

RADIO AGE

RESEARCH · MANUFACTURING · COMMUNICATIONS · BROADCASTING



APRIL

944



ELECTRONICS IN ACTION



The Strangest Radio Program

THERE'S a new radio program coming. You won't hear it! You'll *live* it. You and your children. In a new world—the world of *electronics*.

Electronics is radio—but it is also television, the "electric eye," radio-frequency heating, talking pictures. Each of these is electronics because all are basically dependent upon control of electrons by means of *electron tubes*—tubes such as are used in your radio and in the broadcasting stations.

Electronic devices, equipped with electron tubes of proper design, can perform a great variety of tasks. They can control machines and processes. Operate traffic, fire-alarm and other signal systems. Protect factory workers from acci-

dents. Provide quick, mobile police communications. Detect and trap criminals. Sort fruit, nuts, vegetables. Weld, solder, seal, sew, weigh, measure, gauge. Fill bottles. Ease pain, treat disease. Preserve foods. Guide and land airplanes. Spot submarines. Aim and fire guns. Even keep an eye on the baby—literally!

All these jobs can be done electronically—and in almost every case, *automatically*. And electronics, via electron tubes, is going to do immensely *more* after the war. Remember that the fundamental element in *any* electronic device of any *kind* is the electron tube; and that RCA is the fountainhead of modern electron tube development.

RCA engineers in RCA laboratories

and in the field are continually developing electron tube improvements of primary importance to the designers of electron equipment. To a greater degree than any other manufacturer, RCA has solved the problem of turning out in quantity high-quality tubes expertly engineered to the requirements of the practical user. RCA welcomes inquiries regarding appropriate tubes and circuits for immediate or contemplated applications. Please write us on your business letterhead. Address *Commercial Engineering Section, Radio Corporation of America, Harrison, New Jersey*.

TUNE IN "WHAT'S NEW?"
Radio Corporation of America's great new show, Saturday nights, 7 to 8, Eastern War Time, Blue Network.



"RCA ELECTRONICS IN INDUSTRY" is a booklet which may suggest important possibilities for electronic applications in your business. Non-technical, well illustrated. Copy will be sent promptly on request. Please use your business letterhead when writing for it. Address—Dept. 68-5B, RCA, Industrial Division, Radio Corporation of America, Camden, N. J.



RADIO CORPORATION OF AMERICA



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America's NEW Frontier

• IN AMERICA'S EARLY DAYS of growth, opportunities for progress lay in the ever widening frontiers. In the fertile lands of the great plains . . . in the timber of our forests . . . in the metal of our mines.

Today, we have reached the limit of our physical frontiers. But new frontiers lie before us—new opportunities for exploration—in our research laboratories. Here in the multiple world of the electron tube are he-

ing born the scientific advances that will make our world immeasurably safer and happier.

Pioneering on this new frontier of research are RCA Laboratories in Princeton, New Jersey. Today RCA Laboratories are devoted to providing the fighting forces of the United Nations with the best radio and electronic equipment available. Tomorrow, this same skill will continue to serve America in creating new and finer peacetime products.

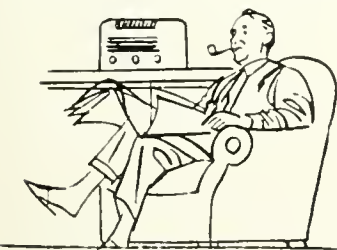
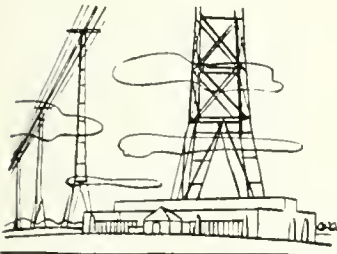
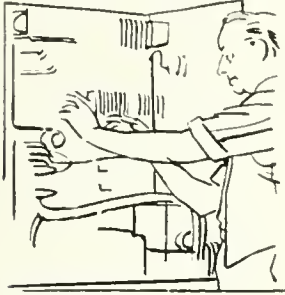


RADIO CORPORATION OF AMERICA
RCA LABORATORIES • PRINCETON • NEW JERSEY

RCA
leads the way in
radio—television—
electronics



TUNE IN! . . . RCA's great new show, 7:30-8:00 P.M. EWT, over the Blue Network, every Saturday ★ BUY WAR BONDS EVERY PAY DAY ★



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VOLUME 3 NUMBER 3

APRIL 1944

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THE COVER: NBC's television camera went to the New York Botanical Garden in the Bronx for this colorful scene of Spring fashions and flowers. Wearing a Hattie Carnegie costume is Mary Patton, popular NBC actress.

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ROLL OF HONOR

Thirty-two employees of the Radio Corporation of America, its divisions and subsidiaries have given their lives to defend and preserve civilization and the American way of life. To them we pay reverent tribute.

WILLIAM ADAMSON
CHARLES BAER
WILLIAM BLAIR, JR.
JAMES BOYD
JOHN W. BROWN
THOMAS M. BROWN
RAYMOND W. BUNTING
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Television as Dynamic Sales Force

ITS COMMERCIAL DEVELOPMENT VIEWED BY T. F. JOYCE AS EFFECTIVE METHOD TO PREVENT POSTWAR BUSINESS SLUMP—CREATION OF 4,600,000 NEW JOBS IN DECADE IS PREDICTED

HOW will we avoid a depression after the war? Will the soldiers be able to find work? Will our wages be cut when peace comes? What is being done to make sure that people won't be on relief again?

These are questions foremost in the minds of many Americans, according to a Gallup Poll cited by T. F. Joyce, Manager of the Radio, Phonograph and Television Department of the RCA Victor Division, in a recent address that emphasized the part television may play as a dynamic new sales force and vehicle of prosperity in the years after the war. He spoke before members of the Sales Executive Club of New York.

"Obviously, our post-war problem will not be one of production," Mr. Joyce declared, after calling to mind the outstanding achievements of our war factories. "It will be one of distribution. Only as people buy goods are people put to work growing farm products or turning out manufactured products.

"Since our American system is based on individual initiative, the responsibility for furnishing the fuel that will keep this production engine fully loaded necessarily falls upon business management. Specifically, it is the sales management group that must carry the load. They—the sales managers—must develop a total demand for goods and services that will keep all the people who wish to work fully and profitably occupied.

Must Lower Costs

"They must find ways of getting merchandise from our farms and from our factories to the ultimate consumers at lower costs. They must reduce the time needed to show consumers the advantages of the new post-war products and services and to bring about rapid buying of those goods and services on a large scale.

"The sales managers must find more effective ways to show consumers how to use the products of our farms and factories to improve

health, lighten the burden of our domestic and farm work, raise the standards of education and culture and bring material happiness and well-being to every home.

"How can they—the sales managers—do this?

"Rather than try to answer that question myself, I have sought answers from a number of leaders in American life. One such leader is Paul Hoffman, President of Studebaker and Chairman of the Board of Trustees of the Committee for Economic Development. He came up via the sales manager's route. He is one of America's greatest sales managers. Here is what he has to say:

The coming of peace will create a challenge to the sales executives of the United States. They must take on a large share of the responsibility of keeping our factories and our farms in abundant production through their sales activities.

It is estimated that by the end of 1944, the American peo-

RIGHT: T. F. JOYCE OF RCA EXPLAINS TELEVISION'S GREAT BUSINESS PROMISE TO NEW YORK SALES EXECUTIVES CLUB MEMBERS.

BELOW: PART OF CROWD OF BUSINESS LEADERS WHO HEARD NEW SERVICE DESCRIBED AS DYNAMIC SALES FORCE AND JOB-MAKER.



[RADIO AGE 3]



LEFT: SALES COMMERCIALS AS TELEVISION PRESENTS THEM. AMAZING STRENGTH OF NEW GLASS AND EASE OF OPERATING NEW VACUUM CLEANER SHOWN.

BELOW: SALES EXECUTIVES WATCH SALES DEMONSTRATIONS ON TELEVISION SET.

ple will have accumulated individual savings of 100 billion dollars. That 100 billion dollars is static so long as it remains in the form of nonproductive savings. It becomes a dynamic productive, giving jobs to millions, only as it is transformed into effective consumer buying.

In the post-war period, the sales executives must assume the responsibility of putting this accumulated purchasing power—as well as the post-war earning power of the people—into motion and thus into jobs.

New and better weapons are playing a large part in defeating the enemy. Our post-war sales executives must also make use of new instrumentalities if they are to create the volume of consumer purchases necessary to support our greatly expanded production facilities. The most far-reaching and comprehensive new instrumentality for the presentation of new ideas is now on the threshold—television.

When television is established as a nation-wide service, it will enable sales executives to *demonstrate* their product simultaneously in millions of homes. Television makes it possible to project the most effective sales presentation directly into the intimacy of the family circle. Television is dynamic salesmanship.

In 1940, 46,000,000 people were gainfully employed. If the intelligent advertising and sales use of a nation-wide tele-



vision system increased the demand for goods and services by only 1 per cent, the effective result will be to create, in terms of 1940 employment standards, 460,000 new jobs. I would not be the one to say that a so far-reaching development as television could not be responsible, within a decade after its full commercialization, for increasing the demand for goods and services by as much as 10 per cent. That would mean potentially 4,600,000 new jobs that have been created as a result of the increased purchasing of goods and services brought about by television.

Paul Hoffman is not alone in this belief. Mr. Joyce declared, adding that in discussing the subject of television, Ed O'Neil, President of the American Farm Bureau, had this to say:

For centuries the farmer has had to live an isolated life.

Modern forces have been breaking this tradition down. First came the R.F.D. Then the telephone. Then the automobile. Then radio. All that's necessary to make the farmer as much a member of the commercial community as your next-door neighbor is television.

Television will undoubtedly stimulate the desire of people everywhere for better foods, fancier farm products. Higher average farm income should prevail. If the farmer is thus permitted to share in a general increase in prosperity, he will continue to buy more manufactured goods, and contribute substantially to the increased employment and welfare of all concerned.

To the appraisal of television by these leaders, Mr. Joyce added this statement by Prime Minister Churchill:

I hope to see a vigorous re-

vival of healthy village life . . . what with modern methods of locomotion and the modern amusements of the cinema and the wireless to which soon will be added television, life in the country, and on the land ought to compete in attractiveness with life in the great cities.

These leaders and others in our political, economic, social and religious life, Mr. Joyce announced, see in television "the great scientific accomplishment which will break down the last barriers of man's isolation." And continuing, he asserted:

"Now, to the magic of radio sound has been added the magic of sight. A much greater revolution is ahead of us than when sound was added to the motion picture. The Chinese proverb states, 'One seeing is better than a hundred hearings.' From this, I would deduce that the relative importance of television over radio—FM or standard broadcasting—is in the ratio of 100 to 1."

There is a lively, interesting, once-a-week television program in every department of the department store, Mr. Joyce remarked, because the primary problem of life is living—and to make life worthwhile is the problem of the women, who spend 85 per cent of the income.

Television Boosts Sales

"Or take the travel industry," Mr. Joyce added. "This group, only a moderate user of radio, ranked as the most prominent television advertiser over a two-year NBC experimental period. And for obvious reasons. Bathers splashing in the surf at Miami, in the winter, and beautiful maidens sporting in the snow at Sun Valley, stimulate more train, auto and air traffic than all the still or word pictures in the world.

"So whether you're selling Buicks or bassinets or lower berths, steamship tickets or airplane tours, you're going to sell more of them by television; and what's more, you're going to have to hire *more people* to take care of the extra business."

What proof is there of televi-



COLONEL SARNOFF



LIEUT. GENERAL HARBORD

Col. David Sarnoff, President of the Radio Corporation of America, has returned to active military duty with the U. S. Army overseas. During his absence, Lieut. Gen. James G. Harbord will perform the duties of the President, in addition to his duties as Chairman of the Board.

sion's selling power as compared with other advertising media?

"Just this," Mr. Joyce declared. "One of NBC's 1941 television advertisers in a scientifically controlled test determined that the effectiveness of television selling was of the order of ten to eleven times greater than all the other media used by the advertiser combined."

Because television has the power to create consumer buying of goods and services beyond anything that we have heretofore known, he explained, we can count upon its helping to bring about a high level of post-war prosperity in agricultural, industrial and the distributive industries, as well as personal and professional services.

"This means jobs," Mr. Joyce pointed out. "Jobs are made when people decide to buy goods or services."

People valued their money, all through the depression, more than they did merchandise, he said, adding: "It is only when people value merchandise more than money that they are willing to exchange money for merchandise. Television, properly used, has the power to make

people want merchandise more than money, thus creating the necessary turnover of goods and services which alone can sustain continuing and useful jobs."

It would not be unreasonable to assume, Mr. Joyce declared, that within ten years after the full commercialization of television, television service would be available to 23,700,000 wired homes or 80 per cent of the wired homes of the United States. This would represent an audience of about 112,000,000 people and approximately 82 per cent of the total U. S. buying power.

"Television industry sales at this point," he said, "should be approximately 2,500,000 units per year for a total retail billing of between six hundred million and seven hundred million dollars. This billing, together with replacement tubes for existing receivers, service, transmitter sales, television advertising revenue, and so forth, will make television the billion dollar industry that many have prophesied it will be."

Buy War Bonds



NBC TELEVISION PLANNING GROUP, LEFT TO RIGHT, WILLIAM S. HEDGES, VICE PRESIDENT IN CHARGE OF STATIONS; PAUL W. MORENCY, OF WTIC, HARTFORD; NILES TRAMMELL, NBC PRESIDENT, AND O. B. HANSON, VICE PRESIDENT AND CHIEF ENGINEER OF NBC.

NBC Television Plans

TRAMMELL, IN STATEMENT TO NETWORK AFFILIATES, ANNOUNCES POLICY TO MAKE NEW SERVICE AVAILABLE TO THE PUBLIC

OF ALL THE post-war developments promised by the progress of the art and science of radio, television presents the greatest challenge and the greatest opportunity, Niles Trammell, President of the National Broadcasting Company, declared in a statement to the 145 NBC-affiliated stations. He then set forth the position of NBC with respect to television, announcing that the policy of NBC "always has been, and will continue to be, to foster and encourage any developments in the broadcasting field which promise better service to the public".

NBC will cooperate with the government and with other members of the industry in line with its research, experimentation and practical operating experience in television, in the effort to secure the best possible standards of operation for a commercial television broadcasting system in the United States, Mr. Trammell declared.

