratories Division are again directed to peacetime pur-

suits, we realize our responsibility in continued and intensified research pertaining to national security," the RCA President asserted. "The war, in which science had such a vital role, taught this nation that the study and application of science and invention to military, naval and aviation operations should never be neglected or underestimated. Therefore, in applying new knowledge and discoveries in science to peacetime services, we shall determine their relationship to our national security."

Progress in television was reported being made by RCA on three fronts—research by RCA Laboratories, manufacturing by the RCA Victor Division, and telecasting by the National Broadcasting Company.

"Television was an important factor in the selection of Philadelphia as a site for the Republican National Convention in 1948," declared General Sarnoff. "That city is on the coaxial cable line that links New York and Washington into a television network. The Convention will be within view of a large audience along the Atlantic seaboard from south of Washington to north of Albany. Television, therefore, with its audience increasing daily, will play a new role in the 1948 national political campaign.

"We demonstrated all-electronic color television on a 15 x 20-inch screen of home size on October 30, 1946. An important further step was taken by RCA Laboratories last week when it successfully demonstrated its color television system on a 7½ x 10-foot theater screen at The Franklin Institute in Philadelphia. This was the first showing of color television pictures of this size, and as a result a new field is open for television entertainment in theater and motion picture houses."

He said that RCA believes that research and development work in color television have by no means been completed, and added: "Our scientists and engineers are building new instruments with which to explore the higher frequencies, conduct field tests and lay the groundwork for a complete service. We shall carry on these experiments energetically and hope that



GENERAL SARNOFF REPLIES TO A QUERY FROM A STOCKHOLDER.

the American public will enjoy the finest and most practical all-electronic television service in both black and white and color at the earliest possible date."

Plans for the mechanization of facilities of RCA Communications, Inc., have been partially completed, it was disclosed, and conversion from manual to printer operation is being made on the important radio circuits between New York and London, Paris, Rome, Berne and Stockholm. RCA trans-pacific circuits, operated from San Francisco, are on a printer basis. Substantial improvements have been made in RCA stations in the West Indies. The recent opening of a new radiotelegraph circuit to Greece gives RCA Communications direct circuits to 61 countries outside of the United States.

Marine Radar Tests Successful

It was reported that successful demonstrations of marine radar, developed by engineers of Radiomarine Corporation of America—a service of RCA—have led to sizable orders for equipping merchant ships. Thus radar has been added to the RCA line of radiotelegraph and radiotelephone instruments and direction finders manufactured for marine use. Radiomarine now operates eleven coastal stations and serves ships throughout the world.

It was announced that RCA Institutes, Inc., today has more than 1,300 students, 70 per cent of whom are war veterans, taking training courses in various branches of radio, television and electronics.

"While we are mindful that American, as well as international economy, is subject to rapid shifts in the years that follow war, we believe that 1947 will be a year of scientific achievement and indus-

trial progress," General Sarnoff continued. "Further economic adjustments may be expected. I assure you that the Directors and Management of Radio Corporation of America are alert to all such trends.

"There are few important industries in America where competition is as wide and as keen as it is in radio. This is so, not only in the manufacture and sale of instruments, but also in broadcasting, communications, and all other branches of the art and industry. The war has served to increase the size and scope of competition in radio and the struggle for survival goes on alongside the struggle for volume and profits. The profit margin in the radio business are among the lowest in American industry. No one in America has a monopoly in radio.

"Radio is fortunate to have television as a new postwar industry for it gives promise of a growing business and affords constructive opportunities for extended service and growth. Wherever a television station goes on the air, a new market for home receivers is immediately opened. At the same time, other services of radio and electronics, modernized by wartime developments in science, are opening new commercial opportunities.

"Our operations in every phase of radio are built upon a firm foundation of long experience," he concluded. "We believe that research and developments in manufacturing, broadcasting, communications, television and electronics offer great opportunities to expand business and increase our service to the public. We have confidence in the men and women who constitute our organization. Our faith in RCA and its future is strong."

HEADS RCA INSTITUTES

General Ingles, former Chief Signal Officer, U. S. Army, Elected President and a Director of Technical Training School

MAJOR GENERAL Harry C. Ingles, who served as Chief Signal Officer of the United States Army from July, 1943, to March, 1947, was elected President and a Director of RCA Institutes, Inc. on May 8.

General Ingles, a native of Nebraska, retired from the Army on March 31 after a long career in military service. He holds the Distinguished Service Medal, awarded for service in the Caribbean Theater, and the Oak Leaf Cluster, which he received in recognition of his wartime record as Chief Signal Officer. In addition, he has been decorated for distinguished service by Great Britain, France, Venezuela, and Colombia.

As Chief Signal Officer, General Ingles was responsible for the Army's world-wide communication system, the enormous supply program of communication and electronic equipment for the Army, as well as the Signal Corps' research and development program.

After serving on the War Department General Staff from 1935 to 1939, General Ingles was assigned as Signal Officer to the Caribbean Area. This included the Panama Canal Department, the "hot spot" of pre-Pearl Harbor years. Then, he commanded the Mobile Force and served as Chief of Staff in the Caribbean Theater during the early part of the war. In 1942, he was selected by Lieutenant General Frank Andrews to serve as his Deputy Commander in the European Theater of Operations.

General Ingles was born March 12, 1888. He attended country grade school and was graduated from High School at Lincoln, Neb. He studied electrical engineering at the University of Nebraska and, in 1910, received an appointment to the United States Military Academy at West Point. After his graduation from West Point in 1914, he served in the infantry until his transfer to the Signal Corps in 1917.



