

RADIO AGE

RESEARCH · MANUFACTURING · COMMUNICATIONS · BROADCASTING

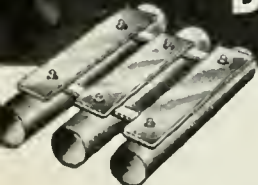


JULY

1944



THREE BELLS FOR ADANO



Hundreds of Adanos, known by other names and scattered throughout the world, find daily consolation in bells the Axis hasn't been able to silence—the NBC chimes.

Every night and day of the year, America's best-known radio signal rings through friendly and enemy countries alike, carrying hope among the downtrodden...sounding a warning to this nation's enemies...echoing a welcome and familiar note to Americans fighting abroad.

An Italian prisoner now in the U. S. writes: "*When I think how the voice of NBC brings daily comfort to so many Italians suffering in the homeland under the German heel, I should like to shake your hand.*"

Long before Hitler marched into Poland,

NBC began broadcasting in six languages over two powerful international short-wave transmitters beamed to various parts of the world. Countless hundreds abroad learned to rely on NBC for news and entertainment.

Pearl Harbor marked the beginning of increased, and ever increasing co-operation between the Government and NBC. Its International Division became a hard-hitting front-line weapon in the field of psychological warfare.

* * *

NBC's international broadcasts began as an experiment...just one of the many types of experiments NBC carries on constantly to maintain its leadership in radio. It is the results of these experiments...experiments in many fields...which help keep NBC out in front, help make NBC "*The Network Most People Listen to Most.*"

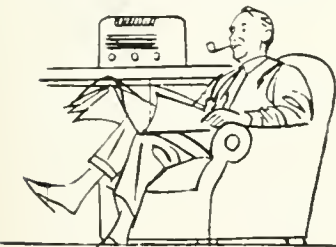
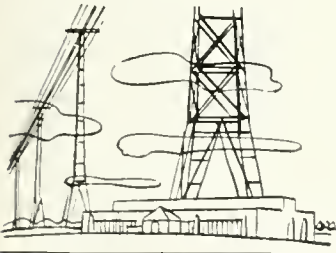
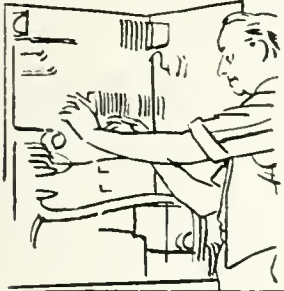
They all tune to the
National Broadcasting Company

It's a National Habit

America's No. 1 Network



A Service of Radio



RADIO AGE

RESEARCH · MANUFACTURING · COMMUNICATIONS · BROADCASTING

VOLUME 3 NUMBER 4

JULY 1944

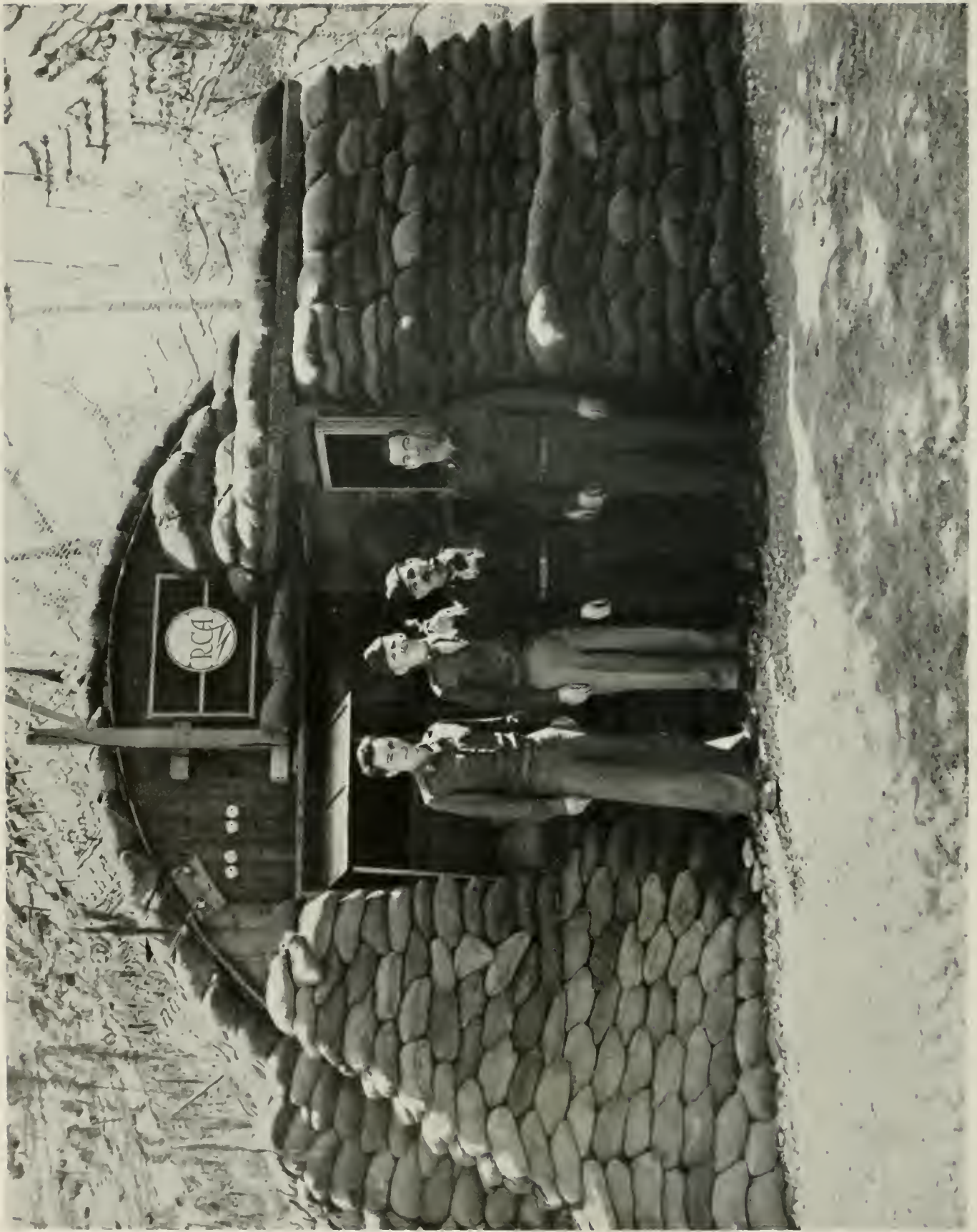
CONTENTS

	PAGE
NBC INVASION REPORTS WIN ACCLAIM <i>by William F. Brooks</i>	3
AIDS PENICILLIN PRODUCTION <i>RCA System Speeds Dehydration Process</i>	7
TWO NEW MICROSCOPES <i>by Perry C. Smith</i>	9
RCAC OPENS ROME STATION <i>Direct Radio Circuit Links U. S. and Italy</i>	12
BUILDING HUMAN RESOURCES <i>by W. B. Dominick</i>	13
RCA IN CANADA PRODUCES FOR WAR	16-17
NBC AWARDS 6 FELLOWSHIPS <i>by Dr. James Rowland Angell</i>	18
TELEVISION GOES AFIELD <i>by Henry E. Rhea</i>	20
"ARTHUR HOPKINS PRESENTS" <i>NBC Creates New Dramatic Series</i>	23
NBC IN TEACHING PROJECT <i>Cooperates with Columbia University</i>	24
MUSIC CRITICS CIRCLE IN SYMPHONY AWARDS <i>NBC Presents Competitive Works</i>	25
SIGNAL CORPS HONORS RCAC, BEVERAGE <i>Certificates of Appreciation Presented</i>	26
WINTERBOTTOM MARKS 30TH YEAR WITH RCA	27
CONVENTION FILMS TELEVISED	27
50,000 PRODUCTION IDEAS	28
HARBORD IS CONFIDENT OF INVASION'S OUTCOME	29
RCA STOCKHOLDERS MEET	30
NBC RECORDING STUDIO PRODUCES ARMY SERIES	32
BEAL SEES TELEVISION AS TOOL OF INDUSTRY	32

COVER: Old Glory shines forth as anti-aircraft men feed ammunition clips to a radio-directed Bofors—an inspiring kodachrome contributed by the U. S. Army Signal Corps.

Radio Age, published quarterly by the Department of Information of the Radio Corporation of America, RCA Building, New York, N. Y., for the RCA services: RCA Laboratories, RCA Victor Division, R.C.A. Communications, Inc., Radiomarine Corporation of America, National Broadcasting Company, Inc., R.C.A. Institutes, Inc., RCA Service Company, Inc.





STANDING IN FRONT OF THE RADIO STATION THEY ERECTED AT NAPLES, ITALY, FOR R. C. A. COMMUNICATIONS, INC., ARE, LEFT TO RIGHT, EDWARD FARNSWORTH, NIEL BECK, THOMAS D. MEOLA, AND ANDREW W. LONG. THE STATION HAS BEEN OPERATING IN AN RCA DIRECT

NBC Invasion Reports Win Acclaim

GRAPHIC, COMPREHENSIVE COVERAGE OF D-DAY NEWS DRAWS CONGRATULATIONS OF AFFILIATED STATIONS — NETWORK IS FIRST ON AIR WITH EYEWITNESS ACCOUNT OF LANDINGS IN FRANCE



By William F. Brooks

*Director of News and Special Events
National Broadcasting Company*

FROM the first invasion flash and throughout a tense and solemn D-Day's dramatic unfolding of Allied strategy and might in the bold cross-channel sweep onto Normandy beachheads, NBC's fully-prepared and far-flung personnel and facilities passed their most challenging reporting test with flying colors.

In climaxing six months of extensive preparations for invasion coverage with one of the most complete and comprehensive reportorial jobs in the history of radio, NBC's news and special events departments in effect linked the fighting hearts of our striking forces across the Atlantic with the hopes and prayers of the home front.

Practically every minute of June 6 was devoted to giving the public a vivid and searching conception of what was taking place in the drive across the English Channel by the unparalleled Allied armada of ships and planes.

Thus did a prediction made nearly a decade ago by Col. David Sar-

noff, President of RCA and Chairman of the Board of NBC, come true. Said Colonel Sarnoff on May 1, 1933, in an address at the Army Industrial College at Washington, D. C.: "Inventive resourcefulness may bring the full panorama of war to the instrument at our fireside."

D-Day found Colonel Sarnoff surveying the panorama of war at close range with the United States Signal Corps in England as Special Consultant to the Communications Branch of the Public Relations Office, Supreme Headquarters of the Allied Expeditionary Force.