"In developing a basis for an eventual television network," he continued, "NBC will cooperate in every way with the owners and operators of the stations affiliated with its network, many of whom have from the very beginning dem-

onstrated their willingness and capacity to include in their service the latest technical developments the radio art has brought forth."

Points Are Enumerated

Enumerating other important points, he added:

"In preparation for the expected expansion of television services in the post-war period, NBC will, within the limitations of wartime operations:

- (a) Expand its existing program service by tapping new sources of program material and talent, and by developing new program techniques;
- (b) Transmit field programs once a month or oftener from points outside the studio;
- (c) Resume studio broadcasts from the NBC television studio in Radio City, which is now being reconditioned preparatory to the renewal of broadcasting live talent programs;
- (d) Continue research and development in all phases of television.

"As soon after the war as materials become available, NBC will construct a television station in Washington, D. C., so that a service of sight-and-sound may be available in the nation's capital, and from the nation's capital to other cities when interconnection between stations is made available."

To establish the anchor points of a television system, Mr. Trammell explained, NBC has filed additional applications with the Federal Communications Commission for construction permits for television stations in Chicago, Cleveland, Denver, San Francisco, and Los Angeles, where NBC already maintains a programming organization and studio facilities. It is hoped that the FCC will act favorably on these applications, Mr. Trammell said, adding:

"A nationwide network will not spring up overnight, but must proceed as an orderly, logical development. Such a development, as we see it, would establish television networks in the following possible ways:

1. An Eastern Network that will extend from Boston to Washington, with stations located at such intervening points as Worcester, Providence, Hartford, Schenectady, New York, Philadelphia, Wilmington, and Baltimore, with perhaps an extension to Syracuse, Rochester and Buffalo.
2. A Mid-West Network that will develop with Chicago as its hub, spreading out to Milwaukee, Minneapolis, St. Paul, Des Moines, St. Louis, Indianapolis, Detroit and Cleveland.
3. A Pacific Coast Network utilizing the great talent center of Hollywood, connecting with San Francisco and gradually extending to other important points.

"These regional networks will gradually stretch out over wider

areas, and will themselves become linked together. Thus, city after city across the continent will be brought into network operation, until finally complete nationwide networks will become a reality."

Viewing television as a forward stride in the field of communications as great as aviation has proved to be in the realm of transportation, Mr. Trammell described the networking of television programs on a nationwide basis, when this can be achieved, as "one of the major services of the 20th Century to the American people".

Despite the problems and the risks which confront the broadcasting industry, Mr. Trammell said, the National Broadcasting Company believes that television service should be brought as soon as possible into every American home, and that this is, and should remain, the task of private enterprise. In conclusion, he declared:

"NBC will continue its activities in the field of television with vigor and confidence, with absolute faith

in the vital significance of sight-and-sound broadcasting to the American public. Television promises to be the greatest medium of mass communication yet evolved with unparalleled opportunities for services of entertainment and education. It is our belief that NBC affiliates will join in these activities and share in that faith. By such cooperation, we will successfully meet the challenge and the opportunities which television presents to the initiative and courage of American enterprise."

Schedule Outlined

Together with his statement, Mr. Trammell made public a letter from Keith S. McHugh, Vice-President of the American Telephone and Telegraph Company, which outlined a schedule contingent on the war and other considerations, for the installation of special coaxial cable for long-distance transmission of television signals.

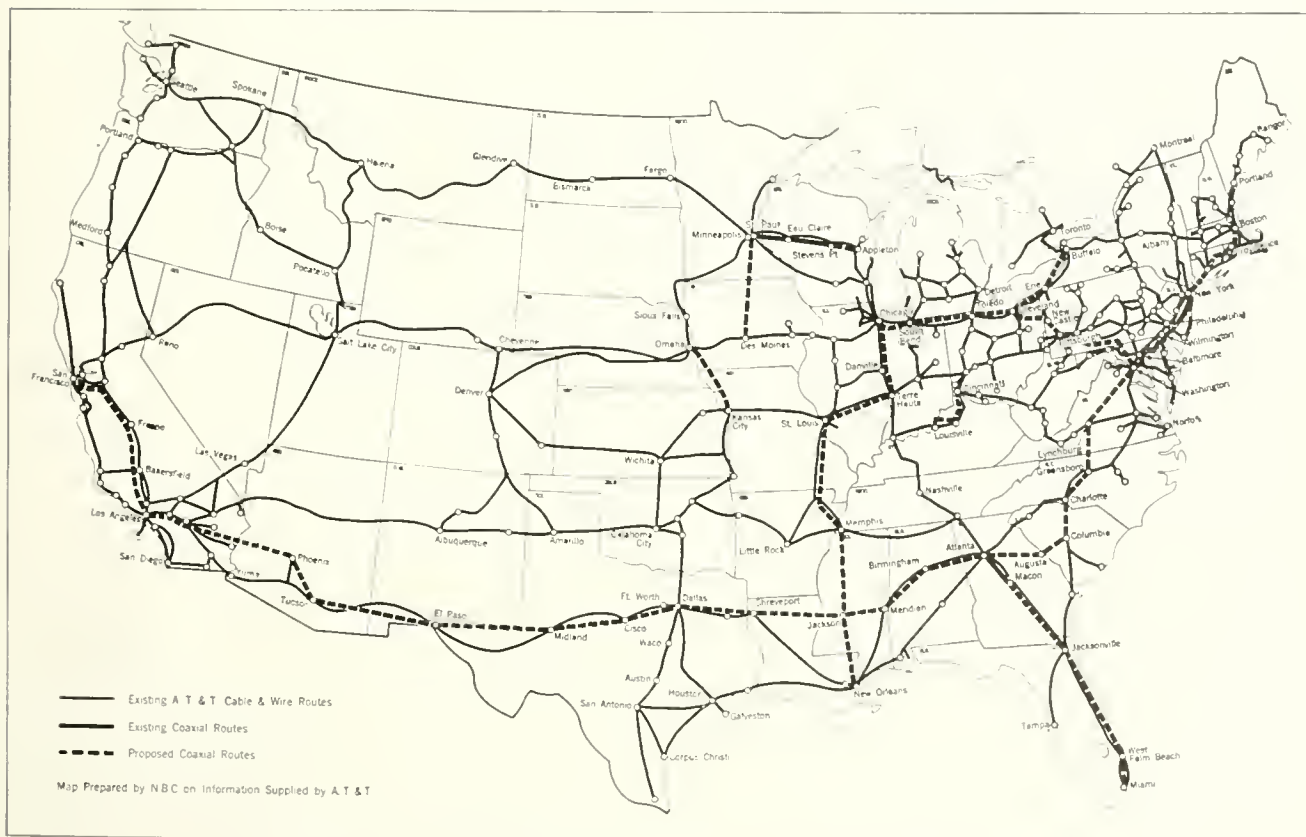
The schedule shows how three regional transmitting projects event-

ually may be joined in a 6,000-to-7,000-mile, all-American television network, as follows:

- 1945—New York-Washington
- 1946—New York-Boston; Washington-Charlotte; Chicago-Terre Haute-St. Louis; Los Angeles-Phoenix.
- 1947—Chicago-Toledo-Cleveland-Buffalo; part of the Southern transcontinental route including Charlotte; Columbia-Atlanta-Birmingham-Jackson-Dallas-El Paso-Tucson-Phoenix.
- 1948-'50—Completion of Southern transcontinental route; Washington - Pittsburgh - Cleveland; St. Louis-Memphis-New Orleans-Kansas City-Omaha; Des Moines-Minneapolis; Atlanta-Jacksonville - Miami; Los Angeles-San Francisco.

Buy War Bonds

PROPOSED INTER-CITY CONNECTIONS OF COAXIAL CABLE FOR TELEVISION.



RCA Research Aims

SCIENTIFIC DEVELOPMENTS IN RCA LABORATORIES CONTRIBUTE
TO SOCIAL AND INDUSTRIAL ADVANCEMENT OF THE NATION



By **Otto S. Schairer**
*Vice President in Charge
RCA Laboratories*

RADIO CORPORATION OF AMERICA was created to put into practical use the contributions of science and engineering. Its subsequent growth and progress have been based in large measure upon the achievements of its laboratories.

The first quarter-century of RCA history has been marked by initiative and resourcefulness in research and development, and by revolutionary ventures to make the results of its original work of service and benefit to the public.

Global, marine, continental, aeronautical and broadcasting communication by radio have become commonplace. Radio and electronics contribute greatly to the superiority of weapons, equipment and communications which are assisting the armed forces of the United Nations in winning the war. Television, frequency modulation and facsimile broadcasting, radio relaying and many other new radio and electronic services and devices will speed reconstruction and rehabilitation in the postwar period.

RCA has pioneered and has exercised initiative and leadership in all of these fields. Its research, development and inventions have been major factors in the creation of these new services and products.

Its record of scientific accomplishments and of contributions to industrial progress is inspiring; it is one of which all members of the organization can be proud. It strengthens their determination to meet the challenges of the present to make a greater future. Advancement of the radio, electronic and kindred arts is their primary objective. Original, creative and constructive work are the means employed to attain this end.

The efforts of the scientists and engineers of the Laboratories are devoted to the discovery of previously unknown principles and phenomena; to the revelation and expansion of knowledge; to the extension of horizons. They explore new fields and remove barriers to progress. They create and develop new and improved industrial processes and products; and provide new communication and other services to the public.

First Laboratory In 1919

In these ways RCA Laboratories are endeavoring to promote continued industrial expansion, ever-increasing employment opportunities for workers and investors, improvement of living and working conditions, betterment of the general welfare, and greater understanding and community of interest among peoples.

Important as were the inventions

existing when RCA was organized, they were inadequate to make possible the development and rendering of an efficient and reliable global communication service by radio. Out of this necessity for further research and development was born the first improvised and crude laboratory of RCA in 1919. It was located in a tent at Riverhead, L. I., with a staff of five engineers.

As the business of RCA developed and was extended into other radio fields including manufacturing, additional laboratories were established in or near its various plants and offices. A large step in the development of the present research organization occurred in 1930 with the integration of the research, engineering, manufacturing and selling operations in radio fields which had previously been conducted by the General Electric and Westinghouse Companies and RCA. This brought together many experienced research workers who formed the nucleus of the staffs until recently associated with the manufacturing activities of RCA.

It was long the dream of those in charge of the research work of RCA that some day central laboratories would be erected to which would be transferred many, if not most, of the research activities which originated at several scattered locations. After the outbreak of World War II in Europe increasing demands were made for the conduct of research and development work directed toward the creation of new radio implements of war. It soon became apparent that the research laboratories should be moved out of the principal manufacturing plants to provide space

THE FIRST RCA LABORATORY—A TENT AT RIVERHEAD, L. I., IN 1919.



for production, and also that improved and more extensive laboratory facilities would be necessary to enable the research men more effectively to devote their efforts, and to use their talents, to assist in the achievement of victory.

Awarded Army-Navy "E"

Exactly one year before Pearl Harbor the first scouting trip resulted in the finding of a site for the new Laboratories near Princeton, New Jersey—a community conducive to creative and original thought and work. Three weeks before Pearl Harbor the site had been acquired, plans, drawings and specifications had been prepared, the first floors and basement were completed and the cornerstone laid. Ten months later the buildings were dedicated and the Laboratories were soon in full operation. Into them were brought the research staffs and facilities formerly located at the manufacturing plants at Camden and Harrison, New Jersey.

Before the Princeton Laboratories had been in operation a year they were awarded the coveted Army-Navy "E" flag to which one star has been added.

The buildings already erected at Princeton represent about two-thirds of those originally planned. Erection of the remainder of the buildings was prevented by the war, but it is the intention to erect them when conditions permit. They will accommodate other laboratory staffs and facilities now located at other places, as well as offices for the Patent and other departments.

Every effort has been exerted to make the new Laboratories outstanding and highly creditable. To this end a location was sought which would facilitate developing an atmosphere conducive to creative and original thought and work in a community where men gifted with the talents essential to such work could live and rear their families under cultural and stimulating influences. The Princeton area meets these qualifications. Furthermore, it is accessible from the principal plants and offices of RCA by means of the main line of the Pennsylvania Railroad and many good highways.

A large tract of land was acquired to provide insulation from external disturbances and to permit of indefinite future expansion of the enterprise. The large tract makes possible landscaping and a setting for the buildings which will convey an impression of stability and quality intended to give expression to the nature of RCA and all of its undertakings. In the further development of the project it will be given much of the character of an institution set in beautiful grounds resembling a park or campus.

Influence On Work

Being designed for experimental work, the Laboratories themselves are an experiment in elevating the tone of industrial enterprise. It is hoped that they will be regarded as a pattern for the establishment of decentralized units where workers can live in comfort and health and work under ideal conditions. These

factors are emphasized because it is believed that they have a beneficial influence upon the important work of the Laboratories.

Since the work now being done relates to military and naval activities, nothing can be said at this time concerning its specific nature. Suffice it to say that the wartime inventions added to those of the pre-war period hold promise for great expansion of the radio art and industry in peacetime.

Aids to Other Industries

Undoubtedly, television and radio relays, and their many by-products and outgrowths made possible in large measure by the work of RCA Laboratories will prove to be the most important and most extensive of the new services and products. Television and other developments in the field of the higher frequencies will provide not only a vast new medium of communication, but they will also provide aids to transportation and travel by land, sea and air which will contribute greatly to safety, reliability and speed.

Radio and electronics will revolutionize, improve and expedite innumerable manufacturing processes and provide many new and superior materials and products. In short, there is probably no branch of science or industry which offers more promise for future development and progress than radio and electronics.

Having been created to assume a position of leadership in radio, and to that end having been granted the right to use and to make available to others the radio inventions of

THE PRESENT HOME OF RCA LABORATORIES AT PRINCETON, N. J.; OCCUPIED IN 1942.



several domestic and foreign organizations, RCA was given a unique opportunity and responsibility further to develop the radio art and to promote progress of the radio industry. In effect, it was given the radio "ball" to carry forward.

Early in its history RCA adopted a practice of making its inventions available to responsible applicants by means of patent licenses. Such licenses include all unexpired patents of RCA and all with respect to which it has or may have the right to license others during the periods of the licenses which it grants. They, therefore, include both the present and future inventions made both in RCA Laboratories and in those of several other organizations.