MAJOR GENERAL H. C. INGLES.

In World War I, General Ingles was in charge of military and technical training of Signal Corps officers. Then he took over the Signal Corps Reserve Officers Training Corps and studied electrical engineering in the Graduate College of the University of Minnesota.

Subsequently, he became Signal Officer of the Philippine Division, 1921-24; Director of the Signal Corps School, Fort Monmouth, N. J., 1924-27; Instructor in Army Command and General Staff School, 1928-31; Director of the Signal Corps School, 1931-33, and Commander, 51st Signal Battalion, 1933-35.

Founded Signal Association

General Ingles is the founder of the Army Signal Association, which is regarded as an important contribution toward national preparedness. On April 28, 1947, he was honored by the Association with a certificate as an Honorary Life Member. In the educational field, he holds the degrees of Bachelor of Science and Doctor of Engineering. He is a graduate of the Army Signal School, a distinguished graduate of the Army Command and General Staff School, and a graduate of the Army War College.

RCA Institutes, Inc., the oldest technical training school in the field of radio and electronics in the United States, is located at 75 Varick Street, New York.

New Television Camera Works on 90% Less Light

A new studio television camera which makes it possible to reduce present studio light requirements by as much as 90 per cent has been announced by the RCA Engineering Products Department. "Eye" of the improved studio camera is a new type of image orthicon television pickup tube.

By operating with only one-tenth the light demanded by the best previous cameras, the new camera permits considerable savings on expensive studio lighting equipment and air conditioning units, according to W. W. Watts, Vice President in charge of the RCA Engineering Department.

The new studio-type image orthicon pickup tube combines the light sensitivity of the RCA image orthicon tube with the sharp resolution and contrast of the older kinescope. It produces brilliant, sharply defined pictures with excellent half-tone shading at light levels of 100 to 200 foot candles.



LATEST TELEVISION CAMERA.

BRIG. GENERAL D. L. WEART, (LEFT) OHIO RIVER DIVISION ENGINEER, CONGRATULATES COL. B. B. TALLEY, DEVELOPER OF THE METHOD OF CHARTING INLAND WATERWAYS BY RADAR.



COMPARISON OF RADAR MOSAIC (TOP) WITH STANDARD CHART OF SAME SECTION OF RIVER SHOWS ACCURACY OF NEW MAPPING METHOD.



of the bugbears of river navigation—or other soupy weather. Each image on the radarscope, whether showing an island, shoreline cliff, a building or a cluster of gas storage tanks, will be recognizable as though he could see the landmark itself."

The cost of charting a river by radar, it has been pointed out, would be low in comparison to the savings that owners of Radiomarine 3.2-centimeter radar equipment could make through the general speeding-up of traffic and the elimination of delays due to weather conditions.

The 3.2-centimeter super-high-frequency band on which Radiomarine radar equipment operates, gives sharp, clearly-defined images that are easily photographed from the radar's 12-inch scope by Colonel Talley's method. The high-frequency beam hugs the surface of the water and picks up buoys or other small objects over distances twice as great as those afforded by lower frequency radars of the type used in wartime. Two or more closely spaced objects appear on the Radiomarine radar scope as separate, distinct targets in their true relationship to each other. Locks, bridges, shorelines, channel markers and approaching tows can be picked up by the radar.

MAP-MAKING BY RADAR

Rapid Preparation of River Navigation Charts through Method Developed by Army Engineers, Is Made Possible by Use of RCA's 3.2-Centimeter Radar Equipments

PREPARATION of river navigation charts from radar photographs assembled in mosaic form has been accomplished by the Army Corps of Engineers, Ohio River Division, using 3.2-centimeter radar equipment manufactured by Radiomarine Corporation of America. Col. B. B. Talley, Army Engineers Corps, developed the map-making method and conducted initial tests of the apparatus aboard the U. S. survey boat *Cherokee*.

In making a radar mosaic, an automatic camera is attached to the radar instrument and adjusted to photograph images on the scope at regular intervals. The prints are then matched to produce a continuous strip-map reduced to the scale

of standard navigation charts. On the assembled charts, engineers add dotted lines indicating the channel to be followed, together with figures showing the depth of water, and brief identifying descriptions of important landmarks.

According to Brig. General Douglas Weart, Ohio River Division Engineer, the importance of this development in chart-making is "comparable only to the introduction of steam power on the river."

Knows Position At All Times

"By using radar and radar charts," General Weart said, "it is possible for a pilot to know exactly where he is and 'see' the obstacles before him regardless of fog—one

LISTENING TASTES TESTED

RCA Laboratories Confirms Belief That Majority of Persons Prefers Natural Music With Full-Range of Tone Quality

ALTHOUGH some surveys have indicated that music reproduced by loudspeakers is more acceptable to the public when its tonal range is restricted, a substantial majority of listeners prefer natural music in its full range of tones and overtones, Dr. Harry F. Olson, section head of the Acoustics Research Laboratory of RCA Laboratories, Princeton, N. J., reported to the Acoustical Society of America at its meeting held in the Hotel Pennsylvania, New York, on May 9. Dr. Olson based his conclusions on tests carried out at the Laboratories on more than 1,000 persons of various ages and vocations.

In making the tests, Dr. Olson said, a small orchestra, consisting of piano, trumpet, clarinet, violin, contrabass, drums, and traps, was placed in a room acoustically treated to simulate conditions in an average size living room. A partition constructed of material that absorbed all tonal frequencies above 5,000 cycles—the normal limiting range of radio reproduction—was placed between the musicians and the audience. By revolving movable panels in the partition, this limitation on tone quality could be removed, allowing the music to reach the audience unchanged.