Niles Trammell, President of NBC, long ago realized the magnitude of the invasion story. He knew that the nation wanted to know everything happening with the least possible interruption. Hence, soon after the first bulletin came in via German radio, he ordered every commercial broadcast, without exception, cancelled and to stay cancelled as long as there was a story to be told.

Numerous stations on the network, realizing the vast importance of the invasion, gladly sacrificed their commercial time for continuous coverage. On Tuesday evening, wires flooded the newsroom with congratulatory messages for the manner in which NBC was reporting the invasion.

Nothing was overlooked in an effort to give listeners a composite picture of what many have termed

the greatest military action the world has ever known. From the time the AP machines sounded the five bells in the newsroom, shortly after midnight on June 6, until the flow of spot news began to die on the wires, NBC news and special events overlooked not a single detail in an effort to bring to the people a story in which it was vitally interested.

There were interviews with wives of military leaders on the front. Priests, ministers and rabbis came to the air to give their benediction to this cause of freedom. Government representatives in Washington were summoned to the air to give their reaction to this great military undertaking. Even the music, which was heard so seldom during the day, seemed to be played with a finite feeling, demonstrative of some momentous occasion.

Planned 6 Months Ahead

Six months ago NBC's news and special events department began to lay plans for D-Day. London and Mediterranean staffs were augmented, and Francis C. McCall was later dispatched to the English capital to help Stanley Richardson, London Manager, coordinate the set-up and to see that the news was developed for broadcast consumption.

Seasoned reporters like W. W. Chaplin, John Vandercook, Merrill

ARMED WITH QUICKLY PENCILLED NOTES AND A MAP OF FRANCE, H. V. KALTENBORN, VETERAN NEWS ANALYST, IS ON THE AIR WITH NEWS FLASHED FROM THE INVASION COAST OF NORMANDY.

[RADIO AGE 3]





IN THE NBC NEWSROOM (LEFT), ROBERT BROWN AND WILLIAM F. BBOOKS SCAN THE LATEST D-DAY BULLETIN. IN A LONDON OFFICE (RIGHT) COL. DAVID SARNOFF, PRESIDENT OF RCA, DISCUSSES WITH J. H. BBEBNER, DIRECTOR OF THE NEWS DIVISION, BRITISH MINISTRY OF INFORMATION, ADVANCE PLANS FOR HANDLING PRESS BY RADIO AND CABLE ON D-DAY. COLONEL SARNOFF IS ON ACTIVE DUTY WITH THE U. S. ARMY SIGNAL CORPS, ATTACHED TO SUPREME HEADQUARTERS OF THE ALLIED EXPEDITIONARY FORCE.

Mueller, a veteran of two previous invasions; David Anderson, George Y. Wheeler and Edwin Haaker were sent to the other side to aid Stanley Richardson and John MacVane. In addition, there were Tom Treanor, Los Angeles newspaper man who was assigned to the Coast Guard, Ruth Cowan, accredited to the Coastal Receiving Hospital, and Wright Bryan, Atlanta Journal managing editor, who is attached to the Naval Forces.

It was Wright Bryan who brought to England the first factual report of the actual invasion, and it was the first radio description to reach the airways.

There was no one man responsible for NBC's invasion coverage. From its top-notch reporter to the boy and girl who tore copy from the teletype machines, all worked as a well-oiled machine in bringing this spectacle to the news-hungry nation.

When the first broadcast flash came at 12:40 A.M., June 6, there were few people in the newsroom in Radio City. Even then, in view of the false report two days previous, caution was demanded. An announcer was summoned and a

bulletin was flashed over the air. Then began the task of calling in all who were to work on the invasion, including Mr. Trammell.

Even though there was then no official confirmation from the Allied Supreme Command, the continual flow of bulletins of German derivation seemed to substantiate the original report. Within periods of several minutes, NBC gave the story to the public as it came from the press association news tickers.

Supervised Bedlam

Robert St. John, veteran correspondent and one of NBC's ace commentators, was at a microphone a half-hour after the original report. Following him came H. V. Kaltenborn, dean of radio news analysts, whose coverage of the Munich crisis is still considered radio's greatest reporting job.

These men sorted out long bulletins at the microphones as the true invasion story gradually unfolded. Then came the official Allied confirmation at 3:30 A. M. By this time, the NBC newsroom was a scene of supervised bedlam. Adolph Schneider sat at the cue channel

desk talking and on the other side of the Atlantic Ocean, in a small radio booth, he was being answered by those in charge of radio facilities there. He was arranging for broadcasts on D-Day action, and lining up stories which were later brought to the world. He didn't leave that room for eight solid hours, for as the action grew more intense his task became greater.

Bob St. John made a total of thirty-three broadcasts, ranging from two-minute bulletins to half-hour shows. H. V. Kaltenborn was equally active, as, without script but with his map before him, he gave the stories to the people of a listening nation, many of whom had sons in the very action he was describing. Kaltenborn gave a most dramatic picture, as, working only with notes, he unhesitatingly pieced together the battle action, describing each landing, how it was made and giving historical backgrounds where the landings took place. He could do this because he had been at the very spots where Allied boats scratched the sandy shore to dump their cargoes of men, arms and equipment.

When news tapered slightly in New York, NBC turned its point of pick-up to Washington, Cleveland, Chicago, Pacific Coast, Honolulu, Australia, Rome and other points around the Globe. Not once during the long hours of this invasion did this story lose its interest.

There were three interviews

DON GODDARD (LEFT), NBC COMMENTATOR, READS A D-DAY BULLETIN TO DE WITT MILLHAUSER, AN RCA DIRECTOR, MAJ. D. H. DWYER AND GEN. SIR THOMAS BLAMEY, COMMANDER-IN-CHIEF OF THE AUSTRALIAN IMPERIAL ARMY.



from Washington with wives of famous military men, including Mrs. Harold R. Stark, Mrs. Carl Spaatz, Mrs. James Doolittle and Mrs. Alan R. Kirk, and a message was read from Mrs. Eisenhower, wife of the Supreme Commander in Europe.

From the Senate gallery, Morgan Beatty, one of NBC's Washington correspondents, gave the news as it developed from the nation's capital. In the Senate gallery, he interviewed Senator Barkley, Senator Hill, Senator White and Representative Claire Booth Luce.

With Richard Harkness, Beatty was on top of every possible news story in Washington, and did the first broadcast from the Pentagon Building.

When it became certain that the invasion was actually under way, NBC made immediate preparations to bring to its microphones men from religious life to speak a word of inspiration and to voice a prayer for the preservation of those taking part in this military feat. There were Dr. Norman Vincent Peale, Rabbi David Poole, Reverend Francis X. Shea, Right Reverend William T. Manning, Episcopal Bishop of New York, Dr. Douglas Horton and the voice of the President as he led the country in prayer. Then there was a broadcast of King George's address to the men of the Allied Armies, which was part of NBC's invasion coverage.

Other NBC newsmen who kept this life line of bulletins and stories on the air, were Don Goddard; Elmer Peterson, who recently returned from London, and Don Hollenbeck, who knows what invasion is, as he faced the German shore patrols at Salerno. Alex Dreier told his stories from Chicago, and from the Pacific Coast, Louis Lochner, who spent six months as a German internee, gave a background description of the German army and told how the landing would be successful.

Facilities Are Expanded

When Hitler crossed his first border, NBC actually laid the groundwork for its world-wide coverage of news. Covering an invasion, or any great military action, goes beyond the realm of simple reporting. First there must be perfection of mechanical facilities; for, regardless of how good the story is, or of the risks involved in getting it, it will remain curled in

the roller of a typewriter if there are no facilities to bring it to the waiting world of radio.

Months ago, when invasion was first a mere possibility, NBC set out to seek improved transmission facilities from the European theater of operations. At that time, there was one regular communication channel between the NBC News and Special Events Department and Great Britain. Contacts were made with the Army, the Navy, Censorship, RCAC, the AT&T, the British Post Office, which controls circuits out of England, the BBC and various officials in Washington and London who were charged with a part in the censorship and dissemination of news once the invasion started. In cooperation with the other networks the problem was explained and clarified. On D-Day, three communication channels linked American broadcasting headquarters in London with home offices in New York.

These new radio outlets enabled the radio audience to get a more complete picture of developing military action than was ever possible before. Background copy was prepared and ready both in New York and London. Special features were assigned for development both domestically and abroad. Prominent personages representing various countries in the occupied territories were approached, and made ready to broadcast once the flash on the invasion came 'speeding over the ocean.



THE PILE OF PRESS SERVICE COPY FROM THE EUROPEAN INVASION FRONT MOUNTS RAPIDLY AT THE SIDE OF MARSHALL SMITH IN THE NBC NEWS-ROOM AS HE RUSHES A NEW LEAD TO BE FLASHED OVER THE NETWORK.

In the NBC Newsroom in New York, the engineering staff did yeoman work installing a newly-developed control board to make for more perfect control of the network during news operational periods, regardless of their length.

Ordinarily there are four possible ways to cover a military operation:

First, by correspondents getting their stories with the troops and on the ships at the fighting front and sending them back to the main broadcasting points for transmission.

Second, by use of portable wire and tape recorders. This magic of radio has been instrumental in bringing some of the most dramatic stories of World War II to the radio audience. Don Hollenbeck used it in the Salerno invasion; Merrill Mueller had this device in the early stages of the Italian campaign, and Ralph Howard used it later when the Allied armies broke through the German lines in the push which drove the Nazis from Cassino to the outskirts of Rome.

Many of NBC's front line reporters were equipped for invasion with these recorders. While not new in radio, this equipment is still very much of a mystery to the average layman. The instrument weighs about thirty-five pounds, faced with a panel board on which are two spools. A wire (or tape) runs from one spool to the other. A reporter, using the wire recorder, speaks into a microphone and what he says is recorded on the wire. He can then

reverse the spool, and what he has spoken is played back to him.

Our front line men carry the recorder into battle; tell the story of engagements from fox holes, from ships and from the air. They send the wire spools back to headquarters where censorship makes any necessary deletions, and then pass them on to NBC broadcasting points for the world to hear.

The third method of covering the invasion is possible only after definite and permanent landings have been made and fixed transmission facilities are available. The broadcasting setup in Naples was typical of this type of coverage. When the Allies took this city, there was no transmitter available. That condition existed until the Army Signal Corps and RCAC were able to set up a transmitter powerful enough to relay broadcasts back to another transmitter, which powered the reports overseas to NBC in New York.