May Extend Licenses

More than 200 such licenses have been granted. Some of them extend to 1947 and others to 1948. All of them may be extended by the licensees at their options to 1955, which is the latest date of expiration of the agreements by which RCA acquired rights to grant licenses under the patents of certain other organizations. These licenses impose no restrictions upon the volume or proportions of the business that licensees may do, nor upon the prices at which they sell their products. Under these conditions it is not possible for RCA to monopolize any part of the radio or electronic business, nor for RCA nor any of its licensees to suppress any licensed invention.

For many years the Industry Service Division of the Laboratories has rendered technical services to the many licensees of RCA. It furnishes them with technical information concerning advances in the radio art, informs them periodically of the inventions which become available to them under their licenses, and assists in putting them into practical use. Facilities are also provided for testing and measuring apparatus developed by licensees. These laboratories like all others have recently devoted their efforts exclusively to war work. However, when the requirements of war diminish, they will again undertake to serve licensees, and it is the intention greatly to improve and develop this service.



INGENIOUSLY PLACED BEHIND THE WALL PANELS OF THE EXECUTIVE CONFERENCE ROOM AT RCA LABORATORIES IS THIS ARRANGEMENT FOR DISPLAYING MAPS, CHARTS, DRAWINGS, AND MOTION PICTURES.

During and shortly following its organization agreements were made between RCA and a number of foreign concerns under which RCA acquired the right to use their inventions in the United States and to permit others to use them, and under which RCA granted rights to the foreign companies. Most of these agreements have terminated or will expire by the end of 1944. In the postwar period it is the intention of RCA to grant non-exclusive licenses under its foreign patents, as in the United States, and to use them to expand the markets for its products.

In concluding this article, it seems appropriate to say that the continued aggressive conduct of research, inventive and development work in RCA and other laboratories is dependent to a large degree upon the maintenance of a healthy patent system. Without the protection afforded by such a system only such constructive work could justifiably be undertaken as could be paid for out of immediate sales and use of new ideas. No one would be willing at his own expense to undertake major, long-range and expensive developments if the complete practical results of his vision and courage, and of his efforts, expenditures and sacrifices, could be appropriated by others without their contributing to the development and without their making the slightest compensation to the entrepreneur.

It is inconceivable that the radio art could possibly have made such accelerated progress, or could have attained such an advanced state as

it has, if it had not been for the encouragement and protection afforded by patents. There is no better example of how the patent system stimulates and accelerates scientific research and industrial progress than is afforded by the development of electronic television which has already required more than two decades of persistent efforts.

System Provides Incentive

To make television its present reality required imagination to visualize its potentialities for service and benefit to the public; initiative, courage and determination to create and develop it into a practical medium of communication; perseverance in original and constructive efforts; and the expenditure of many millions of dollars. It was the stimulus and incentive afforded by the patent system, and the reasonable assurance of reimbursement and reward which it provides, that induced the television pioneers to devote their talents and resources to such a hazardous undertaking.

Surely it must have been enterprise of this character, which is so definitely in the public interest, that the framers of the Constitution intended to encourage and reward when in that document they empowered the Congress to pass laws which would "promote the progress of science and the useful arts by securing for limited times to authors and inventors the exclusive rights to their respective writings and discoveries."

As Lincoln once said "the patent system . . . added the fuel of interest to the fire of genius in the discovery and production of new and useful things." He classed the introduction of patent laws with the arts of writing and printing, and with the discovery of America, as occurrences of peculiar value in facilitating inventions and discoveries.

But there are those in high places whose words and actions are causing so much confusion and misunderstanding that there is danger of the patent system becoming impaired and weakened and made ineffective as a medium for rendering great public service. They are tinkering with an intricate but highly useful mechanism that has contributed greatly to the scientific and industrial supremacy of the United States, that has provided continually increasing employment for workers of all classes, and that has been of great social and economic significance.

Strange Theories Advanced

Many strange theories and doctrines are being advanced by those who are apparently unsympathetic with patents. Among them none are more at variance with the intent of the patent laws than some of the tests of invention that have recently been proposed. One of them is the "flash of genius" test,—which is purely subjective and would provide only one process by which an invention could be made.

More than a century ago when the patent system was young and its foundations were being laid, and when men still understood the Constitution, the United States Supreme Court, through the eminent Mr. Justice Story, said:

It is of no consequence whether the thing be simple or complicated; whether it be by accident, or by long, laborious thought, or by an instantaneous flash of the mind, that it is first done. The law looks to the fact, and not to the process by which it is accomplished. It gives the first inventor or discoverer of the thing, the exclusive right, and asks nothing as to the mode or extent of the

application of his genius to conceive or execute it.

By the great preponderance of Court opinion since that time the objective test of invention has been applied—namely, that it must be an advance in the art and involve the exercise of more than the expected skill of the calling; something that would not be obvious to one skilled in the art. The true test is whether or not the contribution substantially advanced the art, and not the mental or other processes by which the progress of the art was made possible.

Invention Is Defined

Then there are those who say that there is no invention "in the exercise of persistent and intelligent search for improvement", and that "neither the result of great industry in experimental research nor the successful product of a gradual process of experimentation over a period is invention."

According to this theory, step-by-step progress, and especially when made by two or more persons or a group working together in diligent and sustained effort to advance a science or an art, would not be rewarded by patents on such steps as constitute invention judged by the long-established standards. If this theory were generally accepted, which fortunately it is not, it would discourage and destroy organized and systematic scientific research and put most research laboratories out of existence. No more mischievous and wanton theory could be suggested.

An idea is no less an invention because it is only a step forward,

rather than a leap, or because it is based upon prior steps forward either by the same individual or another. If each step forward involves the exercise of more than would be obvious to persons skilled in the art who are confronted with the problem, it is invention.

Progressed Step-by-Step

The sciences and arts have always progressed by the step-by-step process. It is only the combination of many steps forward, and usually those of many people, that great progress is made. No single human mind has ever been great enough to conceive of, and to produce, such advances as radio communication, radar or television in fully perfected and useful form. These required long and tortuous effort and involved many ingenious steps by many contributors.

Patents were obviously intended to promote progress whether by lone inventors, by joint inventors, by groups, by organized and systematic efforts, by large and small laboratories, by flashes of genius, moments of incandescence, or by continuous, persistent and persevering research and development. The patent laws do not discriminate between the many ways of promoting progress which provide mankind with new services and goods, improved standards of living, greater employment and general betterment of the public welfare.

Buy War Bonds



LEFT: DR. H. H. BEVERAGE, ASSOCIATE RESEARCH DIRECTOR OF RCA LABORATORIES; BELOW: DR. V. K. ZWORYKIN, ASSOCIATE RESEARCH DIRECTOR; E. W. ENGSTROM, RESEARCH DIRECTOR, AND B. J. THOMPSON, ASSOCIATE RESEARCH DIRECTOR.



MacLEISH SERIES ON NBC

Life and Literature of the Americas Recalled in "The American Story", New Inter-American University of the Air Presentation.

TRACING the history, development, and fulfillment of the literature of the Americas is a job that has been entrusted on the new National Broadcasting Company series, "American Story," (7:00 p.m., EWT Saturdays) to Archibald MacLeish, Pulitzer Prize winning poet and Librarian of Congress. As the third permanent presentation of the NBC Inter-American University of the Air, the series represents the first time, not only in radio but also in the history of literature, that a contemporary literary figure has been commissioned to produce a cycle of inter-related literary works.

MacLeish, who quietly asserts that Americans do not understand their common background, has as his immense canvas the life and literature of the Western Hemisphere for the last four and a half centuries. And into the study of these aspects of American development, the poet has poured an immense amount of painstaking research, including authenticating obscure facts, reverting to original source material for his quotations, re-checking sound effects,—in fine, re-creating to the utmost the atmosphere and conditions that actually existed in the days of which he writes.

The distinguished poet sets the framework for each broadcast in his sound effects. His exploitation of sound as a means of setting the scene is unusual.

Even the sound directions are written in the same poetic style that marks the dialogue. Witness this direction in the initial broadcast, telling of the journey of Columbus to the new world: "The roll of a ship in a slow swell . . . the slapping of canvas . . . the cattery of a gull." Or later, this effect, designed to simulate the caravels on their way at sea: "Sound of the sea, of the wind in a ship's rigging, of the great sails flattening and filling, of men in the handling of a ship, the words inaudible, this sound washes over the Admiral's words or falls beneath them. It is a continuing sound of the caravels in the great sea. It is always heard under or over what follows."

All the sound devices at radio's command are employed by MacLeish to set the stage for the narration.

Uses Poetic Narration

In addition to the laborious research and authentication, the poet includes the most important fillip—his own brilliant style of the prose poem, a style which has won for him the accolades of the literary world. Each line read on the broadcast is a part of this poetic narrative style, giving each program a dramatic sweep so necessary in producing the effect desired.

MacLeish says, candidly, that he is employing his artistic talents to create new forms of radio expres-

sion. His is no conventional radio drama. The broadcasts present a phase of American development, as represented in the logs and the journals of the men who discovered the lands, in the original chronicles of life in the New World, and in the tales that returned to the Old World from the new, tales that prompted the vast flow of people to these lands. They tell a story, to be sure, but the conventional form of radio drama is not utilized in the presentation. MacLeish's technique varies with each broadcast, for as he says, this is an experiment. The dramatic form, narration, straight reading from sections of great literature, a combination of the three, and even several new variants such as reliance on sound itself to tell part of the story—all these techniques have been tried and tested until they meet with the poet's satisfaction.

To date, the broadcasts have sketched the discovery of the new lands as culled from the logs and journals of the discoverers, the journeys of the discoverers on the coasts of the New Land, the Indian reactions to the advent of the white man on their soil, the wars against the Indians on both continents, a humorous discussion of Amerigo Vespucci's "discovery" that led to the naming of the new lands, and accounts from the Americas as reported by people living here. Before the series is finished, MacLeish expects also to demonstrate how much alike was the birth of freedom on both the western hemisphere continents, and just how this freedom was extended by the peoples of the land.

"I think one reason the Americans find it so difficult to get along



[12 RADIO AGE]

AT LEFT, ARCHIBALD MACLEISH, NOTED AMERICAN POET, WHO DIRECTS NBC'S "THE AMERICAN STORY" SERIES. BELOW, HE WATCHES FRANK POPP, PRODUCER, DEMONSTRATE THE SOUND OF A SAIL BLOWING, AND (AT RIGHT) HE NOTES SHIP'S RIGGING SOUND EFFECTS.



one with the other, is that we don't understand our common background." MacLeish has said. "From Alaska to the tip of South America, every stage of life was the same. The Pilgrims landed in Massachusetts, with the sea behind them and the wilderness in front. But the same thing happened in Olinda, in Brazil. Each community felt out the shoreline, and infiltrated slowly into the wilderness. Each had wars with the Indians, and each established frontier after frontier. All the settlements went through the colonial stage in which the government was foreign and the people already American. Each felt the urge toward free development and each became free through revolution.

"This is the common American Story," he concludes.

Comments Are Favorable

Favorable comments from newspaper editors, educators, producers, and a number of men of letters have already been forthcoming. The *New York Times*, after the initial broadcast, said: "A prodigious task, clearly. . . . There was something immediately attractive about the beginning of it; something which, for want of a better word, you may call simplicity. . . . The result—as Mr. MacLeish, with a poet's sensitivity, surely calculated—was "the sense of the wonder long ago."

One of America's most distinguished poets, MacLeish is also author of a number of challenging poetic dramas for radio. MacLeish was awarded the Pulitzer Prize in 1932 for his "Conquistador." He was appointed Librarian of Congress by President Roosevelt in 1939, a position he has filled with distinction.

As Sterling Fisher, director of the NBC University of the Air has explained, all of the University's permanent series, of which "American Story" is the third, are designed to attract and instruct the casual listener who may tune in to only one of the broadcasts. And the regular listener who listens week after week will gather the benefits of the comprehensive college course.



MISS MARY FRETCH, ORIGINATOR OF TIME-SAVING IDEAS, RECEIVES WPB CERTIFICATE FROM DONALD M. NELSON AT LUNCH IN HER HONOR.

MARY FRETCH IS HONORED

Worker At Harrison Plant of RCA Victor Division Awarded Title of "Best Woman Suggester" To Speed War Production At Washington Ceremony

THE Nation has honored another RCA Victor war worker for outstanding production suggestions which help speed equipment to the armed forces of the United States and its allies.

Miss Mary Fretch, employed at the Harrison plant for 14 years, was singled out by the War Production Board for special honors in ceremonies held in Washington, D. C., March 3, and heard herself described as the nation's best woman suggester.

RCA Victor's "Arsenal of Ideas" was the only woman among eight war workers summoned to Washington from all parts of the country to receive special certificates from the WPB. She likewise was the only representative of the radio industry.

During the last year, Miss Fretch, a quality control inspector, has won awards of approximately \$800 for three suggestions which are credited with saving 35,000

man-hours annually in the output of tubes at the Harrison plant.

One of her valuable time-saving ideas was portrayed in the nation's capital at the National Labor-Management Production Exposition in the Department of Commerce auditorium. The RCA exhibit, prominently placed at the auditorium entrance, was highlighted by a huge portrait of Miss Fretch. She was at the exhibit explaining her production suggestions to visitors.

Miss Fretch received her WPB certificate from Donald M. Nelson at a luncheon attended by Paul V. McNutt, chairman of the War Manpower Commission, and Frances Perkins, Secretary of Labor.

Her Washington trip included visits to the Pentagon, Arlington Cemetery, Jefferson Memorial, Washington Monument, Lincoln Memorial, National Art Gallery, the House office building and Congressional press galleries.

Antennas Point Ahead

LONG AND INTENSIVE RESEARCH BRINGS NEW AERIAL DEVICES TO ASSIST IN GROWTH OF SOUND BROADCASTING AND TELEVISION



By Dr. George H. Brown
RCA Laboratories
Princeton, N. J.

THE painstaking development of radio antennas has contributed immeasurably to the growth of the radio industry—oftimes preceding engineering advances in sound broadcasting, television, facsimile and “FM” broadcasting.

Investigations and study of the properties of antennas date back to a period almost 30 years before Marconi's success in radio-teleg-raphy. Maxwell, Hertz, and Poynting are among the great scientists whose discoveries and theories have been the basis for the modern antenna systems that have sprouted since the advent of radio communi-cation. About 1900, it was Max Abraham who probed the action of a half-wave antenna in free space and, as far as I know, was the first to evaluate the radiation resistance of a half-wave antenna.