Additional tests with subjects in various age groups, Dr. Olson added, showed that 75% of listen-

ers between 30 and 40 preferred the full frequency range of popular music while only 59% of those between 14 and 20 expressed an appreciation for the unrestricted tonal range in this classification of music.

"The listeners in the latter age group," Dr. Olson stated, "are probably influenced by listening to radios, phonographs and juke boxes rather than orchestras and are, therefore, conditioned to a restricted frequency range."

Popular Music Used in Tests

Most of the tests were carried out using popular dance music. The small size of the room made it impossible to play symphonic numbers but listener preference in this direction was checked with a semi-classical selection. For all practical purposes, these results agreed closely with those obtained in the popular-music test.

When tests were carried out on speech, listeners preferred the full frequency range whether the audience was familiar with the speaker's voice or when the voice was being heard for the first time.

In discussing the preferences of listeners for mechanically reproduced music with restricted frequency range, Dr. Olson said that this choice might be due to the distortions of sound which are in-

herent in common types of reproducing systems. In his opinion, such distortions would be found less objectionable when frequencies above 5,000 cycles are eliminated. These possibilities, he said, would be explored in future investigations.

USES OF TELEVISION

(Continued from page 11)

by making numerous long-shots, close-ups and other special camera versions of the scenes involved in the working script. From the miles of film resulting from this procedure, editors select the sections of footage best adapted to the development of the story. With high definition television cameras and a motion picture television recorder—a device that takes motion pictures of television screen images—these costly and time-consuming operations could be eliminated. This is how such a system might work:

Instead of training a battery of motion picture cameras on the scene, an equal number of television cameras would be focused on the action, at angles specified by the director. The latter would then take his position in front of a group of television monitor screens on which the pictures recorded by all cameras would be reproduced simultaneously. As the director selected the best of the views shown, he would press a button and the output of the television camera which produced that view would be shifted instantly to a single screen. At the same instant, the motion picture television recorder would begin to record the images on a master film strip together with dialogue and sound effects. When all sequences were completed, the feature would be in its final edited form ready for the developing and printing laboratory.

Television's contributions eventually will affect all branches of man's endeavor. As an efficient and effective selling tool, it has no equal. In television also can rest a good measure of the world's social destiny. An opportunity to lift the general welfare is a rare privilege, yet through television all this and more can be done.

[RADIO AGE 25]

ACOUSTICAL FILTERS USED IN RADIO-MUSIC TEST.





ROSALIE ALLEN, WHOSE "PRAIRIE STARS" PROGRAM OF RECORDINGS IS HEARD NIGHTLY OVER STATION WOV, NEW YORK.

RADIO'S RECORD SALESMEN

Nearly a Thousand "Disc Jockeys," Operating from Broadcast Stations, Create New Markets for Recordings.

THE past decade has seen the emergence of the radio "disc jockey" as one of the most potent sales factors in the record business.

Today approximately 1,000 record-playing announcers are heard regularly on U. S. radio stations. The overhead for disc jockey programs is remarkably low; the disc jockey's stock in trade is small—a persuasive, friendly voice, a turntable, and a vast library of popular and classical recordings which are kept up-to-date through purchase of the latest releases.

Once a low-cost method of filling air time for small-budget stations, the disc jockey program has mushroomed amazingly. Nationally known announcers, willing to trade the prestige of network affiliation for the lucrative yield of disc jockeying on small, independent stations, are gaily spinning platters today.

For better or worse, the platter

spinner is no longer a phenomenon of radio. He is as much a part of local station operations as comedy headliners, audience participation programs, daytime serials and mystery dramas on the networks.

He has become the target of song pluggers, press agents and promoters. He is no longer the last resort of the sponsor who can only afford low-cost air time.

Stimulate Interest in Classics

In the past year or two the disc jockey has turned to programs of classical music, and these broadcasts have become increasingly popular and are doing much to stimulate interest in symphonic and operatic recordings.

Hand in hand with the interest in classical music that has been developed via the disc jockey route is the program known as "Music You Want" which RCA Victor Records introduced in 1937 as a

means of developing new audiences for classical records. Today the "Music You Want" broadcasts may be heard five nights a week on any one of 58 independent stations throughout the United States. This half-hour program operates by means of a loan library of classical recordings which are made available to radio stations together with scripts prepared by the record company. It is a half-hour sustaining show, which has become so popular with independents that today a long list of stations wait for an opportunity to be added to the "Music You Want" circuit. The technique differs from the disc jockey type of show, for each disc jockey maintains his own individuality and builds his show around his own personality.

Program Format Varies

Tune into any one of a number of stations that remain on the air all night and you will hear the voice of the disc jockey, talking about and playing popular recordings just off the presses. The format of these "dawn patrol" shows is varied and informal. Top names in the music field stop in to chat with the jockeys and manage, in the course of a few minutes on the air, to get in some effective plugs for their latest record releases.

Visit an all-night restaurant that possesses a radio, and you will hear these marathon announcers. Five minutes of news on the hour or half-hour; a series of commercial plugs between recordings. That's the way the disc jockey talks and plays his way through the night, a boon to night-shift workers in plants that do not have industrial music; a faithful friend of cab drivers, restaurant countermen and other night owls whose working day starts when other people are getting ready for bed.