From the Front Lines

The fourth method of invasion coverage, and one of the most dangerous is by live broadcasting from the front lines. It necessitates a series of small transmitters and an equal number of transmissions. Such a broadcast was made from Bougainville by George Thomas Folster, intrepid NBC correspondent, with three men, covered by a sharpshooter, beyond the American lines, mike in hand, while wire was played out to him through the jungle undergrowth. Even as he

spoke, gun fire broke out a bare 75 yards away.

In the NBC Newsroom in New York daily conferences were held with engineering, traffic, program, and sales department representatives. Standby programs were set up, new facilities were installed and ordered from commercial companies, and the news staff was drilled incessantly with the fact that NBC hoped it would be first with every break of important news but, more important, it wanted to be correct. Monitoring of Axis capitals was ordered up from R.C.A. Communications in both New York and San Francisco, and arrangements were made for emergency cots and meals for the 24-hour shifts expected for the staff.

Back of the on-the-spot NBC reporters were the immense facilities and staffs of the British Broadcasting Corporation, with whom NBC made exchange arrangements for coverage, and, of course, the immense staffs of the three great American press associations—the Associated Press, the United Press, and the International News Service—whose world-wide reports are constantly available to the NBC news organization.

The role played by RCA equipment in the invasion on land, on sea and in the air was stupendous, but cannot now be told. The thousands of RCA workers surely experienced an added thrill on D-Day realizing the extent to which they may have participated in equipping the heroic Allied armada.

ADOLPH SCHNEIDER, ACTING MANAGER OF THE NBC NEWS DEPARTMENT, ON TELEPHONE AT LEFT, AND ARTHUR GARY, ON 'PHONE AT RIGHT, AWAITING A GO-AHEAD SIGNAL FROM LONDON. RIGHT—ROBERT ST. JOHN ON THE AIR.



[RADIO AGE 6]



DR. GEORGE H. BROWN GIVES THE PENICILLIN ELECTRONIC DEHYDRATING APPARATUS HE DEVELOPED IN RCA LABORATORIES A FINAL INSPECTION BEFORE IT IS SHIPPED TO THE E. R. SQUIBB & SONS PLANT AT NEW BRUNSWICK, N. J.

AIDS PENICILLIN PRODUCTION

Electronic System Developed in RCA Laboratories Completes in Thirty Minutes Evaporation Process Requiring 24 Hours by Conventional Methods.

IMPELLED by recurring demands from American fighting fronts and homefront sickrooms for increased production of the renowned drug penicillin, the Radio Corporation of America has developed an electronic system that in 30 minutes completes an operation which requires 24 hours by the conventional system in the bulk-production of purified penicillin solution—a time-consuming step in production.

This achievement was announced jointly today by the RCA Laboratories, Princeton, N. J., one of the world's foremost centers of radio and electronic research, which has

conceived radio-frequency concentration of penicillin solution, and E. R. Squibb & Sons, manufacturing chemists to the medical profession since 1858, under whose auspices extensive tests have just been completed.

Tests at the new Squibb penicillin production plant at New Brunswick, N. J., showed that in one day's operation a single RCA electronic apparatus had a potential capacity of concentrating penicillin solutions containing approximately 2,000,000,000 Oxford units. The speed of operation is about 48 times as fast as it is in one of the conventional "freeze-drying" ma-

chines. The number of units concentrated in 24 hours in an RCA electronic apparatus corresponds to approximately 20,000 ampuls, each containing 100,000 units—an amount sufficient to treat 4,000 patients requiring 500,000 units each.

Squibb scientists disclosed that during the experimental period starting on May 5, when the high-frequency equipment was installed, they conducted more than 1,000 tests to ascertain the relative effectiveness of the electronic system and the conventional method of concentrating this product. The advantages in using radio heat, aside from speeding the process, included:

1. Reduction in operating costs, equivalent to the saving of one ton of dry ice a day, or approximately \$65 every 24 hours.
2. Reduction in maintenance costs through elimination of complicated freezing apparatus and high vacuum pumps.
3. Smoother flow of production, with less chance of shut-downs and other delays due to refrigeration and mechanical difficulties.
4. Reduction in floor space requirements by nearly 10 times, as the RCA equipment takes up about the space of an up-ended office desk.

In addition, RCA officials pointed out, the radio frequency equipment represents a large saving in initial investment, as compared with the installations required for concentration by freeze-drying, with single units of the RCA equipment tested at Squibb destined to be sold at about \$6,000 which is several hundred per cent less than some of the present installations in use by the Nation's eighteen producers of penicillin.

Horace A. Holaday, Associate Director in Charge of Squibb Biological Laboratories, who supervised the tests, had this to say:

"On the basis of what I have observed, the RCA apparatus offers an important contribution in facilitating the evaporation of the final purified penicillin solution. It greatly simplifies the operation,

and eliminates the necessity of using much more elaborate equipment."

Individual credit for the development of the high-frequency dehydrator has been given to Dr. George H. Brown, 35-year-old research engineer, of RCA Laboratories, who was inspired in making his invention by a newspaper story he read on the production problems of penicillin, the demand for which, overseas and at home, has far exceeded the supply. He received helpful assistance from his associates, R. A. Bierwirth and Cyril N. Hoyler, and from scientists at the Squibb Biological Laboratories, the latter providing most of the penicillin solution for his experimental runs.

Dr. Brown's radio-frequency system deals directly with the problem of the bulk-reduction of purified penicillin, rather than with the production of penicillin itself.

After the penicillin is produced by the mold either by surface or submerged fermentation in containers holding up to several thousand gallons, the penicillin-containing broth is separated from the mold by filtration and the crude penicillin extracted from the broth with an organic solvent. It is then given an elaborate series of chemical treatments which finally remove most of the impurities and reduce the bulk by about 600 times.

This is the point where the final bulk-reduction must begin for, while the penicillin in solution now has a potency of about 40,000 units per cubic centimeter, the objective is to attain 100,000 units per cc. Once that is accomplished, the penicillin is freeze-dried to powder form in ampuls for shipment to places of urgency designated by the War Production Board.

Since ordinary heat methods of evaporation destroy the effectiveness of penicillin, the bulk-reduction in plants under WPB control has been achieved through freeze-drying, a process in which the penicillin solution is caused to evaporate in a high vacuum at below-freezing temperatures.

Dr. Brown's electronic bulk-reducer employs radio-frequency current to concentrate the penicillin solution. His system consists of three large glass bulbs, con-

nected in vertical series, and attached to a pump that maintains a relatively low vacuum.

To the setup is connected a 2,000-watt radio-frequency generator. Electrodes carrying the output of the electronic generator are attached to the base of the lowest glass bulb which, when the unit is in operation, holds about 200 cubic centimeters of liquid.

As the vacuum pump starts, the suction draws the solution into the base of the lower bulb. The radio current is turned on and, as the current passes through the solution, heat up to 50 degrees is created and the liquid boils. This causes an evaporation at the rate of two litres an hour.

Laboratory Model Installed

It was Dr. Brown's laboratory model, built in its entirety at RCA Laboratories, that was installed at the Squibb penicillin production plant on May 5. There its operation was observed both by Mr. Holaday and by Mr. C. W. Eberlein, superintendent of the plant, who after conducting exhaustive tests, announced they are ready to place it in steady production.

The apparatus occupies a floor space roughly 3 x 5 feet and is approximately 7½ feet tall.

Electronic bulk-reducing equip-

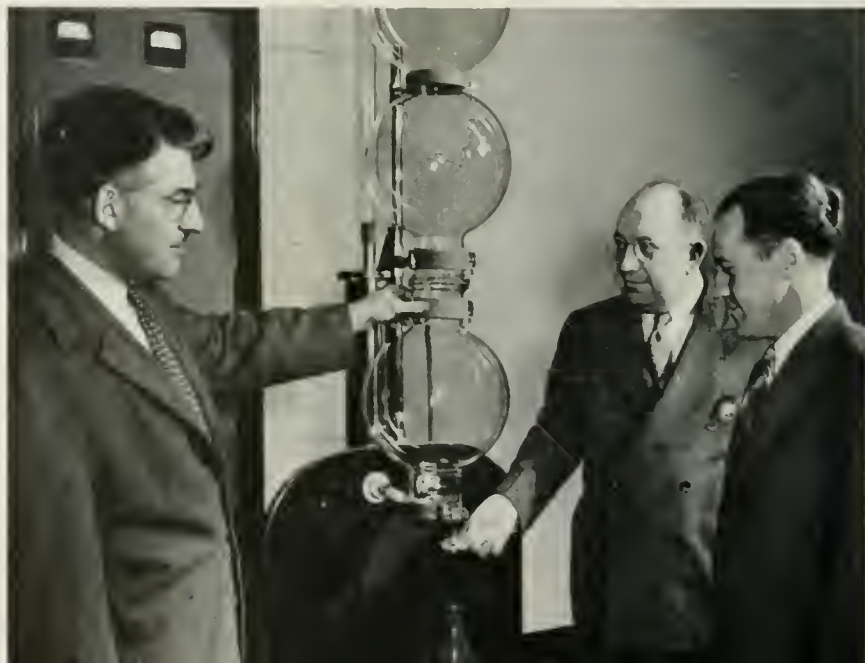
ment, based upon the model, will be manufactured and marketed by the RCA Victor Division, Camden, N. J.

In an interview, Dr. Brown recalled some of the problems with which he contended as he sought to perfect his invention. One of the difficulties that had to be overcome in the original setup of two connected glass cylinders was excessive foaming, which slowed up the process. The thought occurred to him that glass marbles placed in the connecting necks of the cylinders might be effective.

The scientist sent out a messenger, who visited all of the shops in the town of Princeton without so much as finding a marble. Dr. Brown called his home and enlisted his wife to search his children's belongings. Still no marbles. Finally, his wife reported that one of the neighbor's children, John Turney, who "played for keeps", had a shoe-box containing 1,000 glassies. This supply was tapped and science moved ahead.

Dr. Brown's final solution, however, was to replace the two glass cylinders and marbles with the three glass bulbs of his model, and add a water coil. Further, the penicillin was "degassed" before placing it in the containers. Dr. Brown explained that boiling occurs in the bottom bulb, the next bulb takes care of excessive foaming, and the third is "just for good measure."

CYRIL N. HOYLER (LEFT), DR. GEORGE H. BROWN, AND R. A. BIERWIRTH SHOWN WITH THE ELECTRONIC DEHYDRATOR.