As radio developed, the long waves were first used for broadcast purposes and the shorter waves were used for point-to-point com-munication. Just as this division in wave length came about because of the difference in application, so was there a division in the develop-ment of antenna structures.

In the first broadcasting stations, the antenna usually consisted of a giant T, supported by two wooden or steel towers. Since the action of this type of antenna was not well known, the horizontal portion of

the T was regarded as highly im-portant. It accordingly was built of cages of wires or a number of parallel wires held in position by spreaders. The vertical portion was looked upon as a carrier of energy to the horizontal portion. But, as a matter of fact, the vertical part of the average T antenna radiates 98 per cent of the total radiated power.

It soon was found in a number of cases that the antenna induced strong currents in the steel sup-porting towers. The re-radiation from these currents was enough to greatly distort the radiation pat-tern of the system. Measured hori-zontal patterns were found to be oval and sometimes the shape of a figure 8. Reduction of the distor-tion was achieved by developing insulators to isolate the tower from the earth. The next obvious step was to use a single insulated tower for the antenna proper.

Used Model Antennas

The theoretical work of Stuart Ballantine, published in 1924, brought another important ad-vance. It showed that where the antenna consisted of a straight wire, the maximum field strength along the horizontal was achieved when the wire was six-tenths of a wave length. In 1931, with the con-struction of the first self-supporting tower antennas, the height set forth by Ballantine was taken as optimum. But operating experience with this type of structure soon showed a grave difference between theory and practice.

Because of the difficulty in per-forming critical experiments on towers several hundred feet in height, work was carried out in our laboratories on the use of model tower antennas. Experiment brought out the fact that, since the towers were not a uniform cross-section throughout their length, the current distribution dif-



“TURNSTILE” ANTENNA USED WITH THE FM TRANSMITTER OF STATION WCAU, IN PHILADELPHIA.

fered from the sinusoidal distribu-tion assumed by Ballantine. The model antenna technique not only explained the action of existing an-tennas, but also pointed the way to improvement of these antennas and assisted in justifying the construc-tion of “constant cross-section” an-tennas.

When the first “constant cross-section” antennas were constructed and tested, it was found that the results predicted by Ballantine were realized. However, by 1934, there were a number of cleared-channel stations in operation. Almost in-variably, the night service distance was not limited by signal intensity. The limit of service was determined by the so-called selective fading zone, that region where the direct ground wave and the sky wave re-lected from the Kennelly-Heaviside layer were about equal in magni-tude. Here, these two waves first reinforced and then tended to can-cel, with consequent fluctuation and distortion. Studies of these effects, together with consideration of the properties of antennas by RCA en-gineers, led to the almost universal adoption of the “constant cross-section” antenna for cleared-channel stations, with the total antenna height equal to 53 per cent of a

wave length, the so-called 190 degree antenna.

Theoretical investigations indicated that the efficiency of broadcast antennas could be increased materially by the use of more extensive ground systems. Experiments showed that by using larger ground systems there was an appreciable saving in antenna heights without heavy loss in efficiency.

The extent of our investigations may be seen in the fact that before their completion sixteen separate and complete ground systems were laid. For tests on each system, the antenna height was varied from 10 to 100 feet, in 10-foot steps. For each one of these 160 combinations, complete measurements were made of antenna resistance and reactance, field intensity one mile away, current distribution in the buried wires, and total earth current distribution.

The trend to use constant cross-section antennas for high-power cleared-channel broadcasting stations grew, and it became evident that the guyed-type of antenna would be more economical than others. But from the field came objections that the guy wires would distort the radiation pattern. To obtain data on this point, our investigations included theoretical studies, experiments with models and actual full-scale tests to confirm the model experiments.

In a number of cases, it was not possible to erect a 190 degree antenna because of the proximity to airports or airways. Top-hat antennas were then resorted to. Here a large set of outriggers was placed on the top of the tower to act as a capacity, thus altering the current distribution so that the radiation pattern of a 190 degree antenna could be obtained with an antenna which was actually shorter than the optimum.

In general, it is not physically possible to construct a hat of sufficient diameter to reach the best point. To get around this obstacle, the hat was mounted on insulators and connected to the top of the tower by means of an inductance coil. The addition of this coil not only allowed the use of a smaller hat, but gave great flexibility in exactly achieving the desired re-

sults, for the proper adjustment was achieved simply by moving a tap on the coil. In practice, the addition of a top hat in one instance more than doubled the effective night service area.

Further Studies Made

Further studies by RCA engineers showed that more efficient operation, with lower voltages, could be obtained by using a sectionalized antenna. In this antenna, the insulators were used to break the tower at a point approximately one-third of the distance from the top. The coil was again used to connect the two parts of the tower. In certain special cases, a combination of sectionalizing and top-hat seemed desirable. Model measurements have been especially helpful in studying top-loading problems.

As the number of broadcasting stations increased, directional antennas began to appear. Arrays used in the broadcast band had two purposes: First, so that the energy may be concentrated in a given area, thus increasing field strength to equal that attained by pumping more power into a single non-directive antenna; secondly, and perhaps more important, to protect the service area of another station in the same or adjacent channel. In the latter case, the action is to "chop a hole" in the radiation pattern so that the signal traveling toward the other station is cut to very small values. Such action makes possible the operation of

several regional stations on the same channel.

According to my information, the first commercial broadcasting station to use directive antenna for that purpose was WFLA, at Clearwater, Florida. The array there consisted of two quarter-wave antennas separated a quarter of a wave length, and fed so that the currents in the antennas were equal and in time quadrature. The antennas were so set up that the signal in the direction of the primary service area of WTMJ, at Milwaukee, Wisconsin, was reduced to very small values. Successful results at WFLA inspired many stations to install similar equipment.

Our antenna development group concentrated on the development of directive antennas. These experiments made it possible for us to design the first "asymmetric" directional antenna system, now in use at Station WTAR, at Norfolk, Virginia.

The model technique was further used to study problems arising when individual towers in an array are of unequal height, and information obtained through our tests proved valuable in the installation of this system at Station KDYL, Salt Lake City.

More, the use of small model antennas, operated at ultra-high frequencies, helped us develop methods and apparatus which could be put to work immediately when it became desirable to produce antennas for that type of broadcasting. Close

INFORMATION OBTAINED BY RCA ENGINEERS IN THE STUDY OF MODEL ANTENNAS MADE POSSIBLE THE DIRECTIONAL TYPE OF ANTENNA NOW IN USE AT STATION KDYL AT SALT LAKE CITY.



contact with RCA service engineers, as well as engineers in the field, led us to design the "ground-plane" antenna used in police radio.

In high-frequency broadcasting, it is usually desirable to radiate signals to all points of the compass. This prevents robbing one section in order to concentrate the signal in other areas. A simple antenna radiates a good bit of energy at angles above the horizontal plane. Therefore, a logical step toward increasing signal strength in the horizontal plane seemed to be to take the wasted energy from the higher angles and redirect it to the horizon. The RCA Laboratories development group produced an antenna for this specific purpose.

This antenna resembles a turnstile and, indeed, that is the name by which it now is known. The first models of it used open wire feeders and exposed insulators. It was necessary to adjust or "match" the transmission lines leading from the transmitter to the antenna after installation.

The RCA antenna group continued work on "Turnstile" antenna development over a period of several years, so that a few years ago, when FM broadcasting became popular, a design was ready which could be installed completely, ready to operate without field adjustments.

Advantages of the turnstile antenna are apparent as we consider the problem of transmitting television. For in telecasting, the antenna must match the transmission line from the transmitter over a wide band of frequencies. In one version of the turnstile, the means of obtaining the circular radiation pattern automatically provides the broad-band feature. And when provided with a rather simple network, it may be operated as an ordinary antenna for both sound and picture transmitter without the use of complicated filters.

Increasing use of very high frequencies in radio brings the problems of antennas to the foreground and adds to their number. The tough job for engineers who are doing research on antenna systems and associated circuits is that of deciding which one of the problems to attack first.



EMERGENCY WALKIE-TALKIES

Police, Firemen and Doctors May be Equipped with This New Radio Communications Marvel After the War—Other Possibilities Outlined

MILITARY needs have brought such advanced developments in radio communication that firemen and policemen in the postwar period may be equipped with walkie-talkies to fight fire and crime with radio.

And through the same medium doctors may keep in touch with offices and hospitals, and operators of trains, busses, taxis and trucks would receive their instructions from headquarters while on the move.

No Sudden Transition

H. F. Mickel, manager of the Police and Emergency Communications Section of RCA Victor, Camden, outlined the foregoing possibilities at a recent conference of the International Municipal Signal Association in Philadelphia, attended by signal system experts and officials of cities throughout the country.

Although he declared the possibilities almost limitless in communications and industrial electronics, Mr. Mickel emphasized there would be no sudden transition from the present status. Rather, he said, existing equipments and methods

would be improved and expanded instead of being rendered obsolete overnight.

As an early possibility in the public safety field, the RCA engineer suggested that firemen carrying walkie-talkie sets small enough not to hamper their movements could be directed inside a blazing building by a superior officer on the outside who would be supplied the necessary information by the men throughout the structure. The same technique, he said, could be employed in combatting forest fires.

Another probable development, Mr. Mickel forecast, would be the equipping of all foot and traffic policemen with tiny two-way radio sets through which they could keep in constant touch with headquarters. These applications, he said, will be made possible through the development of new circuits, tiny tubes and components.

"It is probable that future emergency communications systems will tend toward the use of higher frequencies in the radio spectrum," Mr. Mickel said. "Again let me point out that this is the result of gradual evolution rather than the application of a radically new prin-

ciple. The first police and fire department radio systems operated on medium frequencies just above the standard broadcast band. A few years later a gradual swing to the use of channels in the 30- to 40-megacycle band began. However, this transition did not render the original systems obsolete and unusable.

Trend to Higher Frequencies

"The first automatic radio relaying systems in the emergency communications service were in the 30 to 40 MC portion of the spectrum, but just prior to the war, a group of channels in the 116 to 119 MC band was allocated for such use. It can be seen, therefore, that the gradual tendency is toward higher frequencies and it is believed that the trend will continue.

"The use of higher frequencies will result in lower-powered transmitting equipment, smaller-sized apparatus and highly efficient antenna systems. Higher frequency systems may be more readily controlled to cover the exact areas desired, thus making more efficient use of available power. Higher frequencies will also result in the availability of a large number of additional channels.

"Perhaps this will open the way for many new radio applications and services. We may see two-way radio in common use by doctors, bus companies, trucking concerns, taxicab companies, railroads and many other similar users. Many of these services have been investigated in the past, but sufficient

channels have not been available to permit the use of radio in such cases. The rapid advancements being made in the radio and electronic field may present a speedy solution to this problem."

Higher frequencies also will lead to the more common application of automatic relaying units, Mr. Mickel said. Where great distances are to be covered and direct transmission is beyond the range of available equipment, automatic relaying or repeater units may be interposed to pick up the transmitted signal and pass it along to the receiving point.

"An example of automatic relaying is found in the radio system in operation on the Pennsylvania Turnpike," he continued. "Here, unattended relay stations pick up and pass along transmissions from one end of the turnpike to the other. A message originating at any point on the turnpike is clearly heard by all the cars patrolling the road, by all the toll office personnel, by Pennsylvania State Police headquarters in Harrisburg and Bedford and in all maintenance buildings along the right-of-way.

"This system has been in operation for more than two years and effectively proves the practicability of such apparatus. The use of higher frequencies will make such systems more common and easier of accomplishment."

As a development of the present-day fire alarm system, Mr. Mickel visualized a standard radio receiver which, when switched off at night,

would maintain in operation a tiny receiver which would connect the loudspeaker and permit transmission of any desired message when actuated by a specific signal from headquarters. Such a device would have wide application in police and fire systems for calling out reserves or off-duty members, he said.

"We will also see electronic heat indicators for actuating fire alarms," the engineer said, "and the burglar alarm of tomorrow may readily use invisible light rays to prevent any visible indication that such a detection device is in operation."

Chicago Orchestra on NBC

A major addition to the imposing list of NBC music offerings was the launching of "Orchestras of the Nation" on Saturday, March 25 (NBC, 3:00 to 4:00 p.m., EWT). First of the nation's great musical ensembles to be featured on the series is the Chicago Symphony Orchestra under the baton of Désiré Defauw.

The Chicago Symphony is billed for the first five Saturdays of the series. Future orchestras are to be announced.

Samuel Chotzinoff, manager of the NBC Music Division, participated in the opening broadcast and was welcomed to the Windy City at a luncheon given by Edward L. Ryerson, president of the Orchestra Association.



RCA Cadettes on Job

NEW EXPERIMENT GIVES OPPORTUNITY TO COLLEGE GROUP AS
ENGINEERING AIDES ENTER SIX PLANTS OF VICTOR DIVISION



By Dr. C. B. Jolliffe
*Chief Engineer
RCA Victor Division*

WHAT may turn out to be a milestone in social and educational as well as industrial change was established a few weeks ago at Lafayette, Indiana. The event was a commencement—which is a word used by educators for graduation exercises held to signify that certain students have finished their academic studies—an end that is a beginning. Commencement really means, therefore, that the students are now ready to commence work. None of these particular graduates had any doubts about work. They all had jobs which have been waiting until they finished their training.

Students Carefully Selected

The graduates, seventy-three in number, were all young women, most of them under 25 and a few not yet 20 years of age. They had all been hand-picked from RCA's own plants and from among the nation's thousands of young college women. What is unusual in this case is that the entire graduating class were already employed, and by a single employer. Still further to upset precedent, the students had been at Purdue University for only ten months. These were RCA's first "Engineering Cadettes".

These young women are all at work today as Engineering Aides

in the six plants of the RCA Victor Division. They are the products of the first adventure in the intensive training of young women for specialized technical work in the field of radio and electronics. While they are by no means novices, they realize that they still have a lot to learn.

They have completed intensive courses in mathematics, drawing, shop and manufacturing processes, electric circuits, electrical measurements, radio theory and electronics. In their training they learned to weld, assemble, activate, age, evacuate and test a triode tube, as well as to build a six-tube super-heterodyne radio set, and learn the theory behind the operation of each.