Turn on your radio at six in the morning and you will hear voices of disc jockeys, some greeting the dawn with chatter and small talk, others busily plugging their products while people are still rubbing sleep from their eyes.

What percentage of record sales can be attributed to the platter spinner would be difficult to judge. Some endorse and comment on the

recordings they really like. Others maintain strict neutrality as regards the merits of the new releases. But if the listener likes a record when he hears it plugged on the radio as a new record release, it is reasonable to assume that someone in the family may want to add that record to the collection, to play it again whenever he wants to hear the tune.

Revenue for Musicians

The two-year ban on record manufacture emphasized the fact that records and transcriptions generally used by the vast majority of small, independent radio stations throughout the country were an important source of revenue to many musicians. The resumption of recording restored the income of musicians, a number of whom are enjoying very comfortable standards of living as a result of increased recording and transcription income.

These musicians are not "name" bandleaders or vocalists. Some are network affiliate house musicians, others are "sidemen" in dance orchestras. Quite a few are members of symphony orchestras, who augment their income by filling in on recording and transcription dates. The recent increase in the union scale for recording, transcriptions and radio performances has made this a lucrative calling.

The end of the war brought back to the air one of the most popular devices of the early disc jockey—the request playing of "favorite tunes" of listeners. Banned during war years as a possible means of code communication between enemy agents stationed in the U.S., the "all request" disc jockey program flashes through the night air once again. A couple about to be married requests a special tune, played by a specific band. A group of convivial tipplers in a neighborhood bar and grill want a favorite drink-

ing song. Lovers effect a reconciliation via the disc jockey, who announces the playing of Perry Como's "Prisoner of Love," for "John Doe, dedicated to Jane Roe."

Listeners Keep Phones Busy

Telephone switchboards buzz and flash throughout the night, and Western Union teletypes located in the disc jockey's studio, chatter away, registering requests for popular and classical recordings.

How many of these requests, telephoned or telegraphed, are legitimate, and what percentage are the artful practices of songpluggers and promotion, is a matter of speculation.

But the calls keep coming, the turntables keep spinning, and the record industry, producing in greater quantity than ever before in history, still cannot keep up with the demand for records, thanks to the record salesmen of radio.

Plane-to-Shore Message Service Opened

Passengers aboard the Pan American World Airways clipper America, on its inaugural round-the-world flight, which was completed on June 30, were able to maintain contact with business associates, friends and relatives in all parts of the United States by means of a new global plane-to-shore communications system entering public service for the first time on this flight.

Arrangements for handling messages from the giant clipper were completed by the air line with the Radiomarine Corporation of America, a service of the Radio Corporation of America. Radiomarine's powerful radio-telegraph station at Chatham, Mass., capable of sending and intercepting world-wide messages, played the key role in the FCC-approved service. Other RCA stations in Manila, Honolulu and Bolinas, Calif., assisted in handling correspondence.

Announcement of the new service was made jointly by James H. Smith, Vice President, Atlantic Division, Pan American World Airways, and the Radiomarine Corporation of America. The trans-

oceanic journey of the clipper America, they said, was the first in which airborne radio communications facilities were available to passengers of an American plane. Describing the system as a much-needed addition in service to the air-travelling public, they said the global flight could serve to determine the practicability of installing the service as a regular facility.

In charge of the radio communications equipment aboard the America, Flight Radio Officer Hugh E. Simpson, of Selma, Alabama, handled the plane's operational messages and outgoing correspondence which took the form of "Via RCA" radiograms.

Plane-to-shore transmissions are picked up by Radiomarine and relayed to proper destinations. The overall message rates for the service are similar to those for ships at sea.

Another modern feature aboard the America was an RCA loran receiver, providing electronic long-range air navigation. This equipment is capable of facilitating quick and accurate positions of flight over distances ranging from 700 miles in

daytime to 1,500 miles at night, under all kinds of weather conditions.

Also aboard the clipper was an RCA radar altimeter providing information on absolute altitudes above the earth's surface. This instrument operates on a two-range scale, giving heights from zero to 400 feet and zero to 4,000 feet.

PASSENGERS BOARD PAN AMERICAN CLIPPER AMERICA FOR INAUGURAL WORLD FLIGHT WHICH ALSO INTRODUCED RADIOMARINE'S PLANE-TO-SHORE MESSAGE SERVICE FOR AIR TRAVELLERS.





AN NBC CAMERAMAN FOCUSES THE IMAGE ORTHON CAMERA ON A DUNGAREE-CLAD MEMBER OF THE SUBMARINE CREW AT ONE OF THE BATTLE STATIONS ABOARD THE "TRUMPETFISH."

SUBMARINE TELEVISION

NBC Stages and Produces First Sight-and-Sound Program from the Cramped Quarters of a Submerged Underseas Craft

INFINITE attention to every last detail of the project combined with the enthusiastic cooperation of the U. S. Navy made it possible for the National Broadcasting Company to stage the first television program ever to be transmitted from a submerged submarine. The program took place on April 10, 1947 aboard the U.S.S. Trumpetfish, at the Brooklyn Navy Yard, exactly forty-seven years after the Navy had purchased its first submarine, the U.S.S. Holland.

The remote pickup which lasted ninety minutes, was one of the most engrossing in television history. It was also one of the most difficult. The fact that we managed to put it on at all is a tribute to the ingenuity and perseverance of our engineers; and the fact that it turned out so well when it was viewed on television screens is a tribute to the programming ability of NBC's television field staff.