Two New Microscopes

RCA INTRODUCES IMPROVED UNIVERSAL MODEL AND CONSOLE INSTRUMENT AT MEETING OF AMERICAN BACTERIOLOGISTS



By Perry C. Smith

Manager, Electron Microscope Design Section, RCA Victor Division

AN HISTORICAL date was set in December, 1940, when RCA sold the first commercial electron microscope produced in this hemisphere. It is doubtful that the possibilities of this new tool for science were fully realized at the time of the original installation. Many predictions were made but little did anyone imagine what the electron microscope would and did accomplish in so many research fields in so short a time. Although many workers in various endeavors were revealing new wonders daily with the electron microscope, it was shortly after World War II began that electron microscopy received

an impetus which advanced the art at an unbelievable pace and which permitted its name to become synonymous with the science of the war effort. The headline news which the RCA electron microscopes are making daily, unfortunately may not be told until the War is over.

However, it can be said that fifty-eight of the original model electron microscopes—the type EMB—have been produced and delivered up to this date. Likewise, it can be stated that the RCA electron microscopes have definitely won a place in the circle of recognized scientific devices.

Within a year after Dr. Vladimir K. Zworykin of the RCA Laboratories and his associates released the original research model electron microscope for production, it was realized that a product design and advance development group would have to be formed to handle production problems and to broaden and improve the equipment line. To this end, such an organization was formed in late 1941. Among other things, this group has trained hundreds in the art of electron microscopy; it has provided many improvements and attachments for the original design of microscope; it has set manufacturing standards

and guided production processes.

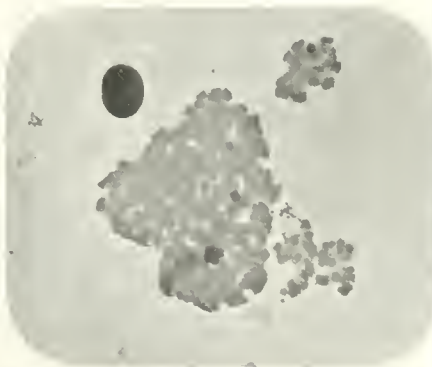
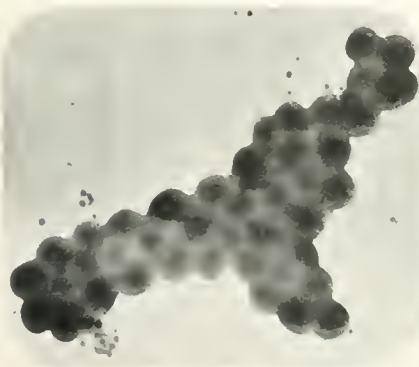
Early in May, 1944, another history-making event in electron microscopy took place when the RCA Laboratories and the Commercial and Industrial Engineering Departments of the RCA Victor Division introduced two new improved instruments before the American Society of Bacteriologists, meeting in New York.

In designing these two new instruments, our Product Design Group was largely guided by the field performance of the EMB microscopes scattered throughout the United States and the more than 100,000 micrographs they have produced. The friendly and constructive criticism of the many technicians and associates using RCA microscope equipment was of incalculable aid.

The type EMU, or universal microscope, and the type EMC, or console microscope, were designed with the following main viewpoints for guidance: (1) operator comfort and convenience; (2) simplicity and flexibility; (3) consistent top performance; and (4) ease of maintenance.

Briefly, the RCA electron microscope is a device for studying and photographing the smaller particles of nature. These particles range in size from those observable with the light microscope down to single molecules. In fact, many of the larger molecules have already been photographed. The usefulness of the electron microscope comes from the fact that its resolving power—its ability to distinguish one small

THE NEW UNIVERSAL MODEL RCA ELECTRON MICROSCOPE (RIGHT) IS DEMONSTRATED BY THE AUTHOR (STANDING), DR. V. K. ZWORYKIN AND DR. JAMES HILLIER. THE TWO ELECTRON MICROGRAPHS BELOW SHOW STAPHYLOCOCCUS AUREUS BACTERIA BEFORE (LEFT) AND AFTER BEING SUBJECTED TO PENICILLIN.



[RADIO AGE 9]



particle from another—is from 50 to 100 times greater than that of the ordinary light microscope. Resolving power increases in proportion to the frequency of the source of illumination. Thus the resolving power of a light microscope is limited by the available frequencies of visible illumination. Electrons, as used in electron microscopy, have wavelengths which may be 100,000 times shorter than the wavelengths commonly employed in light microscopy. The theoretical resolution obtainable with electrons has not by any means been realized. However, as in all science, perfection is only a goal, not a realization, and tomorrow's electron microscope will seek and find more than yesterday's.

Magnifications Compared

The very high resolution of the electron microscope enables the instrument to work at useful magnifications that would have seemed incredible a few years ago. Useful magnification is the largest product of instrumental and photographic magnifications beyond which no further information is revealed to the eye. For the sake of comparison, the useful magnification of a light microscope does not exceed 2000 times, while the useful magnification of an electron microscope in most cases exceeds 50,000 times

and may reach better than 100,000 times, depending on the type of material under examination.

The new Universal Electron Microscope provides three distinct services: straight two-dimensional micrographs; three-dimensional or stereo-micrographs; and diffraction patterns of crystalline substances. Two-dimensional pictures may be taken of particles, suspensions, films, crystals, etc., within the limits of the penetrating power of the electron beam, which is about 1 micron (1/25,000 of an inch). For those materials which are opaque to the electron beam—materials thicker than about 2 microns—valuable information may be obtained through the use of the "replica technique" which was developed for this purpose. This technique consists in casting a very thin film on the surface or area to be studied, stripping the film from the specimen, and photographing the film itself. The difference in thickness of the stripped film, caused by the irregularities of the surface of the specimen, cause the electron beam to register them and produce a facsimile of the original. Refinements of this technique have led to replica micrographs possessing resolution almost equal to standard micrographs.

Great Depth of Focus

Stereo-micrographs are produced by taking two exposures of a given field. One exposure is made with the specimen tilted at a slight angle with respect to the electron beam while the second exposure is taken at an equal but directly opposite angle. When the two exposures are aligned properly and examined with suitable stereo viewers, third dimensions are readily observed and measured. Stereo-micrographs can be made of either standard micrographs or replicas. In appraising the extreme usefulness of electron stereo-micrography, it should be pointed out that electron microscope images possess a tremendous

depth of focus—some 15 to 25 microns—whereas light microscope images have a depth of focus of something less than 1 micron for low magnifications and are proportionately shallower as magnification is increased. From the above it is apparent that the entire fields of electron stereo images are practically always in complete focus and the most intimate knowledge of bulk dimensions, arrangements and linkages are easily obtainable.

Used in Surface Studies

Electron diffraction provides a means for studying the atomic geometry of crystalline materials. Electron and X-ray diffraction studies supplement each other in that electron diffraction is used for the study of surfaces and thin films and X-Ray for the thicker materials. This is brought about because of the difference in penetrating power of the two types of radiation employed. There are two techniques used to obtain patterns in electron diffraction studies; transmission method and reflection. Crystals in powder form are studied by the transmission method and, in these cases, powder smears or groupings are not opaque to the electron beam. Electrons simply are allowed to pass through the devious lattice structures of the random mounted crystals to produce a pattern. For those substances which are opaque or in bulk form, the reflection technique is used. In these cases the electrons are allowed to graze the specimen surface at a slight angle. Mechanical means are provided to properly orient the opaque specimens so that the crystal lattices are in proper relation to the electron beam.

Electron diffraction patterns are sometimes referred to as the "thumbprints" of the crystal universe. No two substances produce the same pattern. In practice, diffraction patterns are obtained to permit the study of the atomic geometry of a new substance or to identify an unknown substance by means of its pattern, checked against its thumbprint in file. The relative degree of crystallinity of a given substance is a further valuable contribution portrayed by dif-



AN ELECTRON MICROGRAPH OF THE SCALES OF A MOSQUITO WING MAGNIFIED 16,000 TIMES.

fraction patterns. Many applications are making use of this phenomenon for straight process control of product and ingredients.

Since an electron microscope is primarily a cathode ray tube which must be opened from time to time to atmospheric pressure to admit new specimens and photographic plates, careful consideration must be given to the vacuum system and its control. As the electron beam, used to illuminate the specimen, is rapidly absorbed and scattered by gas molecules, a relatively high vacuum must be maintained in the body of the microscope. Generally speaking, commercial and laboratory vacuum systems are quite complicated, consisting of a multiplicity of controls, valves and pressure indicating devices. Vacuum control—"rough" pumping, final pumping, "bleeding" to atmospheric pressure and all other sequences—are controlled by one simple valve crank in both of the new microscopes. Since the columns—or microscopes themselves—have been designed for minimum volumes and since the columns themselves are the only portions of their respective vacuum systems requiring pumping during operation, the time required between specimen changes has been kept to a maximum of about one minute and a half, and no air locks or auxiliary pumps are required.

Systems Are Simplified

The electronic systems which control the accelerating voltage—and therefore the wavelength associated with the electron beam—and those which control the power of the electro-magnetic lenses of the new microscopes, are greatly simplified. For example, the Universal Microscope has only twenty-five vacuum tubes compared to the older B Microscope which had fifty-one,

The Console Microscope requires only fourteen tubes for its operation. As a result, the new Microscopes require proportionately fewer circuit components and space and facilities for mounting them.

All electrical and mechanical controls have been designed and positioned for operator comfort and convenience—specimen movement, image intensity, magnification, focusing, power control, camera control, vacuum and circuit meters, are all within easy and convenient reach of the operator.

Occupies Small Space

Mechanically, the new microscope columns are greatly simplified. Clamping rings, gaskets, Sylphon bellows, etc., which are essential parts of demountable and adjustable vacuum systems, have been reduced to a practical minimum. Whereas the EMB Microscope employed 22 Sylphon bellows, the Universal Model uses seven and the Console Model only three. Most of the Sylphon bellows were eliminated by design simplification but in certain cases, bellows have been replaced by a recently developed type of rubber seal. These new rubber seals permit rotary or reciprocating motion within the evacuated chambers and render months of continuous service without attention.

The Universal Microscope is intended for a fixed type of installation. The cabinet has been designed to occupy a minimum of floor space consistent with average allowable floor loading. The instrument may be mounted against a wall or free of any partition. Power, water and forepump connections can be made by way of floor trenching or fed through the right, left or rear of

the bottom skirt of the cabinet. The only accessories external to the microscope cabinet are the fore pump and line voltage stabilizer which can be installed in an adjacent room or other nearby convenient location.