That women can learn to operate milling machines, drill presses, lathes and other power tools, as well as hand tools in assembly and repair work, is no longer news. Many of those who scoffed at the idea prior to Pearl Harbor have lived to admit that on many of these operations women are not only as good as men, but in some cases they have shown even better aptitudes. But if any one had said three years ago to the average educator that women could be taught what these Cadettes have learned in ten months, he would have been regarded as an impractical visionary. One professor, who has since become quite enthusiastic, actually shook his head when the plan was launched and said he could not teach radio theory to students who had not mastered integral calculus. He was willing to try, he found it could be done, and he now is an ardent supporter of the idea.

It goes without saying that the war emergency and shortage of manpower impelled the RCA Victor Division to establish this special class of Cadettes. Several corporations in other industries notably aviation, have also undertaken similar plans. Mr. F. H. Kirkpatrick,

Manager, Personnel Administration, was responsible for the far-sightedness in this planning a year ago to meet the need for technically trained employees.

A few years ago women engineers were as scarce as women lawyers were a quarter of a century ago; as scarce as women physicians. Today, women have made for themselves a permanent and welcome place in both of these professions. There is no reason why this should not be equally true in electronic engineering.

Show Serious Interest

Although it is still too early to say definitely how far these pioneering girls will go in their profession, there is every reason to believe they are fitting satisfactorily into the company's operations. It is perhaps significant that of the seventy-three who were graduated three were married during the training course, but they stayed to continue their career. This is some indication of the serious interest these young women show in their work.

Faculty members at Purdue University are very enthusiastic about the accomplishment of the Cadettes. Their work was satisfactory. In a few cases the level of achievement equalled that of the best regular electrical engineering students, and the class average was above the usual University average. The high number of seventy-three graduates from an initial class of eighty-six is also evidence of their interest. Of the thirteen who did not complete the course, six voluntarily dropped

ENGINEERING AIDE HELEN MUENSCHER, ONE OF THE RCA "CADETTES", IS SEEN AT WORK IN ELECTRON MICROSCOPE LABORATORY AT RCA VICTOR, CAMDEN, N. J.



[18 RADIO AGE]

out to return to technical employment at the company's plants. The seven who withdrew altogether did so for personal and health reasons.

Though nothing like this class had ever been attempted before, and in many ways it was contrary to pedagogic tradition, Purdue faculty members gave their full support and cooperation to the idea that intensive training for a specific objective was feasible.

Postwar Effect Studied

Educators and industrialists looking to the future for the supply of college trained men and women are giving a great deal of thought today to the effect RCA's pioneering educational project may have on college courses after the war. Although the Cadettes followed an exacting schedule of forty hours a week of class and study hours for the ten months they were at Purdue, they were also regular members of the student body and enjoyed the privileges of college life. They lived in regular dormitories and participated in many college activities.

Under the terms of the contract made between RCA and the University, the Cadettes were responsible to the University Administration. A great deal of credit must be given to Miss Frances M. Tallmadge, who was RCA's representative on the campus, but her responsibility concerned itself with counseling and company relations. Discipline, had there been any need for it, was a faculty matter. As a consequence, the most harmonious relations between RCA and Purdue were maintained and the girls were

loyal and enthusiastic employees of RCA as well as ardent Purdue supporters.

The question now being asked is whether many other young men and women — and their parents — may not set up a demand in the future for similar short training courses in other fields of technical study. Also what effect this is likely to have on the social and economic patterns of the nation. There is no doubt that many traditional educators might feel, in that event, that we would be turning out too many students whom they would regard as having only a partial engineering education, although for many kinds of work it would be very adequate. There are some who feel that true education is a process which ends only with death, and starts with actual experience. They hold that technical work in college is only preliminary training to the real essence of education — which lies ahead on the job.

RCA is happy to welcome these young women to its shops and laboratories. They are tackling their jobs confidently, with poise and assurance. What is even more important, with ambition and enthusiasm. It will not be surprising if many of them advance rapidly within the next few years. There is plenty of room at the top, and few barriers to brains and ambitions.

Buy War Bonds

POSTWAR FACSIMILE EXPANSION POSSIBLE

RCA Research Director Says New Broadcasting Service Is Ready for Wide Use.

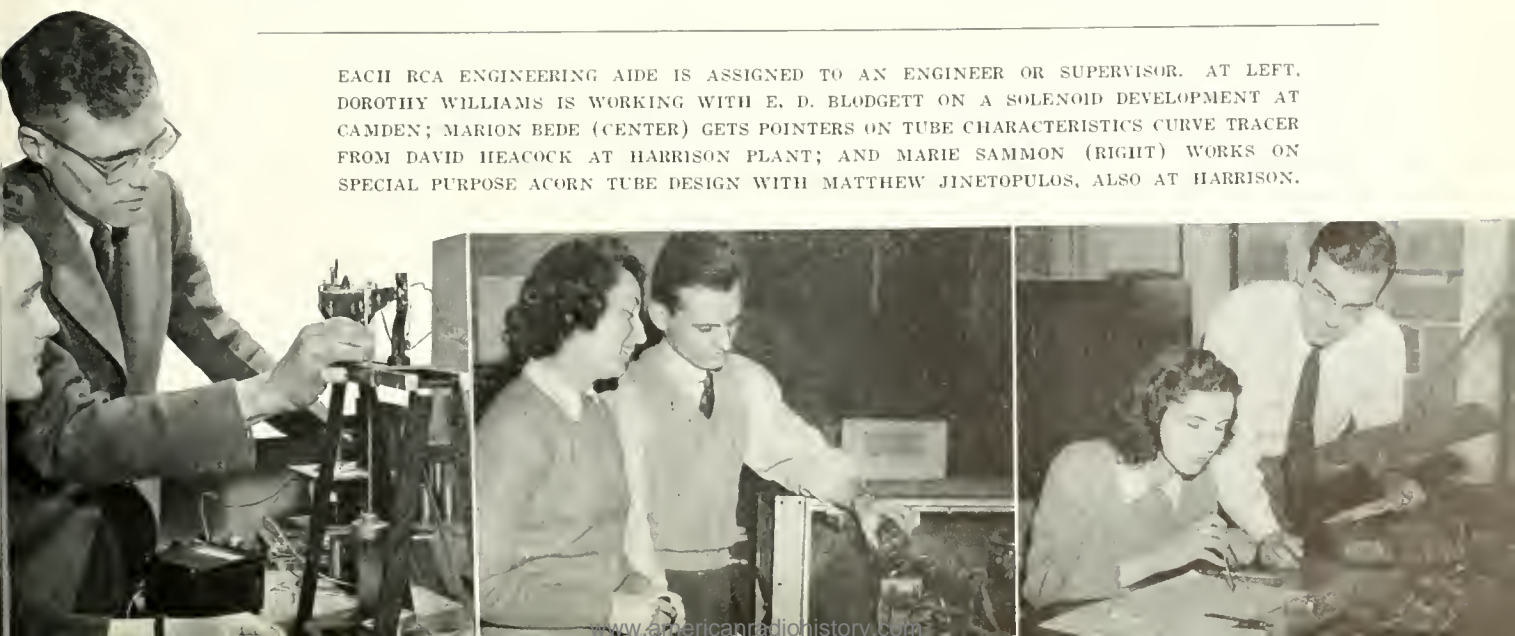
Foreseeing effective and reliable home and office type radio facsimile recorders capable of printing news at the rate of several hundred words a minute and pictures equal in quality to the best found in newspapers, E. W. Engstrom, Research Director of RCA Laboratories, Princeton, N. J., on February 17 ranked this new kind of radio service at the side of television and frequency modulation (FM) broadcasting as a definite possibility for expansion early in the post-war period.

Addressing several hundred members of the American Marketing Association at a "Radio-in-Wartime" luncheon at the Hotel Sheraton, New York, Mr. Engstrom said: "Facsimile is a service that can now be made available. There is still needed a comprehensive market survey to indicate the form it should take and the kind of services it should render.

Mr. Engstrom expressed it as his belief that television, FM, and radio facsimile are the three most significant trends in broadcasting.

"Television is a new service ready for public use," he explained. "Frequency modulation broadcasting is in addition to the already established and accepted sound broadcasting service. Facsimile is a new service which awaits knowledge of how it should be introduced and used."

EACH RCA ENGINEERING AIDE IS ASSIGNED TO AN ENGINEER OR SUPERVISOR. AT LEFT, DOROTHY WILLIAMS IS WORKING WITH E. D. BLODGETT ON A SOLENOID DEVELOPMENT AT CAMDEN; MARION BEDE (CENTER) GETS POINTERS ON TUBE CHARACTERISTICS CURVE TRACER FROM DAVID HEACOCK AT HARRISON PLANT; AND MARIE SAMMON (RIGHT) WORKS ON SPECIAL PURPOSE ACORN TUBE DESIGN WITH MATTHEW JINETOPULOS, ALSO AT HARRISON.



Plant Broadcasting

SYSTEM HIGHLY DEVELOPED BY RCA VICTOR SPEEDS FACTORY-WIDE COMMUNICATION, AND IMPROVES EMPLOYEE RELATIONS



SPEAKING AT PREVIEW OF MOTION PICTURE "MANPOWER, MUSIC AND MORALE," EDUCATIONAL DIRECTOR MARK STARR, OF I.L.G.W., REVEALS SURVEY RESULTS.

By David J. Finn
*Sales Manager,
Industrial and Sound Department,
RCA Victor Division*

AN axiom of industry is that the problems of management multiply as the size of an organization increases. This factor makes its initial appearance while a business is still very small. At that point where an employer has to hire a foreman or any other assistant to help him supervise his workers, he begins to lose direct personal contact. No matter how able his aides, that slows up his line of communication.

Plant broadcasting is one of the most effective means of overcoming this handicap. Basically there is nothing new in it. For paging, for communications and for music it has been in use for many years. However, when the war emergency placed especial emphasis on harmonious relationships between workers and management as a requisite for more effective production, plant broadcasting came into its own.

Although many questions still remain to be answered concerning the most effective use of sound systems, there is no longer anything hit or miss about it. A considerable fund of information has already been gathered, mainly in acoustics and by psychological research into the actual benefits of music for men and women at their jobs, particularly when these jobs are of the repetitive type. Added to this, is much valuable experience in war

plants under almost every conceivable condition.

According to those who are using it, plant broadcasting is doing a really important job in war plants. This was again confirmed in a recent survey conducted by the War Production Board in Washington, which disclosed that 87% of plants using a sound system stated that music improved morale and 57% reported music increased production. In nearly everything that has been written on the subject, however, emphasis has been laid on morale. The word has been used so much that it sometimes loses its meaning. Drawing from experience and scientific studies, we are now beginning to realize some of the true potentialities of plant broadcasting—and these potentialities have assumed an importance far beyond the expectations of those who pioneered in this field.

Four Basic Units

What is plant broadcasting? When I say there is nothing basically new in it I am referring chiefly to the equipment. There are still only four basic units: The microphone, the control desk, one or more amplifiers to supply broadcasting power, and the functional loud speakers. Initially, sound equipment for plants was very crude compared to the equipment available today. There are now, for example, several types of microphones designed to meet the different needs. The master control desk or cabinet of today is stream-lined and built with an eye to future as well as present needs. There are a number of types of speakers, each of which serves best under conditions suited to its specific characteristics.

It is estimated that thousands of industrial plants in the United States are now equipped with sound systems of one kind or another, and a large percentage is broadcasting music. There would be many more plants in both categories if the nec-

essary priorities could be obtained for the material, and if the manpower was available for the installations. Surveys indicate there are about 14,000 top industrial plant prospects for sound equipment. The market is certain to expand as more industrialists learn the multiple advantages of modern sound systems.

Just now, when war production output is a paramount requirement, the greatest attention is being given to the influence of music on production. Dr. W. A. Kerr of the Personnel Planning and Research Department of the RCA Victor Division has recently completed one of the most thoroughgoing studies in this field. Among his conclusions, based on experiments continued over five months with groups of varying numbers and different occupations, are that in 12 comparisons, average output was greater when music was broadcast than when it was not. Average quality of production was higher with music in 7 out of 10 comparisons.

"Present evidence," says Dr. Kerr, "indicates best production with music that is interpreted as of moderate or peppy tempo. It does appear that the time has arrived when industrial music may be increased further in effectiveness by systematic evaluation of the effects of specific music factors on quantity, quality, and net good yield."

If morale is to be defined as interest in one's work, here is unquestionable evidence of what music can do for the worker. It is evidence also that plant broadcasting is of

definite use in bringing about closer relationships between employer and worker, in large plants particularly. It also takes the worker's mind off his own real or imaginary troubles and makes him feel that he is part of the organization. Even though this may not always reveal itself in an immediate output increase on a specific operation, the net long-range effect on any organization is self-evident.

Many Studies Made

The studies by Dr. Kerr were made in various plants of the RCA Victor Division. Many somewhat similar studies have been made for shorter periods by users of RCA equipment, and others. S. Wyatt and J. N. Langdon report that the British Industrial Health Research Board found an increase in output ranging from 6.2 to 11.3 per cent while music was being played, while the total daily output showed an increase of 2.6 and 6.0 per cent. The long-run effect was noted by Wynford Reynolds of the British Broadcasting Company.

"First of all," said Mr. Reynolds, "do not expect the wrong things from music; do not expect it to act as an immediate means of speeding up. It is a tonic like a cup of tea, something to cheer the mind. You will get increased output all right, but it will be spread over the workspell as a whole. You will not nec-

essarily get it while the music is actually being played."

The RCA Victor Division is in a particularly favorable position to evaluate factors such as the foregoing, as well as the varying effects of different kinds of music for different types of work, because of its own long experience in the field.

RCA plant broadcasting and industrial music activities are centralized in the Sound and Picture Section of the Industrial and Sound Department. This department is in constant touch with new ideas and methods developed by users of RCA sound equipment. In this connection, it might be noted that RCA is the only company that manufactures every item of equipment going into the most complete sound system.

Installations are made by RCA engineers, and though all the individual units have been standardized, every system is custom-made to meet specific requirements. As the first step in this process, a scientific sound survey is made in the plant where the system is to be installed. Noise level readings are taken. The physical layout of the buildings is studied. Notations are made of acoustic obstacles to be overcome. From these studies it is possible to determine exactly what equipment is required, where it should be placed and the right volume at which it should be operated.

After the actual installation has been made the next step for the user is to acquire a sound system operator, who assumes responsibility for its operations. RCA Victor provides a manual of operating instructions, and special training schools are made available to purchasers at various times throughout the year. A few of the points covered in the instruction courses are: planning the program, use of the microphones, setting up area controls, recording, rehearsing live talent, and the filing and care of records.