Five major problems faced us in planning the program. We had to devise a way to get our camera-



By O. B. Hanson

*Vice President and Chief Engineer,
National Broadcasting Co.*

and-sound cable into a submerged craft. A locale had to be chosen that would have all the necessary qualifications, viz., direct line-of-sight to the RCA Building or the Empire State tower; water that was deep enough for submerging, and an adequate and dependable source of power supply for lighting. We had to find out how to set

up our cameras in the crowded interior of a submarine. Tests must be conducted to determine how to illuminate the submarine interior; and finally, we had to build a smooth-running program in order that viewers would gain a clear idea of the action aboard a submarine while submerging.

Two men were charged with solving these problems: Alfred E. Jackson, of the Engineering Department, an assistant field supervisor on television programs, and Noel Jordan, a WNBT field program director.

Since the Trumpetfish, then in use by the Navy for public relations work, was based at the Submarine Base, New London, Conn., Jackson, Jordan and Bob Stanton, television special events announcer, went to the Base about ten days before the program. There they got their first good look at the ship, learned what actions should be high-lighted in the program, and discussed with the crew members the best methods to follow in getting the program on the air. As part of the preliminaries, Jordan and Jackson went to sea in the craft and were aboard during three dives.

The Navy first suggested putting

the cables aboard the sub by taking out one of the hull plates, inserting the cables through the hole and then plugging the gap around the cables. Jackson, however, hesitated to subject the comparatively delicate cables to the pressure of the clamps that would be necessary to render the gap watertight when the ship submerged. Furthermore, the Navy was none too enthusiastic about removing plates from one of its submarines.

Spare Periscope Removed

The second suggestion proved practicable. This was to remove the ship's spare periscope and drop the cables through the empty tube. Handled in this way, the cables would not be squeezed by deep-water pressure, since the submarine would not submerge entirely and the spare periscope tube, under such conditions, would remain a few feet out of the water. From the Navy's viewpoint, removing the periscope was an easier task than removing a hull plate.

The problem of finding a dock with enough depth of water, adequate electric power and a line-of-sight view of Radio City was solved when the Navy offered the use of a berth at the Brooklyn Navy Yard where all these specifications were met. Inasmuch as the program was to be put on at night, it was necessary to use 60,000 watts of lighting for the outdoor scenes and to

erect high scaffolding on which to place the lights.

The problem of getting our three cameras into the submarine and making them mobile in the cramped interior was solved by the ingenious method, conceived by Jackson, of building special platforms on wheels and bolting the cameras to them. By these means, the cameras could be rolled down the length of the submarine's interior, from one compartment to another, merely by separating platform and camera whenever a hatchway was encountered. In this way, all three cameras inside the sub could cover the maximum amount of space, without being restricted to one particular watertight compartment.

Lighting Problem Complicated

The problem of lighting the submarine's interior was complicated by the fact that our foto-flood lights would not fit Navy lamp sockets. Adapters had to be made—31 of them. Then asbestos pads had to be placed over all parts of the ship's interior that were likely to be blistered by the heat from the foto-flood lights.

The programming side of the pickup is another story. The whole show moved smoothly and provided a clear-cut account of how a submarine is handled, including an extremely convincing mock torpedo attack as seen from the forward

torpedo room. There was but one hitch in the program. Just before the mobile unit went on the air, the searchlights which were to illuminate the sub's "target"—a cruiser moored at a nearby dock—failed completely. As a result, viewers were deprived of a periscope view of the intended "victim."

Except for this minor disappointment, the program proceeded according to plan. Four cameras—one atop the mobile unit on the dock, and three in the submarine—registered every action from beginning to end of the dive. Three announcers—Stanton, Ray Forrest and Rad Hall—supplied the commentary and interviewed members of the crew. Approval of the telecast was general. Not only we, at NBC, but the Navy as well, were delighted, and letters from viewers were enthusiastic in praise of the event.

COLOR TELEVISION FOR THEATERS

(Continued from page 20)

over an ultra-high frequency radio circuit before a special hearing of the Federal Communications Commission."

Revealing the next big step to be expected in the evolution of color television, Mr. Engstrom said that cameras and other necessary apparatus are being developed at the Laboratories, which will enable a demonstration of color television featuring outdoor scenes in motion. He hinted that autumn tints on the countryside would afford ideal views to test the delicate and sensitive vision of the all-electronic color camera eye.

In looking to the future, Mr. Engstrom said that it is the plan of Radio Corporation of America to perfect color television in such a manner that ultimately it will take its place alongside the RCA all-electronic black-and-white television system, which now is bringing news, entertainment, sports and events of national importance to observers in New York, Philadelphia, Schenectady and along the Atlantic Seaboard as far south as Washington, D. C.



TELEVISION CAMERA ON MOBILE UNIT RECORDS EXTERIOR SCENE AS SUBMARINE EMERGES AFTER ITS DIVE.

The Story of 16mm. Sound

From Its Start in This Field in 1931, RCA Has Scored Many "Firsts" in Methods and Equipment

SIXTEEN years ago, the Radio Corporation of America introduced the first 16mm sound film projector. Since that date, RCA, through its 16mm Motion Picture Equipment Section, has carried out continuous development work in its laboratories out of which has come the present perfected 16mm sound projector as it is known to the industry today.

The first problem faced in the early Thirties, that of putting sound on the narrow film, only $\frac{5}{8}$ " in total width, was considered insuperable but RCA solved it. From that starting point, the company went on to score most of the significant "firsts" in the 16mm industry.