The Console Model has been designed for semi-portable usage. The desk type construction, whose dimensions allow clear passage through a standard thirty-inch door, fulfills the requirements for occasional mobility. The Console desk houses the fore pump and all other accessories except the line voltage stabilizer, which can be mounted at any nearby convenient location. A large amount of storage space is provided by the shelving unit built into the compartments at the right and left of the kneehole of the desk.

Both the Universal and Console Models of the Electron Microscope can be operated from standard socket power—110 volts. The Universal Model consumes 1,500 watts and the Console Model 1,000 watts. Both instruments have vacuum systems which pump their respective columns to better than one tenth micron of mercury.

The Universal Microscope has a direct magnification range of from 100 to 22,000 diameters, adjustable in forty steps. The Console Model provides two direct magnifications of 500 or 5,000 diameters. The photographic negatives produced by either microscope must be photographically enlarged to reveal all the detail present.

Development Continues

Each day brings new discoveries and broadens the list of applications of electron microscopy. Keeping pace with this new science—the science of electron microscopy—is the RCA Product Design Group, among whom are such outstanding young engineers as Dr. Robert Picard, Samuel Zollers, Frank Runge and Miss Helen Muenschler. Advance development is proceeding on other electron optical devices related to the science, and each new product will perform new and useful service for mankind.



THIS NEW RCA DESK CONSOLE MODEL ELECTRON MICROSCOPE IS DESIGNED FOR EASE AND SIMPLICITY OF OPERATION. MINIMUM TRAINING IS REQUIRED FOR OPERATORS.

Buy War Bonds

[RADIO AGE II]



HIDDEN FROM THE SKIES BY CAMOUFLAGE NETTING AND PROTECTED BY STACKS OF SANDBAGS, THE RCAC RADIO STATION AT NAPLES, ITALY, IS BARELY DISCERNIBLE IN ITS WOODLAND SETTING. RIGHT—EDWARD FARNSWORTH AT THE RECEIVER.



RCAC OPENS ROME STATION

New Radiotelegraph Service Links New York and Italian Capital in Direct Circuit—Equipment Installed by RCA a Week After City Was Liberated.

DIRECT radiotelegraph service between New York and Rome, first of Europe's great war capitals to fall to Allied armies, was opened June 13 by R.C.A. Communications, Inc.

Employing radio transmitting and receiving equipment shipped by RCA from New York to Italy in anticipation of the liberation of Rome, the new communications circuit already is greatly facilitating the flow of press dispatches, and Government and military messages to and from the Italian war zone.

It supplements the direct service opened by the company between New York and Naples on February 1.

Following closely on the heels of the Allied occupation forces, a group of RCA engineers and operators under the supervision of Thomas D. Meola, manager of both the Rome and Naples stations, moved their American radio equipment into Rome and had it in operation just seven days after the Germans fled the city.

RCAC established the Rome station with the assistance of the Signal Corps, U. S. Army, at the request of and in cooperation with the U. S. Board of War Communications and U. S. military authorities. The Naples installation was the first wholly-owned American commercial radio station on the continent of Europe, and the Rome station is the second.

During the period from February 1 until June 13, when the Rome station was opened, RCAC won high praise for its Naples terminal from news organizations in the United States for overcoming difficulties in transmitting war news from the Italian front.

Reports reaching the RCAC offices in New York told of a remarkable feat in which engineers of the company installed the station from scratch in less than one month and began flashing on-the-spot news accounts at a rate as high as 240 words a minute. Transmission of news copy to the United States mounted steadily until the daily capacity of the station exceeded 75,000 words.

American war correspondents discovered that, once urgent messages were passed by censors, the dispatches reached press association offices in New York by RCA in less time than it took to compose them. "Flash" copy and urgent bulletins often made the journey in as few as three minutes.



NIEL BECK TUNES A STANDARD RCAC DIVERSITY RECEIVER AT THE NAPLES STATION.

BUILDING HUMAN RESOURCES

RCA Victor Personnel Administration Believes Planned Development of Employees' Abilities Is Important Factor in Postwar Industrial Success.



By W. B. Dominick

Personnel Administration
RCA Victor Division

ECONOMISTS have predicted that a life and death struggle may be expected in the post-war period between well-established companies making the same kinds of products.

They also point out that, under the necessity of increased war production, many small pre-war businesses expanded tremendously beyond their normal fields and will be keen competitors of nationally known firms. Other companies distantly related in normal times are now prepared to compete in the same markets.

The end of the war and the resumption of peacetime production will undoubtedly find many of these war-born and expanded companies determined to remain in their new fields. This will surely bring more intense competition than ever known before.

In this predicted post-war struggle, perhaps the greatest promise for a company's survival lies in its *human resources*. To place this in its true perspective, we must remember that certain factors are relatively constant where competition is involved. For instance, a company cannot buy raw materials below market cost. It cannot buy machinery more cheaply than its competitors. It usually has to pay at least the same salary rates as its competitors in the community. And

it cannot sell its products at prices too far out of line with those of competing firms. Under conditions of keen competition, profit margins are so narrow that even minute savings or improvements in efficiency can be of great importance.

The one element which offers important opportunities for improvement and development in an industrial organization is the human factor. Far-sighted industrial leaders agree that the success of an organization depends largely upon the individual well-being of every person in its employ. Much of this personal well-being stems from the employee's feeling of satisfaction in his job. This can be developed and strengthened through a planned program of training that increases his skills and prepares him for advancement in his work.

Accomplishments Listed

What can good training accomplish? More than any other technique of management, effective training establishes good personal relationships, develops employees' skills and understanding of their work, prepares them for larger responsibilities, and clarifies the purposes of the organization through which they work cooperatively for the attainment of certain goals.

Just how productive a systematic

training program can become is illustrated by one supervisor of an RCA plant who attributed a three-fold increase in the value of the items shipped from his section principally to the inauguration of a systematic job training plan. This kind of result in a highly competitive market could very well mean the difference between success and failure.

Reconversion of manufacturing facilities to peacetime production will not diminish the need for good training. As long as we have employee turnover, promotions, transfers or any changes whatever in personnel, there will be need for training. *Just as long as industry is concerned with reducing waste and inefficiency, training will be as vital to management as any other phase of production.*

One of the training tasks that lies immediately ahead concerns the absorption of returning service men and women. This problem is already upon us, because a considerable number of these people are coming back every month. Many of them have developed new skills or gained experiences in the armed services that equip them for different or better jobs than they previously held. The training of supervisors to understand these ex-service men and women and to instruct them patiently and wisely is a task of first importance in formulating a postwar training program.

Another important training task concerns the reconditioning of the thinking of supervisory personnel to peacetime methods and processes. Many business practices condoned

IN RECOGNITION OF THE VALUE OF PLANNED TRAINING, THIS GROUP OF FOREMEN AT THE RCA VICTOR PLANT IN CAMDEN MEETS TO DISCUSS THE HUMAN FACTOR IN INDUSTRIAL PRODUCTION.



because of the war cannot be allowed to continue in a competitive market. The thinking of many supervisors on fundamentals of business economics and principles of scientific management has been altered by the demand for products being confined principally to one buyer, the Government, and by the wide existence of cost-plus contracts.

The struggle for business will also necessitate better training of sales staffs. Pre-war sales training methods too often devoted 90 per cent of their efforts to inspirational talks and only 10 per cent to instructing salesmen how to do their jobs more effectively. In stiff competition, this kind of "training" will not suffice. Because of the many scientific advances brought about by the war, much more attention will have to be given to technical features and applications of products, and to changes in markets and distribution occasioned by wartime shortages and substitutions. Smart business organizations are already giving "refresher" courses to their experienced sales managers and their staffs. In addition, they are cultivating recruits for their new sales groups, and short and long training programs are being developed *now* to be put into operation before and immediately after V-day.

Training programs are also being devised now by progressive business organizations to improve their relationships with distributors. Dealer improvement programs which will help increase the efficiency of the wholesaler and retailer are well beyond the drafting stage. As a matter of fact, some national organizations plan to spend several hundred thousand dollars annually in conducting special courses for their distributors. Some of the subjects are accounting, stockkeeping, store operations and effective merchandising—all of which are designed to make the distributor a more efficient business man. These companies believe that such efforts to increase the efficiency of their distributors will be reflected in increased sales and profits.

To absorb some of the excess American production of war-born and war-extended firms, foreign



IN THE HARRISON PLANT OF RCA VICTOR (ABOVE), JUNIOR ENGINEERS BROADEN THEIR KNOWLEDGE OF RADIO AND ELECTRONICS. CIRCLE—RECEIVING SPECIAL ON-THE-JOB TRAINING AT THE LANCASTER PLANT.

markets will be intensively cultivated. Companies engaged in export trade will need to develop special courses of training for young men to equip them effectively to sell and service products in foreign markets. Many special conditions surround the distribution of products in foreign countries. Sales representatives must therefore be thoroughly grounded in the applications of products to fit the particular needs of foreign buyers. Training will include an understanding of postwar problems, customs, buying habits, trade practices and the channels of distribution of each market. Universities will be called upon to design courses along these lines for sales representatives and many industries will enter into cooperative relationships with colleges for the training of prospective export sales representatives.

Learning Situations Planned

Studies show that every executive, in fact, spends much of his time every day in instructing his assistants and in modifying their skills, habits, and attitudes. Many executives consider training as the principal tool of management. These men devote a portion of each day to the study of the strengths and weaknesses of their subordinates and to devising methods of developing them into better workers.

Some of the most effective training in industry is that carried on



by capable supervisors who plan learning situations for their employees. Unfortunately, however, too few supervisors have been taught how to do this well. Some have failed to grasp the idea that training includes any instruction that is given an employee to help him do his work quickly, safely and efficiently. Much of the training in business has been by "absorption", a process so uncontrolled that employees often obtain misinformation, develop inefficient work habits and acquire wrong attitudes.

Planned training during the war has resulted in better use of manpower, greater speed in production, and practical use of inexperienced workers. The RCA organization fully recognizes the value of planned training as a means of developing the knowledge and skills of its employees—the human factor which is destined to play so large a part in postwar survival.

Manufacturing plants of the RCA organization at Camden and Harrison, New Jersey; Bloomington and Indianapolis, Indiana; Lancaster, Pennsylvania, and Hollywood, California, conduct a variety of training programs designed to fit the number of employees in-

involved, type of products being manufactured, volume of business, and other factors.

Orientation programs at RCA are conducted to assist new employees to get their bearings in the company. Through illustrated discussions and supplementary reading, new employees are acquainted with the background of the company, its policies, products and facilities. Each employee's interest, morale and efficiency is stimulated by these programs.