Employees Cooperate

With the system in operation, the RCA Victor Division supplies a third service designed to uncover any special conditions that may exist in the plant. For this purpose special "attitudes toward music" blanks are distributed to employees. These contain a list of sixty-one selections, divided into thirteen distinct types of music. The employees are asked to check what they like best in the preliminary programs being broadcast to them from the selections in the Victor Music library. These blanks are tabulated, studied and charted.

The Music Library Service at present offers a choice of three record libraries. These are the Mealtime Library, containing 100 selected standard recordings; the Econ-



WORKERS DOING MONOTONOUS TASKS, EXTREME LEFT, ARE AIDED BY MUSIC, AND KEPT INFORMED OF PLANT HAPPENINGS BY PAGE GIRL AT "MIKE," CENTER. TYPISTS AND OTHER OFFICE EMPLOYEES, BELOW, ALSO FIND RELIEF IN WELL-CHOSEN PROGRAMS.



omy Library of 300, and the Budget Library of 600. It is the purpose of the company to offer larger libraries when materials and manpower are available. Each of those now offered is supplemented at the time of shipment with 20 currently popular releases. In addition, subscribers to the services are given preference on shipments of new monthly record releases, now averaging four records a month.

Control Room Complete

When an RCA plant broadcasting system goes into operation the control room is complete not only with the mechanical equipment, but also with the clerical forms required for ease of locating and handling records while the system is being operated. With each 100 records, the company provides 400 color-coded index file cards, a carton of 300 RCA Victor needles, 200 envelopes for filing discs, a numerical loose-leaf record reference catalog, a "Music America Loves Best" record catalog, and the RCA *Industrial Music News*.

RCA internal broadcasting systems are now being used in virtually all types of manufacturing plants, including shipyards and other projects with men working at widely separated points. They are providing service in churches, schools, theaters, the chapels of funeral parlors, in stores, hospitals, freight yards and in ball parks and other public gathering places. So far, no installation has been found too large to be handled over a single system, with accurate area control.

While the foregoing has been

concerned chiefly with music in war plants, music service by no means sums up the value of a plant broadcasting system. In one large plant, the paging function was carefully checked for a month and was found to have saved 4,000 man hours. Key men are never really away from their posts with an adequate sound system, for they can be reached instantly at whatever part of the plant their duties may call them. The effect of this in stepping up the tempo of any organization from the top down will be obvious. At the risk of being repetitious, I might note here that the loss of contact between employer and employee which takes place as a business grows is not the fault of the workman. It is due to the fact that supervisors simply do not have the time to meet and talk personally with all the men and women under their direction.

Reaches All Employees

A plant broadcasting system makes it possible for management to maintain direct contact with employees. In effect, it provides management with an automatic and instantaneous mass-meeting of all employees at their work, and it does this without interfering with production. It enables management to provide a service of current news bulletins which often have a direct bearing on the urgency of the war work in which the plant is engaged. In many plants the sound systems are used to convey birthday greetings, announcements of births and similar events of interest to employees.

That sound systems are here to stay in the manufacturing plants of

the country is now a certainty. In the opinion of many industrial relations men, it will be the unusual factory that does not have both controlled sound and music within a few years after the war ends. Altogether apart from the surveys, employees in all types of plants have shown that once they get a taste of music at their work they demand it more often. This is often brought out forcefully when anything happens to the system, or if it is cut off for experimental purposes. Music is looked on by thousands of workers as an essential factor.

Studies Are Continuing

While the sound equipment now available is vastly superior to that obtainable when the first plant sound installations were made, this does not mean that technical development has stopped in the improvement of this equipment. For example, a continuing study of speaker types is being made by John Volkman for RCA at its Indianapolis plant; of acoustics by Dr. Harry Olson of the RCA Laboratories; of general plant coordination by K. J. Hollister at the RCA Service Company, and of better sound equipment production methods by M. C. Batsel of the RCA Indianapolis plant. The psychological studies by Dr. Kerr and his associates are also being extended. Survey findings, together with new ideas for the use of sound and music, are made available to all users of RCA plant sound equipment.

Buy War Bonds



Bougainville Interview

Lieut. Robert W. Sarnoff, USNR, son of Col. David Sarnoff, President of Radio Corporation of America, chats with a group of Bougainville children who escaped from inside the Japanese lines. Lieutenant Sarnoff is on duty with the Navy in the South Pacific.

RCA OUTLINES FM POLICIES

Postwar Plans for Manufacturing, Selling Full Line of Equipment, Broadcasting by New Method Are Announced by Jolliffe, Trammell.

EMPHASIZING the interest that the Radio Corporation of America and the National Broadcasting Company have had for years in the technical development of frequency modulation, or "FM" as it is popularly known, Dr. C. B. Jolliffe, Chief Engineer of the RCA Victor Division, and Niles Trammell, President of NBC, have announced policies that will govern post-war manufacturing and selling of FM equipment, and broadcasting by means of this new method.

"Prior to the war, RCA had developed and was ready to put into application some novel FM circuits," Dr. Jolliffe told a New York meeting of FM Broadcasters, Inc. "We expect to incorporate these circuits in apparatus produced in the post-war period. We manufactured and supplied FM broadcast transmitters prior to the war. Equipment was installed then and is now operating in such cities as New York, Philadelphia, Detroit, and San Francisco.

"As soon as civilian production is resumed, we plan to offer for sale a complete line of FM transmitters. These transmitters will have the power ratings required by the industry and will follow the general trend of our previous models except for the inclusion of new circuit features and mechanical simplifications. These transmitters will meet all the technical requirements of the FCC for frequency stability, freedom from distortion, and other characteristics that insure good and reliable service. In the post-war period, all RCA standard broadcast audio equipment will meet the present standards of fidelity for FM and consequently all standard equipment will be satisfactory for use with FM transmitters."

Dr. Jolliffe said in summarizing:

"Our policy is simple and clear. We intend to design, manufacture, and sell types of apparatus for which a need exists and which the public wants. We intend to use our background of experience in the broadcast, transmitter, and receiver field plus our engineering facilities to provide the type of equipment the broadcasters need to satisfy the requirements of their listeners and the licensing authority."

Mr. Trammell, outlining network policy in a statement to all NBC-affiliated stations, said:

"The objective sought by NBC is to make its programs available to every radio listener in America, regardless of whether a standard band or FM receiver is being used. The availability of these NBC Network programs throughout the United States on both standard and FM transmitters will assure present and future owners of FM receiving sets that they can continue to hear their favorite programs on an improved radio service."

Research Results Shown

It was pointed out by Dr. Jolliffe that for many years RCA research has been carried forward in RCA Laboratories on specific FM circuits, on the amazing characteristics of very high frequencies, and on the needs of FM broadcasting. RCA engineers have made important contributions, among them the Seely discriminator and the Crosby FM transmitter, now in use not only by RCA but by other organizations.

Regarding the portion of the FM system in which the public particularly is interested—the home receiver—Dr. Jolliffe said:

"As one of the larger producers of home radio sets, we expect to offer for sale to the public FM re-

ceivers of high quality design at reasonable prices. We expect that these sets will do full justice to the FM programs of FM stations."

The policy of NBC, according to Mr. Trammell's statement on FM, has always been and will continue to be to foster and encourage new developments in the broadcasting field. NBC's FM station W2XYZ was the first FM station to be established in New York by any network broadcaster. An application already has been filed for a frequency modulation station in Chicago, and NBC has applied for five additional construction permits for FM stations in cities where this network maintains studios. When these stations are erected, NBC will have a total of seven FM stations.

Advantages of FM, the NBC points out, include:

Virtual elimination of disturbances in reception from natural and man-made static.

Higher fidelity of sound, since wider channels are made available.

Constant service areas, instead of variation from day to night, as in standard broadcasting.

Many stations can operate on the same frequency by judicious geographical spacing without creating interference in the normal service areas of FM stations operating on the same channel, such as occurs on the regional and local standard band channels which shrink the nighttime service areas of those stations.

It is the belief of NBC, however, that FM stations cannot depend solely on these technical advantages in attracting large audiences, Mr. Trammell explained. First and foremost, they must offer programs which are attractive to listeners. The Company holds to the opinion that if FM is required to create or maintain a separate program service, designed solely for FM listeners, who for the first few years will not be numerous, its development

will be greatly retarded due to limited economic support. Such a separate program service would face the competition of well-established and popular programs of the present standard broadcasting system.

Therefore, to stimulate the progress of FM, NBC proposes to make its network programs available to the FM stations operated by the NBC standard band affiliate stations. To insure equal treatment to all NBC network advertisers, it is obviously necessary to carry the same commercial programs on the companion FM stations as are carried by the standard band group.

As soon as an adequate number of affiliates establish companion FM stations, NBC proposes to utilize either improved telephone circuits covering a broader range of frequencies than are currently used, or an automatic radio relay system capable of transmitting programs from point to point with high fidelity.

In respect to cooperation with advertisers, which is recognized as necessary to insure a sound economic foundation for FM, NBC plans no additional charge to ad-

vertisers who use the affiliated FM stations during the development period. The rate of the standard band stations and the FM stations is to be established on the premise that it is a single service, until such time as the combined total audience justifies rate adjustments.

To Receive Applications

It is to be the policy of NBC to extend to its affiliates the first opportunity to program their FM stations with NBC service. In such communities as may not now receive primary service from NBC stations and in the absence of standard band stations, applications for affiliation will be received from operators of FM stations.

NBC believes that as the size of the national FM audience increases, there should be enough FM stations across the country to permit the organization of several new national networks comprised of FM broadcasters. For all practical purposes, FM using its present allocation in the radio spectrum, will provide as many broadcasting frequencies as there will be broadcasters to use them. The number of

stations, however, may be limited by economic considerations.

In the opinion of the NBC, FM will afford a new opportunity to improve radio broadcasting, with the ultimate test hinging on the extent that improvement affects the program furnished the listener. The Company has stated that it welcomes this opportunity to cooperate with its affiliated stations.

Out of the extensive research and development work, which RCA has conducted tirelessly from the inception of FM, have come inventions by RCA engineers that have long been available to the radio industry, by means of patent licenses. Such licenses include not only the existing inventions of RCA and patents of others under which it has the right to grant licenses, but also future inventions made or acquired by it during the life of the licenses. The licenses run to 1947 and 1948, and may be extended to 1955, at the option of the licensees. They impose no restrictions upon the volume or proportions of the business which the licensees may do, nor upon the prices at which they sell their products.

RCA PRESENTS MUSIC AMERICA LOVES BEST

New Network Program Features Outstanding Stars of Both Classical and Popular Fields.

EACH Saturday night at 7:30 P.M. (EWT) over the Blue Network, the RCA Program—The Music America Loves Best presents a versatile half-hour show that combines the outstanding stars in both the classical and popular worlds of music. Jay Blackton, a musician who is well known for his talents in both fields, is conductor of the RCA Victor orchestra and chorus.

Since its premiere date March 4, the parade of stars on The Music America Loves Best has included:

screen and opera soprano, Jeanette MacDonald; popular baritone, Perry Como; Alfred Drake, singing star of the Broadway smash-hit musical "Oklahoma!"; the Metropolitan Opera's sensational 18-year-old coloratura soprano, Patrice Munsel; renowned Russian basso, Alexander Kipnis; lyric soprano, Mary Martha Briney; famed blind pianist and musical satirist, Alec Templeton; Artur Schnabel, hailed as one of the greatest virtuoso's of the piano today; and popular mezzo soprano, Nan Merriman.

Jay Blackton, the maestro in charge of this musical show, is a musician, who, by his own description, has led a "dual career." That is, a career that has included distinguished experience in both classical and popular music. His orig-

inal goal was to be a concert pianist. In this pursuit, he studied at Brooklyn Academy of Music and presented his first recital at the age of 12. This he followed with further study at the Institute of Musical Art and a scholarship to the Julliard Graduate School of Music. He also studied abroad.

Along came "difficult times," and Blackton reports that "I was forced to abandon my long hair and arty ideas in favor of dance orchestras." That, says Blackton, "was the beginning of my dual career." He spent several years as an arranger and conductor of popular dance bands and at the same time made appearances as a concert pianist. Today, his well-versed background in the popular field has won him the assignment as musical conductor of Broadway's most successful musical, "Oklahoma."

RCA Income Increased in 1943

IN AN all-out effort in every phase of radio to help win the war, Radio Corporation of America increased its production of vital radio, sound and electronic equipment for the U. S. Army and the United Nations in 1943 more than 100 per cent over 1942, it was announced in the Company's 24th Annual Report released by David Sarnoff, President of RCA on February 26, and mailed to 230,000 stockholders.

The report emphasizes that no other force than radio could link the widely separated areas of our military and naval operations, and at the same time cites the vital job which radio is doing on the home front, declaring that the American system of broadcasting, with its traditional freedom, is "serving the war effort night and day."

All divisions of RCA—research laboratories, manufacturing plants, broadcasting and communication facilities—are contributing to the conduct of the war, according to a joint message to stockholders from Lieut. General J. G. Harbord, Chairman, and Mr. Sarnoff. Calling attention to the fact that this year marks the twenty-fifth anniversary of RCA, they described the Company's achievements as "a quarter century of progress in the history of radio." They said that post-war planning is being conducted without interfering with the tasks of war.

The report shows consolidated gross income of RCA for the year 1943 was \$294,535,362, compared with \$197,024,056 in 1942, an increase of \$97,511,306. Net profit, after all deductions, was \$10,192,452 in 1943, compared with \$9,002,437 in the previous year. After payment of preferred dividends, earnings per share of common stock amounted to 50.5 cents, an increase of 8.8 cents over 1942.