The first 16mm sound projector was developed by RCA in 1931. Behind it lay years of pioneering effort aimed at solving the many problems — optical, photographic, electronic and mechanical — which plagued photographic sound recording. RCA's first innovation was 16mm film with one row of sprocket holes which reserved the other side of the film for the sound track. In cooperation with the Eastman Company, the film was presented for standardization to the Society of Motion Picture Engineers and after being adopted as the American standard, was later made world standard.

Film Speed a Problem

The small area available for sound on 16mm film was further complicated by the fact that 16mm film runs at only 36 feet per minute against 90 feet per minute for 35mm film. This slower speed further reduced the linear space available on the 16mm film to only 40 percent of that on 35mm film.

RCA's answer, in 1928, was a revolutionary new "dry" galvanometer, part of a greatly improved optical sound recording system. Outstanding feature of the new galvanometer was a mirror fifteen times larger than previously used on sound film recording systems.



By W. W. Watts

*Vice President in charge of
Engineering Products Dept.,
RCA Victor Division*

The new mirror cast light of much greater intensity and made possible an optical system of high resolving power. This, in effect, was the finer "paint brush" necessary to get good resolution of the hair-fine lines on the tiny 16mm track. The greater light intensity also permitted the use of finer-grain film,

resulting in even better resolution.

In addition, RCA engineers developed, at about this same time, a magnetic film drive for sound recording which provided smooth and oscillation-free passage of the film through the recording light. A corresponding improvement in the reproduction of sound in the projector was also made possible by RCA's development of the "rotary stabilizer" which passed the film at smooth and steady speed through the projector, ironing out speed variations which previously had made all pianos sound out of tune and introduced Hawaiian guitar effects into all music.

Grain in Film Caused Noise

A source of interfering noise was graininess in the film texture intensified by dirt and imperfections on the sound track which registered as hissing, crackling and "frying" noises. RCA engineers blanked out this static and chalked up a notable "first" in noise reduction by devising an automatic biasing system which, during low-level passages, keeps the clear area of the track no wider than needed at the moment to record the sound on the film.

Reproducing sound from a film track requires an intense beam of

G. A. DEL VALLE, RCA DESIGN ENGINEER, AND O. V. SWISHER, GENERAL MANAGER OF 16MM. ACTIVITIES, COMPARE THE 1931 MODEL PROJECTOR (LEFT) WITH THE LATEST SOUND FILM UNIT.





LATEST MODEL 16MM. PROJECTORS MOVE ALONG THE PRODUCTION LINE AT RCA VICTOR'S CAMDEN PLANT.

light in the form of a sharp line less than a thousandth of an inch wide. In 1932, RCA engineers dipped into the magician's hat of optical science and came up with a radically different sound-reproducing optical system for the RCA projectors. At the heart of the new sound-reproducing system were cylindrical lenses which have the peculiar ability to produce a line image of the incandescent lamp filament directly on the film. The new lenses enabled RCA to get a more uniform image at the film using an economical low-power lamp in its projector. The small lamp could be operated from an oscillator built into the amplifier, producing a high-frequency current which lights the lamp without flicker.

Developed Improved Printer

In 1933 and 1934, improved models of the original RCA 16mm sound projectors were placed on the market, and in the latter year, RCA further improved 16mm sound by designing an optical reduction printer that made it possible for film-processing laboratories to make 16mm prints of finer quality from 35mm negatives.

In 1935, a novel camera, which would be considered sensational even in a post-war year of wonders, was introduced to the amateur movie markets by RCA. This was the RCA 16mm sound camera, in which pictures and sound were impressed simultaneously on a single film.

But RCA did not rest on its accomplishment. The search for an even finer "paint-brush" for ap-

plying sound to film tracks continued. The trouble with the white light then used was that it penetrated the film emulsion, and "scattered", spreading the exposure and unduly thickening the fine lines of the sound track. Although this was a real problem in 35mm film recording, it was even more serious in the exacting work of 16mm recording. Finally RCA laboratories found the solution. This was ultra-violet light, first commercially introduced by RCA in 1936. Instead of completely penetrating and scattering as white light had done, ultra-violet light was absorbed before penetrating more than a minute distance into the emulsion, localizing the exposure to the exact area struck by the recording light beam. A wonder tool in 35mm sound recording, the benefits to 16mm sound recording were manifold.

The quality of 16mm sound was boosted still further in 1938, with the introduction of the "electronic mixer", or "compressor" by RCA. By this method the full range of sound was "compressed" onto the 16mm track making the weak sounds loud enough to be distinct without making the loud sounds of such amplitude as to overload the sound track.

Film Damage Reduced

At about this same time, RCA engineers broke the back of another problem that had been plaguing the 16mm industry. This was damage to film in 16mm projectors. Casting previous threading arrangements aside, RCA engineers designed a much simplified threading arrangement and incorporated

it in another new projector model. The new arrangement featured large 16-tooth sprockets and the passage of film in wide curves and long flowing lines to end crimping and tearing.

In 1942, the RCA 16mm sound projector donned the olive-drab of the Armed Forces and went to war. As models PG-200 and PG-200A, it saw global service with Army and Navy. Improvements in these models included a slipping-clutch take-up which put the proper tension on the film regardless of the amount of film on the reel, thus extending film life.

During the war, the unusual requirements of field use led to another step forward in 16mm sound with the perfection by RCA technicians of the "closed-cavity" loudspeaker, a development that had been simmering on the scientific fire for almost two decades. Rugged conditions imposed on 16mm sound equipment had brought a request from the Army Signal Corps for a loudspeaker that was weather-tight, small in size and capable of improving the radiation of lower tones. Overcoming the problems of cavity resonance, RCA technicians by 1943 had fulfilled the Army's request. This development put the quality of RCA 16mm sound far in front of the field.