Pre-production training is given in vestibule schools to many new employees. Conducted near manufacturing sections, these classes are designed to teach new workers certain basic skills before assignment to the new job. This instruction increases the new worker's confidence in his ability to perform factory operations and shortens the time required to get him into production. Vestibule schools screen out persons who do not possess the interest and aptitude for factory work.

On-the-job-training, in which several hundred persons participate each month, is carried on in all RCA plants. The trainee learns to perform his job under the guidance of an experienced worker-instructor who has been taught effective ways of passing along the "know-how".

Training in related subjects is offered to RCA employees to supplement their instruction on the job. New employees in the machine shop, for example, work in the factory most of the day, but during

part of the time they receive classroom instruction in subjects such as drill and punch press operation and blueprint reading.

Special product appreciation courses are conducted for employees during and after hours to familiarize them with the manufacture and application of products made by the company. One of the most popular courses is "How RCA Products Function." The average worker's contribution to a complete product is often very small and he is therefore unable to visualize how his efforts are integrated with those of others.

Work simplification is presented to operators and supervisors in short intensive courses to provide an understanding of the philosophy and principles of motion economy as related to their daily tasks. Many improvements in work methods, machines and equipment, resulting in the saving of thousands of dollars annually, can be traced to the training employees received through these courses.

Supervisors Are Trained

Development of supervisory personnel constitutes an important part of RCA management. Conferences and special meetings are arranged to keep supervisors currently informed of changes in policies, methods and procedures. Better teamwork and coordination of effort are achieved across departmental lines through such conferences.

Recently a study of the average foreman's job in all of the plants was undertaken to provide a solid foundation for further training, and to gear the courses more nearly to fit the expressed desires and needs of this group.

Considerable emphasis has also been placed on having supervisors participate in the short intensive programs of the Training Within Industry Service of the War Manpower Commission. These special training programs are known as Job Instructor Training (how to

instruct new workers), Job Methods Training (how to simplify work), and Job Relations Training (how to handle human relations problems).

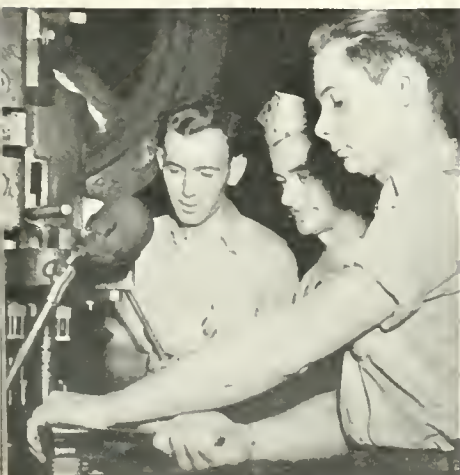
Job instructor training follow-through has been one of the most significant RCA plant-wide training projects. It was instituted to determine the results of Job Instructor Training and to coach supervisors and job instructors in the use of a simple, effective method of training new employees. This project has demonstrated what planned training can do to help supervisors increase production, improve quality and reduce costs.

After-hours classes are sponsored by the Company for ambitious employees who wish to prepare themselves for positions of greater responsibility. RCA benefits directly from employees' broadened knowledge of its managerial and technical problems growing out of such courses as production control, plastics, aviation, radio and television engineering. This program serves to discover talent and facilitate promotion of employees from within the Company.

A tuition loan and refund plan enables qualified employees to enroll in evening courses offered by various colleges. Tuition loans are repaid through payroll deductions. Participating employees are eligible for refunds at the end of the courses, the amount of refund depending upon the course grade earned.

This plan has enabled many deserving employees to complete their college courses or pursue necessary graduate work. The Company has benefited very much from this program, through the fresh outlook and point of view these employees bring to bear on the Company's problems.

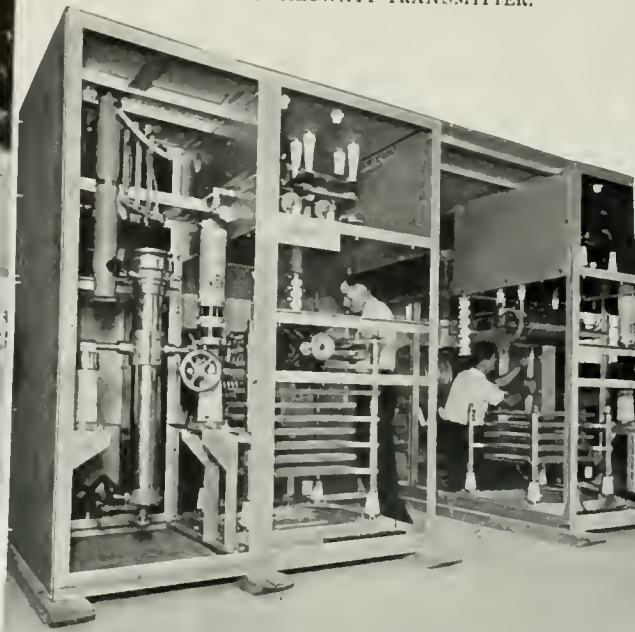
Through these varied training programs, the human resources of the Company are being developed and strengthened. As the efficiency of employees is increased, a reduction in operating costs occurs which in turn permits a lower selling price and a wider market; employment is maintained or increased; employees experience more satisfaction on their jobs and human relations problems are simplified.



APPRENTICES IN TOOL AND DIE WORKS AT THE RCA VICTOR DIVISION PLANT AT INDIANAPOLIS ARE GIVEN INSTRUCTION IN MACHINE SET-UP.



UNDER CONSTRUCTION FOR CANADIAN BROADCASTING CORPORATION, THIS UNIT IS THE POWER AMPLIFIER OF A 50-KILOWATT TRANSMITTER.



TECHNICIANS WITH MANY YEARS OF EXPERIENCE GIVE DIVERSITY RECEIVERS THEIR FINAL ALIGNMENT.

RCA IN CANADA

THIS LONG ASSEMBLY LINE PRODUCES THE HIGH FREQUENCY UNIT OF AIRCRAFT TRANSMITTERS.



RCA Victor Company has won high praise officials for its outstanding developing, and manufacturing equipment for the of Canada, her sister wealth, and other men

A 5-KW. HIGH FREQUENCY COMMUNICATION TRANSMITTER NEARS COMPLETION.



THIS GROUP OF GROUND TRANSMITTERS IS READY FOR SHIPMENT TO THE ARMED FORCES

CONTINUITY OF CONNECTIONS

AIRCRAFT TRANSMITTER-RECEIVER GOES INTO NEW TYPE REFRIGERATOR FOR OPERATING TESTS UNDER WIDE RANGE OF TEMPERATURES.



NAVY INSPECTOR CHECKS SPECIALLY CONSTRUCTED ENTERTAINMENT RECEIVER FOR SHIPBOARD USE.

PRODUCES FOR WAR

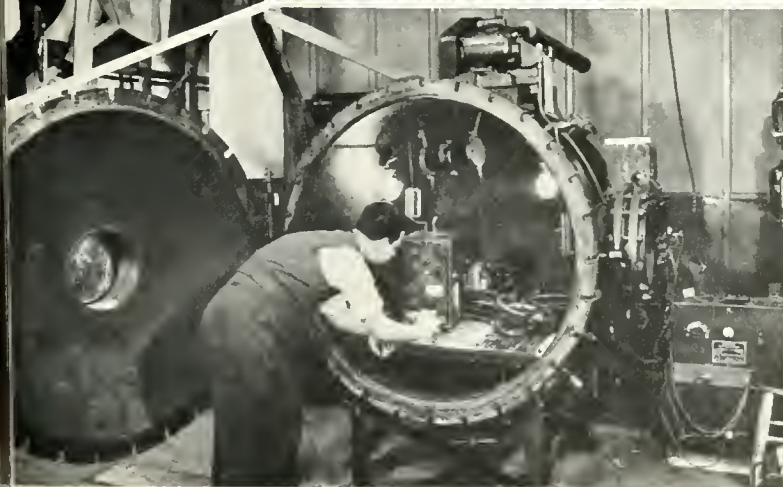
of Montreal, Canada, Canadian Government departments in designing, radio communication, navy, and Air Forces of the British Commonwealth and the United Nations.



THE TUNING UNIT IS ASSEMBLED ON ONE SIDE AND THE CHASSIS IS WIRED ON THE OTHER SIDE OF THIS PRODUCTION LINE FOR DIVERSITY RECEIVERS.



SEVENTEEN 250-WATT COMMUNICATION TRANSMITTERS READY FOR SHIPMENT TO THE UNITED NATIONS.



AIRCRAFT TRANSMITTER IN THIS CHAMBER IS TESTED UNDER CONDITIONS EQUIVALENT TO



ENDS OF RADIO SET



CONFERRING ON THE ADMINISTRATION OF NBC FELLOWSHIPS TO GIVE MINISTERS RADIO TRAINING ARE, LEFT TO RIGHT, DR. TRUMAN DOUGLASS, THE REV. JAMES C. FLINT, THE REV. EVERETT C. PARKER, STERLING FISHER, DR. MAX JORDAN, AND DR. JAMES ROWLAND ANGELL

NBC AWARDS 6 FELLOWSHIPS

Network Inaugurates Plan to Bring Young Ministers More Actively Into Broadcasting—Closer Link Between Church and Radio Is Sought.



By Dr. James Rowland Angell

*Public Service Counselor
National Broadcasting Company*

THE importance of radio for the churches of America has received rapidly increasing recognition in recent years, and certain seminaries have already set up training courses in this field for young men going into the ministry.

The general aim behind this movement is, obviously, to provide a closer link between the church and radio. The National Broadcasting Company, recognizing the need for bringing intelligent young members of the pastorate more ac-

tively into the field of radio, has concluded an agreement with the Congregational-Christian Churches which should go a long way in furthering this important trend. The plan calls for the setting up of two types of fellowships, to be awarded each year, starting in 1944.

In the first of these two categories, a joint committee from NBC and the Congregational-Christian Churches, have awarded fellowships to five ministers in the active pastorate. The fellows thus selected have been chosen from cities where the network has affiliates or managed and owned stations and will attend one of NBC's Summer Institutes in Chicago, Los Angeles, or San Francisco, where the work is carried on in cooperation with Northwestern University, the University of California, Los Angeles Branch, and Stanford University, respectively. The fellowship award in this case covers all tuition and incidental expenses involved in attending the Institutes.