Indicating the further upward trend of Federal Income Taxes, provision for these taxes was \$26,124,000, or 37 per cent over 1942, and representing 72 per cent of income before tax deduction. In addition to these Federal taxes, the total state, local, social security and

RCA'S TEN-YEAR RECORD OF EARNINGS

(The figures shown for all years prior to 1941 include Foreign Subsidiaries)

YEAR	GROSS INCOME	NET PROFIT BEFORE FEDERAL INCOME TAXES	FEDERAL INCOME TAXES	NET PROFIT AFTER FEDERAL INCOME TAXES	EARNINGS PER SHARE ON COMMON STOCK (Based on present capitalization)
1934	\$78,756,994	\$5,055,114	\$ 805,850	\$4,249,264	\$.074
1935	89,228,898	6,026,673	899,800	5,126,873	.137
1936	101,186,310	7,293,037	1,137,100	6,155,937	.212
1937	112,639,498	11,142,158	2,117,300	9,024,858	.418
1938	99,968,110	9,095,772	1,683,700	7,412,072	.302
1939	110,494,398	10,149,511	2,066,700	8,082,811	.350
1940	128,491,611	13,364,656	4,251,500	9,113,156	.425
1941	158,695,722	26,566,316	16,373,600	10,192,716	.502
1942	197,024,056	28,077,287	19,074,850	9,002,437	.417
1943	294,535,362	36,316,452	26,124,000	10,192,452	.505

other taxes amounted to \$4,723,049, compared with \$3,787,763 in 1942.

Sources of Income

The sources of RCA's 1943 gross income were:

Manufacturing Division	\$211,386,587
Broadcasting	60,847,401
Communications Companies	18,764,549
Miscellaneous	3,536,825
Total	\$294,535,362

Disposition of the year's income was as follows:

Cost of Raw Materials, Supplies, Sustaining Program Talent, Rent, Sales and Advertising; Payments to Associated Broadcasting Stations; Research, Administration, and Other Operating Expenses	\$156,135,582
Wages and Salaries to Employees	86,534,505

Depreciation and Amortization	5,925,235
Provision for Post-War Rehabilitation and for Other Adjustments of War-time Costs	2,955,000
Interest	1,945,539
Taxes	30,847,049
Dividends to Stockholders	5,953,623
Carried to Surplus..	4,238,829
Total	\$294,535,362

Throughout 1943, the report states, complete cooperation existed between management and workers. On December 31, 1943, RCA personnel numbered 40,553, an increase of 4,966 over the preceding year-end. Of this number 19,652 or 48 per cent were men and 20,901 or 52 per cent were women. At year-end, 5,918 RCA employees had joined the armed forces, and 32 of them had given their lives to their country.

With the report to stockholders, announcement was made of the annual meeting to be held on Tuesday, May 2, 1944.



A. G. ZIMMERMAN (RIGHT), INDIANAPOLIS PRODUCTION MANAGER OF 16 MM. PROJECTORS, CONGRATULATES FOREMAN MAX HEIDENREICH AS THE LAST ITEM OF A LARGE SIGNAL CORPS ORDER IS SHIPPED AHEAD OF SCHEDULE. AT THE LEFT ARE B. E. CLATWORTHY AND C. M. PURDY.

Photophone at War

MOTION PICTURE SOUND RECORDING AND REPRODUCING EQUIPMENT
SERVING ARMED FORCES IN TRAINING CAMPS AND BATTLE FRONTS



By Barton Kreuzer

Manager, Photophone and Sound
and Picture Sections, RCA Victor
Division

SOMEWHERE in the European theatre of war, two American boys, members of a bomber crew just back from a mission, are sitting in a canteen at their base, drinking coffee. They're not talking much—just sipping the steaming coffee and staring into space. They're dog-tired, but not sleepy. Nerve strain makes you weary and wide awake at the same time. Perhaps they're thinking about the fellows who didn't come back.

It's an easy guess for the captain that they're living the battle over again—and he knows that once is enough to live through any battle. He walks slowly over to their table, starts a conversation, but it lags. Then, glancing quickly at his wrist watch: "Say, we're late for the movie! You fellows coming?"

That does it!

For the next two hours this trio and most of the other men off duty at the base forget the bombing mission and all the rest of the war as they lose themselves briefly in the music, comedy, romance, and drama of an American motion picture.

* * * *

In Italy, an Allied armored division is girding for a major blow against an entrenched enemy force. Supplies of a new piece of fighting equipment, vital to the success of the campaign, have just arrived. Operation of the new equipment is complex. Large numbers of men must be trained quickly to handle it in the most effective way. A sound motion picture film, shipped in with the equipment, does the job.

Scores of men at a time, gathered before a movie screen, are enabled to see the equipment in action while they listen to a running description of the action by an expert instructor. Close-ups give them a detailed view of small operating parts as the instructor's voice explains each detail. Synchronized sound and pictures bring to large groups at one central point an understanding of the equipment which otherwise could only be had from individual instruction and field demonstrations.

* * * *

At a huge training camp in the Middlewestern United States, a bunch of new inductees is being assigned to quarters, stowing away

luggage, being shown around by older hands. ". . . and over there," says a lad who's been there for a month, "is the post theatre—but don't think it's all Betty Grable.

"We have Hollywood pictures in the evening, sure; but we also have training films. You fellows are going to find that sound movies play a mighty important part in teaching rookies how to fight a war—and fast!"

* * * *

A new force is taking over a tiny island in the South Pacific. No fighting here—just waiting. Some of the new men are already homesick. One of them speaks to a member of the old force which, after months on the island, is being relieved. "Look," he says, "waiting can be a lot worse than fighting. What does a guy do when he decides he wants to spend the weekend at home?"

"Nothing to it," replies the veteran. "We got a crystal ball. You just look into it, and there's home—you can see it and hear it. No, wait a minute! I'm not kidding. I mean the sound movies they send down to us. Without them, I guess we would go nuts; but, believe me, they make it a lot easier."

* * * *

In Washington, a group of military strategists is gathered in a small projection room. An official combat film is being screened. Effective planning must take into account the nature of the enemy's equipment, its performance in battle, the kind of tactics employed, and the strength and weaknesses, if any, of our own equipment and our own tactics when put to the test of actual combat. Here, by means of sound motion pictures, may be seen and heard vital records of such combat data, gathered from fighting fronts throughout the world.

* * * *

These sketches give only a rough

idea of the variety and importance of the work being done by motion picture sound recording and projection equipment in the war program of the United Nations.

A dramatic impression of the scope of this work, in which RCA products are playing a major role, may be gained from recent government reports, as quoted in leading film trade papers. It was revealed by these reports, for example, that the latest Hollywood movies are now being seen by an average of 630,000 overseas men in uniform each night in all theatres of the war.

The figure was based on data obtained from a survey of attendance at 1,269 motion picture shows presented the night of October 1 at Army camps around the world. Attendance figures ranged from 15,000 in an open-air amphitheatre in New Guinea to 11 men in an Alaskan outpost.

It also was reported that American forces in the Aleutians are being shown 125 film shows daily. There is at least one 16mm. projector on each island occupied by U. S. forces, according to this report, with a total of 63 on the Aleutian chain.

In the field of training films, it was stated that copies of nearly 2,000 such films from the various military forces of the United Nations have been assembled in Washington, D. C., by the United Nations Central Training Film Committee.

The Photophone Section and the Sound Picture Section of the RCA Victor Division are gratified by the extent to which the performance, durability, and other qualities of RCA equipment have been recognized by the armed forces and other branches of our government and the governments of our allies in

their selection of the means to carry on this important work.

For U. S. Army use alone, RCA has supplied more than five hundred 35mm. sound film projection equipments and several thousand 16mm. sound film projectors, and delivery is being made on more than 150 portable recording equipments.

In addition to these equipments, in use in training camps, recreation centers, and base hospitals throughout the United States, and on fighting fronts throughout the world, more than a score of RCA film, sound and projection equipments have been furnished for special government installations in Washington, D. C. These included one in the White House for the use of the President and his advisers, and others for the Navy Department, the Army and Navy Staff College, and the Army War College.

RCA Supplies Equipment

Of the several thousand 16mm. sound projectors supplied by RCA thus far this year to the armed services, a large proportion has been destined for use on various fighting fronts and at bases overseas. These projectors are used to show both training and entertainment films for units "on the march" or at bases where 35mm. installations are not feasible. An important use of these equipments abroad has been in providing quick, effective, visual instruction for combat troops.

RCA studio recording systems and mobile recording units have been furnished to government recording studios in Washington; Anacostia, D. C.; Astoria, L. I.; Wright Field; and Hollywood.

In addition to manufacturing the various types of equipment and supervising installations, RCA has

assisted in the training of operating personnel and in furnishing continuing maintenance and repair services.

But even the imposing list of RCA film sound equipments being used by United States armed forces and government agencies at home and abroad does not encompass all of the broad field in which such equipment is contributing to the United Nations' undertaking.

Further bolstering the training and morale programs of the democracies, is the motion picture sound equipment which has been supplied by RCA Victor's International Department to various foreign governments.

This includes large quantities of both recording and reproduction equipment supplied to the English government through RCA Photophone, Ltd., of London, and to the government of India through Photophone Equipment, Ltd., of Bombay; quantities of recording equipment furnished for the use of the Russian government; and reproduction equipment furnished to the Dominion of Canada, and, through RCA Photophone of Australia, Pty., Ltd., of Sidney, to the government of Australia.

Equipment has been especially designed to meet conditions under which it must operate. Portable projection outfits supplied to Australian military forces, for example, have been fashioned to permit maximum adjustability to local requirements, easy dismantling, and parts-within-parts packing. This has facilitated the movement of these "theatres on wheels" over thousands of miles of rough country, and their operation at great distances from sources of replacement.

Unit stands are of tubular metal, so constructed that one section fits

LEFT: ONE OF THE THOUSANDS OF GOVERNMENT-ORDERED 16 MM. PROJECTORS IS SHOWN ON THE INDIANAPOLIS ASSEMBLY LINE; BELOW: SOUNDHEAD GEAR BOX SUB-ASSEMBLY AND HIGH-POWER AMPLIFIER EQUIPMENT RECEIVING FINAL TOUCHES BY GIRL EMPLOYEES.



within another. Soundhead and projector are in one unit. The screen frame is of metal tubing, in eight sections which permit folding. To provide for varying conditions in different localities, the equipment is provided with a series of lenses. The equipment has been transported over most of the Australian continent with negligible breakage.

These mobile "vans" have become welcome and familiar sights to fighting men in even the most remote Australian camps and bases. Attendance is always high, and as many as 5,000 troops have been entertained at a single out-of-door screening.

New RCA Projector

Of particular interest among developments in design and construction which have been nurtured by wartime requirements is the new RCA 16mm. projector now being produced to meet revised government specifications. The new projector, which is an adaptation of a commercial model, is shock-mounted on rubber in a tough plywood case.

The armed forces specify that the projector must function properly after being dropped from a carrying position at a height of 18 inches onto a concrete floor. Dropped from this position it would strike on the

bottom surface of the carrying case.

During a recent demonstration for company officials at the RCA Victor plant in Camden, N. J., the projector was set up on a table standing three feet above the floor, and a length of film was shown. Then, with the reel arms folded in and the case closed, but with the projector's six tubes, three lamps, and photocell still in their sockets, the projector was shoved off the table, dropping three feet and striking on a corner of the case. It was then set up again and another film was shown, demonstrating that no damage had been suffered either by tubes or mechanical parts.

The entire projector must also pass rigid tests assuring smooth, efficient operation under extremes of temperature, humidity, dust, and other factors of environment which may be encountered on the fighting fronts.

Other innovations in projection design include an arrangement which facilitates removal of the amplifier unit for servicing, use of special tube clamps to hold tubes firmly in place during transportation, and incorporation of a rotary stabilizer, such as is used in standard 35mm. Photophone theatre projectors, to provide the smooth movement required for high fidelity reproduction of the sound track.



FRANK R. DEAKINS

HEADS CANADIAN FIRM

FRANK R. DEAKINS, whose career parallels the development and expansion of the radio industry, has been named President of RCA Victor Company, Ltd., of Canada, subsidiary of the Radio Corporation of America.

Mr. Deakins rejoins the Canadian company in which he held the position of executive vice president from 1932 to 1934. He will direct the activities of more than 3,300 persons employed in the manufacture of radio and electronic equipment for the wartime needs of the Canadian government.

The new president of Canadian RCA Victor is a native of Jasper, Tenn., and was graduated as an electrical engineer from Alabama Polytechnic Institute.

Mr. Deakins first became associated with the radio industry when he was with the General Electric Company. He rose to become the sales manager of the radio department. He joined RCA in 1930 as assistant to the president.

He was made manager of RCA's Engineering Products Division in 1931 and the next year joined RCA Victor Limited of Canada as executive vice president. He returned to RCA Victor, Camden, in 1934 to become manager of the special apparatus division. Since the entry of the United States into the World War, Mr. Deakins has been executive assistant to the general manager.

AS ONE OF THE FINAL CHECKS GIVEN COMPLETED PROJECTION UNITS, THIS GIRL IN THE RCA VICTOR DIVISION PLANT AT INDIANAPOLIS GIVES THE MACHINE AN OPERATION TEST.





ENGINEER MURIEL KENNEDY, OF NBC, GETS FIRST CHANCE AT THE CONTROL BOARD FOR PRESENTATION OF ALL-WOMAN SHOW "NOW IS THE TIME". MEN IN NETWORK OBSERVE STRICTLY "HANDS-OFF" POLICY.

WOMEN PRESENT NBC SERIES

Network Achieves Another "First" with Four Lively Feminine Dramatizations as a Tribute to Sisters-at-arms in Services

UNPRECEDENTED in the annals of NBC's numerous "firsts" is the all-woman production of "Now Is the Time." This series of four dramatizations, prepared entirely by the distaff side, is a tribute to their sisters-at-arms in the WAC, WAVES, SPARS and Women Marines and is heard on four Saturdays from 9:30 to 10:00 a.m., EWT, March 25 through April 15.

Impetus for this exclusively feminine treatment came when William Burke Miller, NBC's war program manager and manager of the public service department, turned the project over to Jane Tiffany Wagner, NBC's director of war activities for women, with a hands-off-for-the-men, God-bless-the-women-directive.

Miss Wagner, who is also the

current chairman of the Women's Activities Division of the Women Directors of the network, promptly assembled women representatives of every department at NBC and the designated feminine representatives of the Armed Forces. When plans had been coordinated, personnel of the network stations and representatives from the Armed Forces assembled in station studios throughout the country for a closed circuit talk given from Washington by Captain Mildred McAfee, director of the Women's Reserve of the U. S. Navy; Major Catherine R. Goodwin, WAC staff director for Army Service Forces; Miss Wagner and Mrs. Irene Kuhn, assistant director of information at NBC.

Plans went apace from then on, with women representatives of stations of the networks indicating

their enthusiastic approval and co-operation.