Batsel Directed the Work

The history of progress in 16mm motion pictures is the history of work done by a closely knit group of scientists still functioning as a team in the Advanced Development Laboratories and Design Engineering Section of the Camden plant. At the head of the group is Max Batsel, Chief Engineer of the Engineering Products Department. In addition to directing the work, Mr. Batsel was a major force in achieving standardization of film in the Society of Motion Picture Engineers and the American Standards Association.

As Chief of the Advanced Development Laboratories, Dr. E. W. Kellogg is responsible for the basic studies and work in film motion. In addition, he holds the basic patents on speakers used not only in motion pictures, but in radio and sound-reproduction devices.



Sales Meeting..

or Complete Convention—

packs dramatic punch on sound film!



CAPTURE all the fire and technique of the sales manager's hottest sales talk. Use it over and over to inspire distributor and dealer salesmen . . . to increase sales. It is being done, with 16mm sound film and RCA Sound Film Projectors.

Or, stage an entire convention on sound film . . . and present it with telling effect . . . in less time, and at a much lower expense than by methods usually employed.

One manufacturer, famous for the size and character of his distributor get-togethers, recently put the meat of a whole week's show on sound film. He ran off his convention in a single day. Results? Many millions of dollars in direct orders, and a high order of distributor enthusiasm. Furthermore, briefs from the film were

reprinted for use in sales-training work throughout the distributor-dealer set-up.

Yes, sound films can be dynamic sales tools—when presented by means of the finest projection equipment. For maximum effect, use an RCA PG-201 16mm Sound Film Projector. Get vital realism in your show, with crisp, brilliant screen images and lifelike, full-range sound. Performance is comparable in every way to professional theatre showings. RCA Sound Film Projectors are easy to set up, use, and maintain. They give plenty of sparkle and power to the presentation of your sales story.

For details address 16mm Motion Picture Equipment, Dept. 66-J, Radio Corporation of America, Camden, New Jersey.



Model PG-201



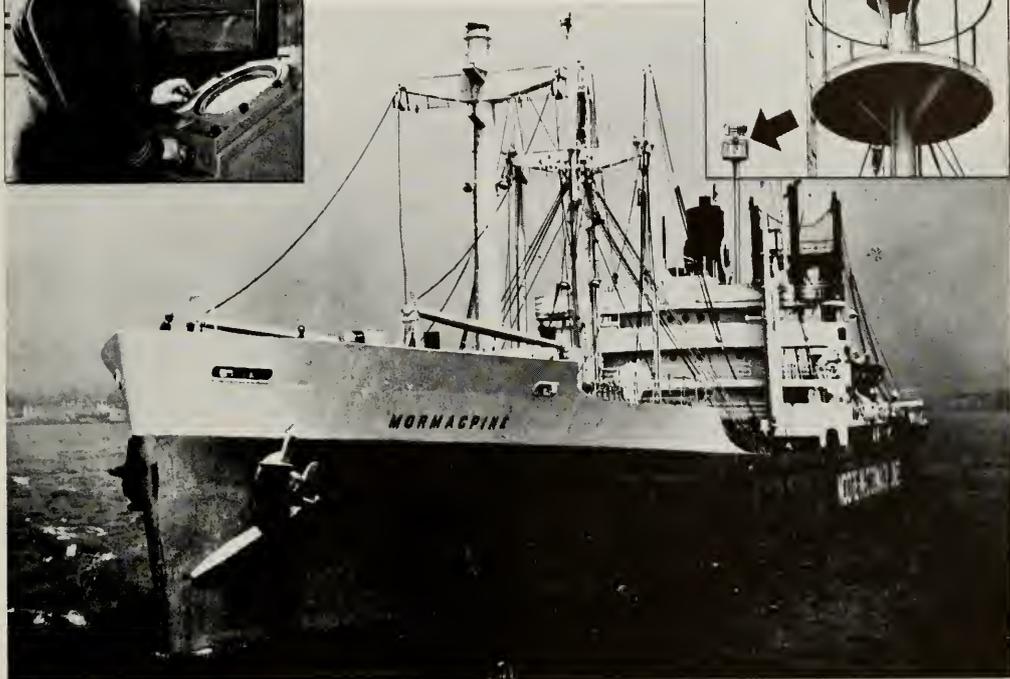
16mm MOTION PICTURE EQUIPMENT
RADIO CORPORATION of AMERICA
ENGINEERING PRODUCTS DEPARTMENT, CAMDEN, N. J.

In Canada: RCA VICTOR Company Limited, Montreal



Indicator Unit of Radiomarine's Radar being operated by Chief Mate C. H. Preusch, of SS MORMACPENN. Installation is mounted in wheelhouse.

Radiomarine compact Radar Antenna Assembly mounted on the bridge.



The SS MORMACPINE, one of the eight new Mormac ships equipped with Radiomarine Radar. Four of them also have Radiomarine Loran aboard.

Aboard Mormac Ships you'll see **RADIOMARINE 3.2 cm RADAR**

Radiomarine's 3.2 cm Radar is aboard eight new ships of the Moore-McCormack Lines, Inc.

Through fog and darkness, in all kinds of weather, on high seas, at ports from Buenos Aires to Stockholm, Mormac vessels with Radiomarine Radar sail with greater speed and safety. Radiomarine Radar helps Mormac ships and other vessels to maintain regular schedules in the fast and safe transportation of cargo and passengers.