A second type of fellowship will also be awarded each year, starting in 1944, to an outstanding seminary

graduate. This fellowship carries a stipend of \$1,000, and the winner will similarly attend one of the three Summer institutes and finish the rest of his fellowship year working on the staff of an NBC station. The fellowship this year was awarded through the Chicago Theological Seminary. Since the Seminary now conducts an extensive series of courses in radio for its students.

In the first category, the five ministers were selected from the Methodist, Presbyterian and Disciples of Christ denominations. They are: Dr. Bernard Montgomery, pastor of the Central Presbyterian Church in Portland, Ore., and chairman of the Radio Committee of the Portland Council of Churches; the Rev. Charles M. Crowe, pastor of the Centenary Methodist Church in St. Louis, Mo., conductor of a number of network radio programs and member of the radio committee of the Metropolitan Church Federation of St. Louis; the Rev. Edwin T. Randall, a Methodist, and conductor of the "Bible School of the Air," station KSTP, Minneapolis, Minn.; Robert S. Steele, a Methodist, of Hartford, Conn., and secretary to the radio committee of the Connecticut Council of Churches; and the Rev. Harley Patterson, pastor of the Richmond Avenue Disciples of Christ Church, and presently serving as chairman of the committee on radio and publicity for the Council of Churches of Buffalo and Erie County.

The winner of the seminary award is Frank Elliott, of the Chicago Theological Seminary, a Congregationalist, who has had several years of pastoral experience in Wisconsin.

All of the fellows have been selected solely upon the basis of their ability and promise in radio. Their religious denominational affiliation will not be a factor. This, I feel, is

perhaps the most important single contribution of the fellowship plan. While the project includes a financial agreement between the Congregational-Christian Churches and the National Broadcasting Company, there has been absolutely no stipulation placed by the church group on the religious connection of the ministers selected.

Much credit is due for the formulation of the plan to the Rev. Everett C. Parker, Acting Assistant to the Manager of the NBC Public Service Department, who collaborated with Dr. Max Jordan, director of religious broadcasts for NBC. The Reverend Mr. Parker is visiting NBC as Blatchford Fellow of the Chicago Theological Seminary and has had a great deal of experience in the field of religious radio. He was assistant chief of radio for the W.P.A. in 1936-1937 and has served as manager of WJBW, New Orleans, and production and program manager of WHIP in Hammond-Chicago. In addition, he has experimented widely through transcriptions with many different types of religious radio productions.

There appear to be grave deficiencies in the way today's religious broadcasting is conducted. Authoritative polls of radio listening habits in the United States show that religious programs rank at or near the bottom in listener interest among the various program types. On a national scale, even the best network religious programs are rarely able to attract more than 15 per cent of their potential audience.

I need hardly explain that in many instances, religious programs fail to gain popular attention because of their program content. Many have argued that religious programs lack interest because they have not adopted the tried and successful techniques of radio, and also because large numbers of religious broadcasters are not trained in the writing, producing, and performing of radio programs.

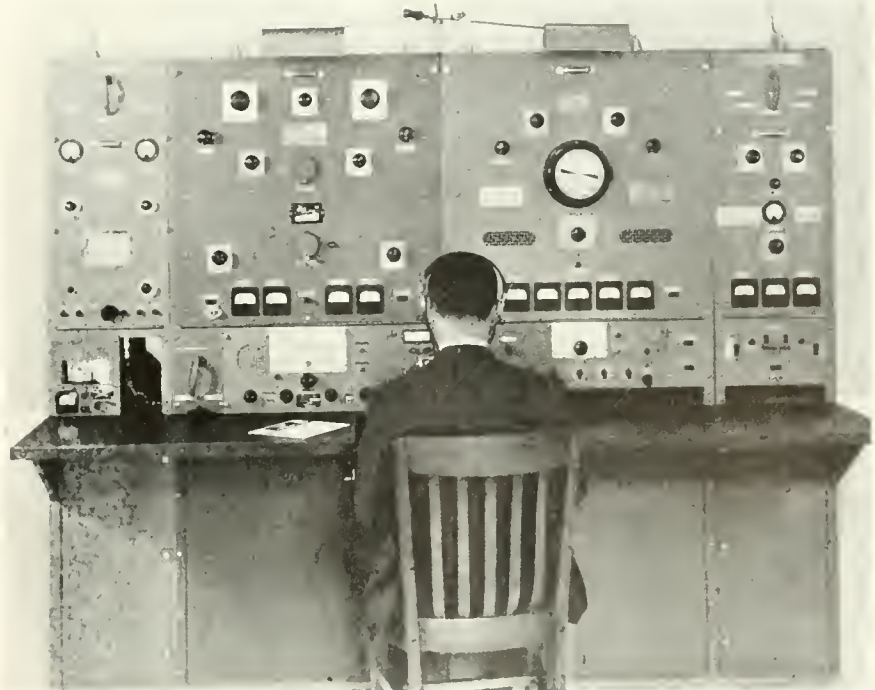
Perhaps this is so. In any event, those of us involved in the present project are striving to give qualified members of the ministry an opportunity to study at first hand the intricacies of the broadcasting industry in the hope that they will then discover more effective means

for presenting spiritual values and viewpoints over the air. Religious broadcasting should be able to compete on a professional level with the better commercial non-religious programs. But this is only possible if the church has at its disposal men who have trained themselves professionally for such a task.

We have established a committee to administer the fellowships. I am acting as chairman. Representing NBC on the committee will be Dr. Jordan and Sterling Fisher, Assistant Public Service Counselor and Director of the NBC Inter-American University of the Air. Representing the churches are: Dr. Truman Douglass, vice-president of the Board of the Home Missions of the Congregational-Christian Churches and member of the Congregational Christian Radio Committee; the Rev. Mr. Parker; and the Rev. James Flint, chairman of the Congregational-Christian Committee on Radio. In the award to the outstanding seminary graduate, Dr. Fred Eastman, professor of biography, literature and drama, of the Chicago Theological Seminary, represented the Seminary.

New Marine Console

Designed especially for the expanding Merchant Marine, including Victory ships and tankers, a "package" type marine radio console comprising three transmitters and three receivers has been developed and put into production by the Radiomarine Corporation of America. In addition to the transmitting and receiving units, which for the first time in console equipment provide for high-frequency operation over extremely long distances, the "package" includes an automatic radio alarm, an alarm signal keying device, a large operating table with built-in typewriter well, and facilities for charging all storage batteries associated with the equipment.



IN THIS MARINE RADIO CONSOLE DEVELOPED BY RADIOMARINE CORPORATION OF AMERICA, THE TRANSMITTERS CAN BE PUT ON THE AIR WITHIN FIVE SECONDS



A PORTABLE TELEVISION CAMERA EQUIPPED WITH THE HIGHLY-SENSITIVE ORTHICON TUBE PICKS UP CIRCUS SCENES IN MADISON SQUARE GARDEN. CIRCLE—PACKED IN EASILY-CARRIED "SUITCASES", CONTROL AND TRANSMITTING UNITS OF PORTABLE FIELD EQUIPMENT ARE SET UP IN A ROOM ADJACENT TO THE GARDEN ARENA.

Television Goes Afield

PORTABLE CAMERA-TRANSMITTERS DEVELOPED BY RCA VICTOR ARE EXPECTED TO ACCELERATE PROGRESS OF NEW SERVICE.

By Henry E. Rhea

*Engineering Products Department
RCA Victor Division*

RCA engineers may be proud that despite the obstacles—technical, economic, and others—that have confronted them, their faith in the future of television has never wavered, and that, partly for that very reason, the contributions of RCA scientists and engineers far surpass the accomplishments of all others combined.

The list is a familiar one and need not be repeated in detail. It includes the Ikonoscope, the Orthicon, the Kinescope, the first all-electronic television system, the first high power television transmitter (40 kilowatts—built in 1936), the first electronic projection picture, the first commercial television station, and the first relay system.

Hundreds of man-years of work, as well as millions of dollars, have

gone into the television work conducted by our Laboratories. The accumulated results of this effort and unswerving faith of our organization in the future of television are the seeds from which a great new industry will grow.

There are numerous signs that the seed is beginning to sprout. In the radio magazines, the trade publications, and the daily press, television is an important topic. Broadcasters, film companies, newspapers, educators, department stores, advertising agencies—all are looking with interest at this fledgling industry.

Most significant of all is the list of television station licenses and applications for licenses now on file with the Federal Communications Commission. As of May 1, 1944, the number totaled fifty-five. Some thirty cities are represented in this list, including New York, Philadelphia, Boston, Rochester, Baltimore, Washington, Pittsburgh, Richmond, Chicago, Los Angeles, Hartford, Denver, Oklahoma City, Minneapolis, Albuquerque, New Orleans, Cin-

cinnati, San Francisco, Cleveland, Milwaukee, Hartford, and Spokane.

This represents an immediate post-war market for our transmitting and receiving equipments. But before this market will develop, an important question must be answered. Where will good programs be obtained? Col. David Sarnoff, in a paper published over seven years ago, stated:

"Whoever the sponsor may be, or whatever his interests or purposes, he will be under the compulsion to provide programs that will bring pleasure, enlightenment and service to the American public. That compulsion operates today and must continue to operate if we are to retain the American system of radio broadcasting."

His statement assumes new significance today.

As a partial solution, the American Telephone & Telegraph Co. recently announced their plans for establishing a television network connecting all of the more important metropolitan areas of the country. This network will extend from Boston to Miami, Atlanta to Los Angeles, from San Francisco to Chicago to New York, and it is expected that it may be completed by 1950. NBC, which is the pioneer in television station operating and programming, and which is today originating programs for rebroadcast in the Philadelphia and Albany-Schenectady areas, is planning to assume the same role of leadership in television network programming that it now holds in the field of sound broadcasting.

In another approach, some of the film companies are engaged in ex-

tensive study and planning for the filming of special programs for distribution to television stations.

Networks and films alone, however, will probably not be sufficient. Live talent shows of local origin will be desirable if the station is to render proper service to its public. This could impose an economic burden inasmuch as many of the stations will be relatively inexperienced in the technique of television programming and consequently will require considerable rehearsal before obtaining a studio show good enough to put on the air.

There are several ways that this job can be lightened. One way is the extensive use of remote pickups, which are comparatively inexpensive and need little or no rehearsal, until such time as the station is in a position to stage the more elaborate inside studio shows.

Another way to provide good programs without undue cost is by film, the electrical transcription of television. On this basis, many of the stations may start out using field pick-up and film equipment for the majority of their programs. Studio cameras and associated apparatus could then be used for developing studio program techniques, and building special shows, until such time as sufficient experience has been obtained to permit extending the scope of programming operations.