From the engineering staff came Muriel Kennedy as control-room engineer, and from sound effects came Marjorie Ochs. Nancy Osgood, who directs "Consumer Time" from NBC—Washington, came on to New York for the directorial assignment. An all-girl orchestra is providing the musical backgrounds for the dramas and for service songs. The 300 guests at each broadcast are ushered into Studio 3B by girl members of the guest relations staff.

Assistants Are Named

Assisting Miss Wagner in the undertaking are: Margaret Cuthbert, Doris Corwith and Marjorie Loeber, public service; Peggy Myles, Jean Harstone, Janet Lane, Claire Hyland, Lucy Towle, Anita Cleary, promotion and advertising; Irene Kuhn, public relations; Anita Barnard, public information and NBC speakers bureau; Phyllis Oakley, station relations; Angela Caramore, traffic; Ruth Ann Brooks and Ruth Manley, script coordinators; Alberta Hackett, production; Bertha Brainard and Helen Shervey, program; Sylva Fardel, music; Helen Bernard, recording; Sue Cretinon, news and special events; Jane Waring and Priscilla Campbell, press.

Priscilla Kent's scripts, which are narrated by Ernesta Barlow (NBC's "Commando Mary"), use the fact-in-fiction method of dramatized presentation in the hope of clarifying in the public mind many misconceptions about the work done by women of the services.

Emphasis is placed on the overall picture of what all four services accomplish jointly rather than on singling out differentiations between one branch and another. NBC hopes, by this dramatized approach, to make recruitment attractive to potential members not only on the basis of patriotism alone, but also because enlistment offers them a change of scene, contact with stimulating new personalities and training in skills which will improve their economic status in the post-war world.

U. S. AND ITALY LINKED BY NEW RCAC STATION

*First American Owned, Operated
Commercial Radiotelegraph Station
in Europe Opened February 1.*

SPANNING land and sea in a direct 4,300-mile route between Italy and New York, the signal of Station X—now signing "ICA"—reached the receiving central of R.C.A. Communications, Inc., Riverhead, Long Island, just after sundown on January 29. The test paved the way for the official opening, three days later, of the first all-American owned and operated commercial radio station in Europe. All personnel of the station, including technicians and operators, consists of highly skilled American employees of RCAC, which opened the new radiotelegraph service with the assistance of the Army Signal Corps and at the request of the War Department.

One of the first messages to be transmitted was that of William A. Winterbottom, Vice President and General Manager of RCAC, to the station's manager, Thomas D. Meola, of Skaneateles, N. Y., who arrived in Italy last December 17 to supervise the job. The message read:

HEARTY CONGRATULATIONS TO YOU AND EACH OF YOUR SEVENTEEN ASSISTANTS ON THE REMARKABLE JOB YOU HAVE ALL DONE IN GETTING THE STATION WORKING IN SUCH SHORT TIME AND UNDER PREVAILING CONDITIONS STOP WE HAVE ALL FOLLOWED YOUR WORK WITH GREAT INTEREST AND YOU MAY BE SURE THAT WE AT THIS END WILL DO EVERYTHING POSSIBLE TO HELP YOU KEEP RCA PROMINENTLY ON THE NEW MAP OF EUROPE.

Expansion of the new service to handle Expeditionary Force Messages (EFM) to and from American troops and other official personnel in the Italian war area, in addition to government and press communications to which it at first was restricted, was announced by RCAC on February 17. All messages must bear the APO number of the addressee, and they may be filed at any telegraph office in the

United States, marked "via RCA."

The EFM service comprises special forms of standard text radiotelegraph messages, made available through the cooperation of American military authorities to members of the armed forces overseas and to their families and friends at home. More than 100 pre-arranged texts are available, and the sender may select up to three of them in composing his message.

While present equipment of Station ICA includes facilities for transmitting radiotelegraphy and voice programs for rebroadcasting over American radio networks, RCAC officials have disclosed that some time soon there will be installed radiophoto equipment to transmit war photographs for the American press. When this service starts, pictures can be sent from Italy, as they are by RCAC from other war theaters, to the United States in approximately ten minutes.

NBC, 3 UNIVERSITIES PLAN RADIO INSTITUTES

*Northwestern, Stanford, California
Cooperate in Summer Courses on
Broadcasting Arts for Newcomers.*

THREE of the nation's leading universities again will collaborate with the National Broadcasting Company to sponsor Summer Radio Institutes in 1944, it was announced recently in a joint statement by Judith Waller and Jennings Pierce, directors of public service for the NBC Central and Western Divisions, respectively.

This will make the third successive year that the network has pooled its resources with educational institutions to give practical training in the broadcasting arts to young people seeking careers in radio. The Institutes will be held at Northwestern and Stanford Universities and the University of California at Los Angeles.

Oldest of the three schools is the NBC-Northwestern University Summer Radio Institute, which was launched in 1942 on an experimental basis. This pioneer method of

radio education was so successful that two additional Institutes were started on the West Coast in 1943. In the last two years, more than 400 students have been trained at the Summer sessions and absorbed by the radio industry and allied fields. The demand for graduates has far exceeded the supply.

As was the case last year, the three Institutes will have as their specific aim the training of students to serve as replacements, thereby alleviating the serious shortage of manpower existing in radio as a result of the war. Courses will carry full university credit and all applicants must have at least two years of college work or previous radio experience.

Textbooks Are Prepared

The NBC-Northwestern Institute will be held during the period between June 26 and August 26.

Serving with Miss Waller on the board of directors of the Northwestern Institute are Armand Hunter, acting chairman of the Department of Radio, School of Speech, Northwestern, and Al Crews, NBC dramatic director.

Instruction at this year's Institutes will be facilitated through use of four text books, prepared by two of the directors and published by Houghton Mifflin Company. Miss Waller has authorized a survey book on radio and the other three treatises, devoted to Production, Writing and Announcing, were written by Crews.

Courses to be offered at the Northwestern Institute and their instructors are as follows: Introductory Course to Radio, Miss Waller; Announcing, Paul Knight, private teacher of speech, and William Kephart, NBC chief of announcers; Newswriting, John Thompson and Baskett Mosse, NBC news editors; Program Planning, John Simpson, NBC musical production director; Control Room Technique, Beverly Fredendall, NBC engineer; Sales Problems, Lou Tilden, NBC local and spot salesman; Continuity Writing, William Murphy, NBC continuity editor, and Dramatic Writing, to be taught by Crews.

First Television in South America

SELF-SCHOOLED URUGUAYAN RADIO TECHNICIAN, MARIO GIAMPIETRO, USING RCA ICONOSCOPE AND KINESCOPE, WINS OFFICIAL RECOGNITION FOR VISUAL BROADCAST EXPERIMENTS IN MONTEVIDEO

HOME-MADE television equipment developed in the face of wartime technical handicaps has earned for Mario Giampietro, a youthful, self-schooled radio technician, recognition as South America's television pioneer.

Giampietro, radio tinkerer in Uruguay since 1924, has staked out a claim of being the first South American to broadcast visual images successfully over distances of more than a mile.

A conspicuous exception to the time-honored assertion that "a prophet is not without honor save in his own country," unassuming Giampietro has received official recognition from the Uruguayan Government, which granted him an experimental wave length and authorization to use CXHAQ as his call letters.

Financially supported by banker Juan Carlos Lasa and electrical technician Domingo Pereya, the video pioneer from south of the border climaxed his extensive experiments recently when he transferred his equipment from his own modest workshop in downtown Montevideo to Uruguay's Congressional building, for the first successful exhibition of television broadcasts in South America.

Trials Are Impressive

The trials were so impressive that progressive Radio Carve, Uruguay's largest broadcasting station, immediately took Giampietro under its wing and is now reported to be planning a commercial company to finance further experiments, including one in which Giampietro wants to keep details secret for the moment.

This hush-hush experiment is said to be a revolutionary idea for broadcasting three-dimensional images. Giampietro and his aides are saying little about it, on the grounds that the idea is still in its earliest stages. But there is no

mistaking the hopeful gleam in his eyes when Giampietro insists that it is a definite possibility.

The war has created many challenging problems for Giampietro in his television experiments. For one thing, the usual scientific data available to him before Pearl Harbor has been stopped under war secrecy measures. He has been hindered, too, by the scarcity of materials—or the complete lack of them.

RCA Tubes Are Used

Reluctant to postpone his investigations until more advantageous postwar times, Giampietro has had to resort to many home-made parts, including specially-built bakelite insulators to take the place of unavailable lucite ones.

He is grateful, though, that he has been able to work with some of the most essential equipment—all-important RCA Iconoscope and Kinescope tubes, as well as a few condensers and resistors, obtained prior to the war.

Giampietro based the design of his home-made equipment on blueprints RCA issued before the war. In some details, however, he has had to work out ingenious changes because of technical differences. For example, the scanning system which RCA based on circuits of sixty cycles, had to be altered to conform with Montevideo's current of fifty cycles.

The scanning system which he now uses permits him to broadcast outdoor scenes of 440 lines, although interior images have usually been confined to 220 lines. In one experiment he utilized fluorescent tubes to illuminate night scenes. The fluorescents were satisfactory, Giampietro reports, despite their limited intensity.

Giampietro, an employe of the Uruguay Congress, is now using 115 megacycles, but his experimental station is scheduled to change to

a commercial wave length of 52 megacycles in the near future. He claims his images, broadcast from an antenna placed only sixty feet above street level, have been picked up clearly by amateurs more than a mile away. Blocked on one side by tall neighboring buildings, signals can be picked up only south of the transmitter, he reports.

Raoul Fontaina, Radio Carve's president, who recently made a trip to the United States, says Giampietro's experiments "not only showed worthiness but convinced Carve that trials should be continued, with increasing likelihood of commercial use.

"I have seen experiments in the United States," says Mr. Fontaina, "and understand that despite the fact that Giampietro is using comparatively primitive equipment, it is considered as the basis for very promising future work."

Looking forward to the end of the war, Giampietro hopes to obtain new equipment from the United States and to receive data on experiments which he feels sure are being made under the cloak of war secrecy.

When, decades in the future, the history of television's development is set down on the printed page, South America's contribution to the magic of sight-and-sound may well carry the name of an unassuming, trail-blazing pioneer—Mario Giampietro.

RCAC Opens New Office

On February 1, R.C.A. Communications, Inc. opened its newest branch office in the lobby of The Waldorf-Astoria in New York, making immediately available to guests of the hotel RCA's worldwide radio-telegraphic service. Mr. Frank W. Shaw, Manager of Agencies for R.C.A. Communications, Inc., has general supervision of the new office.

[RADIO AGE 31]

RESTORATION
of
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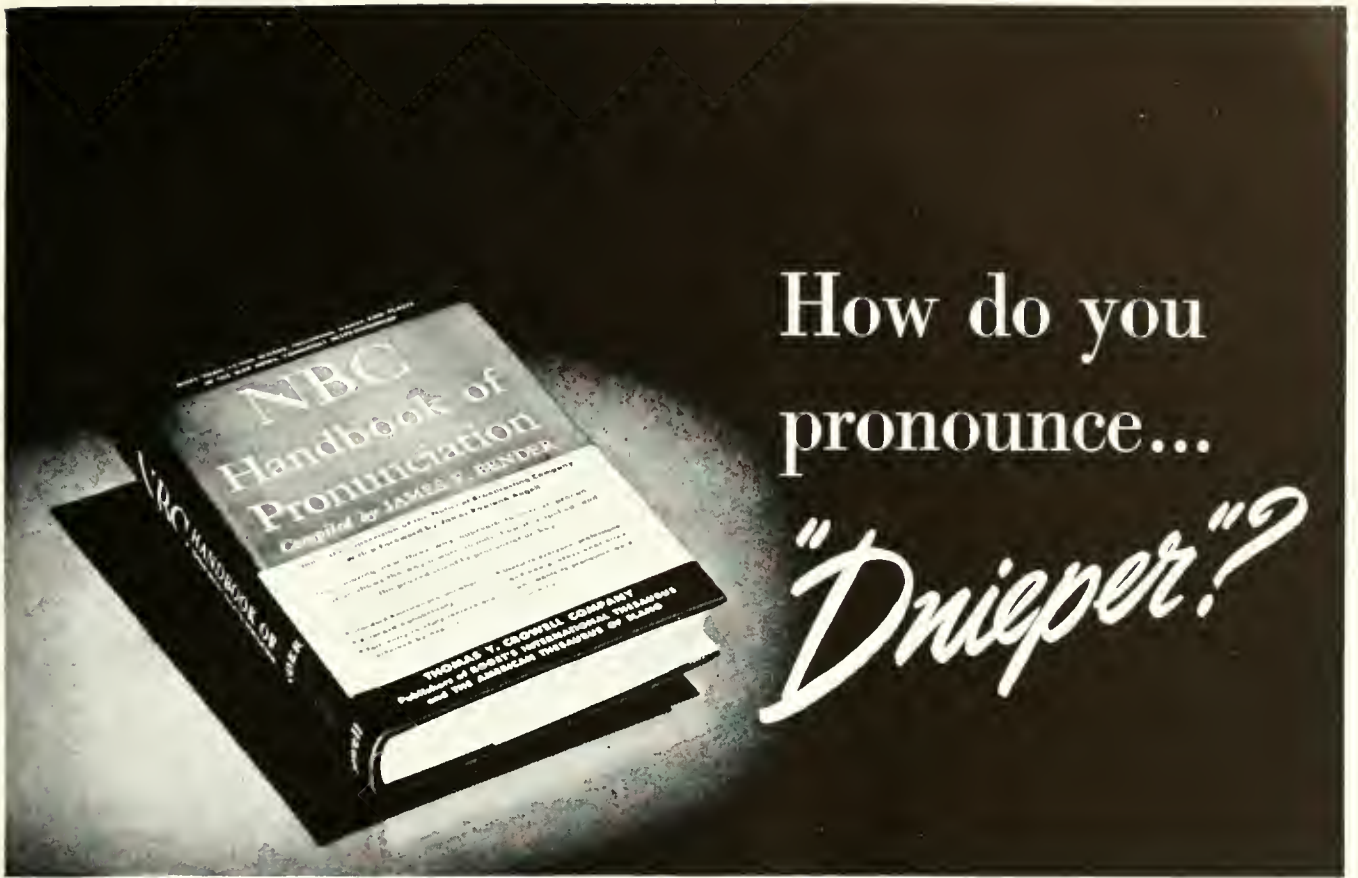
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*From "The NBC Handbook of Pronunciation."

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