Here is convincing proof that forward-looking shipping operators are

taking full advantage of the efficiency and adaptability of Radiomarine 3.2 cm Radar by installing it now aboard their vessels.

Designed for High Performance

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 installations daily! For prices and further information write: Radiomarine Corporation of America, Dept. F-00, 75 Varick Street, New York 13, N. Y.

YOU GET THESE ADVANTAGES with Radiomarine Radar

- 12-inch viewing scope
- 86 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



RCA Miniature Tubes enhance the tonal brilliance of RCA Victor Globe Trotter portable radios.

She shall have music wherever she goes!

Wherever you go with an RCA Victor Globe Trotter portable radio you'll enjoy richness and clarity of tone—volume enough for outdoor dancing—made possible through tiny tubes.

Miniature tubes save valuable space in small radios—space that can be used for larger and better loudspeakers and for longer lasting, radio-engineered RCA batteries.

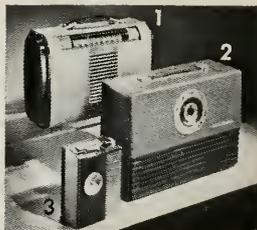
These miniature tubes were developed by RCA Laboratories—a world center of radio and electronic research—and long a leader in development of electron tubes for all purposes.

At RCA Laboratories, the same research, experimentation and advancement that resulted in these improved tubes, keep all RCA products and services in the top in their particular fields.

When you buy a product bearing the name RCA or RCA Victor—a radio set, television receiver, Victrola radio-phonograph, a radio tube or phonograph record—you get one of the finest products of its kind that science has yet achieved.

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

Radio Corporation of America, RCA Building, Radio City, New York 20. Listen to the RCA Victor Show, Sundays, 2:00 P.M., Eastern Daylight Saving Time, over NBC.



Ideal traveling companions. (1) RCA Victor "Globe Trotter" portable radio—operates on AC, DC, or batteries. (2) RCA Victor "Escort"—has a battery you can recharge from any ordinary AC electric outlet. (3) RCA Victor "Solitaire"—less than 6½ inches tall!



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Science in Democracy

BRIGADIER GENERAL DAVID SARNOFF URGES SCIENTIFIC PREPAREDNESS FOR NATIONAL SECURITY—REVOLUTIONARY CHANGES IN WARFARE AND COMMUNICATIONS FORESEEN.



By Brig. General David Sarnoff
President,
Radio Corporation of America

An address before the American Academy of Political and Social Science in Philadelphia on October 5, 1945.

AMERICA, to be first in Peace and first in War, must be first in Science.

To achieve this, we must have democracy in science as well as science in democracy.

The essence of science is freedom to question and to experiment, with an opportunity to draw conclusions, unrestricted by any forces that would hamper liberty in thinking. The realm of study, investigation and development, must be free. Whether in politics or in science, it is the keynote of democracy that people must be free to think, free to discuss, and free to try their ideas in practice. To impose the opposite is tyranny.

That is one of the great lessons of World War II. We should not embrace victory merely as a tri-

umph and let it rest as such in history books. We should study its lessons to cultivate progress and to safeguard the future. With peace comes the vivid truth that to be strong in this modern world a nation must have science ever ready to march with its Army, to sail with its Navy, and to fly with its Air Force. Indeed, some products of science, such as an atomically-powered missile, must be ready to fly through the air instantly, unattended by sailor, soldier, or pilot; guided to its target by push-buttons in a control room far away.

Such an alliance of science and military power can be achieved most effectively under the democratic form of government. The fate of Germany and Japan is evidence enough. Despite an earlier start by Germany in the creation and development of scientific weapons of war, the democracies were able to outdistance the enemy in this domain. If there be any doubt, let the doubter look to radar and atomic power. Developed and harnessed by democracy, they searched out the enemy and wiped out despotism. Our scientists gave their best voluntarily, while those of the Axis powers worked under duress. Democracy, unhampered by prejudices and obsessions about race and creed, was able to utilize the knowledge and brain power not only of its own scientists but of many who had been ruthlessly banished from their homelands by the dictators.

Freedom to Pioneer

For many years past, scientists from foreign lands have come to our shores and settled here so that they could study and experiment free from oppression, free from commands, and free from regimen-

tation. Prominent among them we find Tesla, Steinmetz, Pupin, Einstein, Michelson, Zworykin, Fermi, and many others. Here they found the environment conducive to study and research, to free exchange of ideas, to experiment and discovery. Our nation has profited by their endeavors, and science has advanced.

America, the cradle of liberty, is also the cradle of invention. The list of our native scientists and inventors is a shining roll of honor. As a result, thousands of wartime scientific accomplishments helped to turn the tide of victory for the United Nations and thus rescue democracy from those who would destroy it. Scientists in democracy must continue to pioneer on an ever-expanding scale. We must be as daring in peace as in war. We must follow our vision with the same confidence if we are to cross new frontiers of progress. Through new products, processes and services that science can create, we should gain a fuller life, increased employment, improved health and national security. We must cultivate our natural talents and resources to meet the promise of science if we are to develop its endless opportunities for securing a higher standard of living for the masses of people everywhere.

Vigorous Policy Needed

It is imperative, therefore, that the United States maintain a vigorous national policy for the promotion of science. Statesmen, philosophers and religious leaders have led in the past—now scientists must join them in the vanguard of civilization. In the future, freedom and science must walk together, hand-in-hand as the spearheads of peace.

For this purpose, every phase of

[RADIO AGE 3]