Film equipment for television use was developed by our engineers many years ago. A special projector is necessary in order to provide the "transformation" from the

twenty-four pictures per second which is standard speed for 35 millimeter movie film and the thirty pictures per second standard speed employed in modern television systems. The only other important requirement of television film apparatus is that it reproduce faithfully. This is accomplished by careful design of wide band amplifiers, deflection circuits, and other system components.

Wide Range of Uses

Field pick-up equipment, however, must comply with a wide range of specifications. This becomes obvious from an inspection of its uses—outdoor and indoor sporting events, spot news pickups, on-the-street interviews, important public events, circuses, concerts, as well as telecasts from within the main studio.

This imposes the need for designing the field equipment to be small, light in weight, yet rugged and durable to withstand rough handling; it must be easy to operate and maintain, capable of being put into operation in the shortest possible time, and must operate satisfactorily under a wide variety of climatic conditions. High definition and good stability during operation are essential. Above all, it must have maximum sensitivity to permit use under conditions of low light.

The need for such equipment was recognized early, and in 1937 the first step was taken to develop and

design, for commercial use, a compact transportable television system. The result was the much-famed Type 510A Demonstration Unit which was extensively used at fairs, exhibitions, and demonstrations throughout the country, and also was employed to some extent in a few television stations.

The unit consisted of a control cabinet which was about the size of a 12-inch television receiver and included all of the video control circuits and a monitor. Also provided was an iconoscope-type camera. This demonstration apparatus was not entirely self-sufficient from the standpoint of producing standard television signals and was also fairly large and heavy. It was recognized that in order to provide an equipment that would be suitable for field use, it would be necessary to break the system down into smaller units which could easily be carried.

In 1939, we first started the development and design of such equipment. The cameras were much smaller than any that had ever been previously constructed and used a small version of the iconoscope pick-up tube. The other units comprising the equipment consisted of a master pulse generator, a pulse shaping unit, camera control, master control, and power supplies. Each of the units, with the exception of the cameras, was constructed in suitcase style and was light enough to be easily carried by one man. Equipment of this type was constructed for the National Broad-



[RADIO AGE 21]

RCA PORTABLE TELEVISION EQUIPMENT (LEFT) IS SO LIGHT THAT A ONE-CAMERA UNIT CAN BE EASILY CARRIED IN AN ORDINARY PASSENGER AUTOMOBILE. BELOW—THE FIRST TELEVISION EQUIPMENT DESIGNED FOR OUTDOOR REMOTE PICK-UPS WAS INSTALLED IN TWO LARGE MOTOR VANS.



casting Company and the Don Lee Organization in California. It was put into service in the latter part of 1939.

After sufficient field experience had been obtained, certain limitations were found. In particular, in televising football games, which are an extremely popular source of programs, it was discovered that when the late afternoon shadows fell on the field, the sensitivity of the cameras was not sufficient to produce a good quality picture. The next step in the program, therefore, was to adapt the newly developed orthicon to a field camera. . . . This tube is approximately ten times as sensitive as the iconoscope and greatly extended the scope of field operations.

Requires Small Staff

In 1940 and 1941, orthicon type field equipment was developed and constructed for such organizations as the Bell Telephone Laboratories, Columbia Broadcasting System, National Broadcasting Company, and Don Lee. It proved to be very satisfactory and enjoyed a variety of uses. For example, all of the pick-ups from Madison Square Garden are made with this type of apparatus. It is easily set up and is so designed as to permit operation by a small staff of technicians.

In actual use, the camera control and master control units are grouped with the synchronizing generator at some central control location. It is possible at this location to preview the picture from each of the cameras before switching to the relay transmitter through the master control unit. The cameras are, of course, located on the field of action and can be spaced as much as 500 feet from the central control location.

The relay transmitter and receiver supplied with this apparatus were designed for operation in the 300 megacycle band. They employ directive antenna systems and satisfactory line of sight transmission over ranges up to ten miles has been obtained.

In the cameras, provision was incorporated for using a variety of lens types. During an actual pick-up, it is usual practice to provide one of the cameras with a long focal length lens to permit close-ups

while the other camera is used with a short, or medium, focal length lens in order to cover a wide portion of the field of action. Panning and tilting heads, of course, are standard equipment. View finders are provided in the cameras so that the cameramen not only can follow the action in the field but also can perform optical focusing.

The camera control units contain the deflection generators and amplifiers for the cameras and the wide band high fidelity video amplifier. A 7-inch monitor is included in each camera control unit as is also a 3-inch oscilloscope to permit accurate adjustment of the signal level.

Signals from the various camera control units are connected to the input of the master control. In this unit, synchronizing signal is mixed with video signal and switches are provided for switching the output of any one of the cameras to the outgoing cable. The 7-inch monitor is connected to the outgoing cable and a 5-inch oscilloscope is incorporated to maintain signal level adjustments. The outgoing cable, of course, feeds the relay transmitter.

The synchronizing generator consists of two units—one being the master pulse generator, and the other containing the shaping circuits where the synchronizing pulses, blanking pulses, and deflection pulses are formed.

The receiver, like the rest of the apparatus, has wide band amplifiers so that no loss of definition results. AVC circuits are provided to minimize the effects of signal fluctuation. Generally, the receiver is located in either the main studio or the main station transmitter room. A photograph of this prewar apparatus is shown.

Improvements Planned

When we are again in a position to start the manufacture of television station equipment, there are a number of additional improvements that may be incorporated.

For example, it may be possible to build our new equipment around a more sensitive pick-up tube. It would be possible with this equipment to televise nearly any scene that can be clearly observed by the human eye.

It is likely that the relay trans-

mitter and receiver will operate on higher frequencies and consequently, for the same range of satisfactory transmission, will be considerably smaller and lighter in weight. This will be made possible through the use of extremely directional antenna systems.

It is also expected that the design of the apparatus will be of such form as to permit a more rapid set-up on the field of action. A station wagon or truck can be utilized and the interior arranged so that the control units can be mounted on an operating desk and remain in place during those pick-ups where it is possible to drive the station wagon or truck near to the scene to be televised. This would make necessary the removal of only the cameras from the truck and will materially reduce the set-up time. Provisions could be made for the easy removal of the control and other units so that, when it is not possible to get the truck close to the scene of action, the entire set could be removed in a very short time and placed in operation on the field.

Better Programs Possible

With this type of equipment, the scope of field pick-ups will be greatly extended. Events that previously could not be televised because of equipment limitations, such as low sensitivity, could then be successfully utilized. It would, for example, be possible to use the apparatus in a department store for demonstrating products via television to the public or to customers in other parts of the store. This could be done without resorting to the expensive and powerful lights that are now required for adequate illumination.

Basketball games, hockey, and prize fights could be satisfactorily televised without supplementing the existing lighting systems. Night baseball and football could be used successfully for the first time as television program material. Many other new sources of material would be uncovered.

Such equipment will do much to accelerate the progress of television. It will make possible far better programs at lower costs, and thus will encourage public acceptance of the new service.

"ARTHUR HOPKINS PRESENTS"

NBC Creates New Form of Radio Dramatic Expression in Program Series Under Supervision of Dean of American Theater Producers.

WITH the inauguration of its new dramatic series "Arthur Hopkins Presents", the National Broadcasting Company has added one more page of progress in radio presentation of drama. The new programs, presenting full hour radio versions of great stage plays, with as nearly as possible the original stars, have already in a few short weeks achieved recognition from the public and the press alike.

In planning the series, Clarence L. Menser, NBC Vice-President in Charge of Programs, invited Arthur Hopkins to produce the plays for NBC. It was Menser's feeling that with Hopkins' vast theatre background as the dean of American theatre producers and with the resources of NBC, a new radio dramatic expression could be created. It was Menser's idea to present "theatre radio," not just radio or just theatre.

Hopkins, Menser and Wynn Wright, NBC National Production Director, and director of the series, have made the program different in the sense that it does not seek to

use radio effects for their own sake, but employ them only to aid the drama. The play is the thing always. Music, sound effects and other particular radio creations are integrated into the whole performance so that they do their job, without being separate entities as entertainment.

Not only in its general purpose or the distinguished personnel is this series so significant, but also because of the calibre of the stars and the plays. So far such distinguished artists as Frank Craven, Dorothy Gish, Louis Calhern, Philip Merivale, Katharine Hepburn, Pauline Lord, J. Edward Bromberg, Dudley Digges and Montgomery Clift have appeared on the show, with many more outstanding names to come.

Hopkins Explains Action

In announcing his decision to produce on the air after more than thirty distinguished years in the theatre, Hopkins said:



ARTHUR HOPKINS, DEAN OF AMERICAN THEATER PRODUCERS

"One of the regrettable extravagances of the modern theatre is the shelving of plays once they have been removed from regular presentation. There are many plays of abiding interest that too soon become neglected treasures. Many people would like to hear them again, and an infinitely greater number who have never heard them should not be denied the opportunity. Frequently hastily abbreviated versions of some of these plays have been heard on the radio.

"For the first time, there is now to be a comprehensive program of outstanding plays in full hour performances, carefully prepared so that the original emotional impact and character significance are fully conveyed.

"Wherever possible, actors and actresses originally identified with the plays will be obtained. It is not the plan to discard these plays once they have been presented, but to build up a permanent repertoire to be drawn upon in the future.

"Thus, through the National Broadcasting Company, there is an opportunity simultaneously to create a people's theatre and a repertory theatre, two dreams that have long seemed impossible of fulfillment."

The broadcasts are heard Wednesdays at 11:30 p.m. (EWT).

KATHARINE HEPBURN (BELOW) IS AMONG THE DISTINGUISHED ARTISTS PARTICIPATING IN THE "ARTHUR HOPKINS PRESENTS" SERIES. SHOWN WITH HER ARE WYNN WRIGHT (LEFT), NBC NATIONAL PRODUCTION DIRECTOR, AND CLARENCE L. MENSER, NBC VICE PRESIDENT IN CHARGE OF PROGRAMS.



NBC IN TEACHING PROJECT

Network. In Cooperation with Columbia University, to Offer Comprehensive Series of Courses in Sound and Television Broadcasting Starting Next Fall.

ANOTHER forward step in the field of education has been taken by the National Broadcasting Company with the announcement that starting next Fall the network, in cooperation with University Extension of Columbia University, will offer a comprehensive series of courses in sound and television broadcasting. The joint announcement, made by Dr. Nicholas Murray Butler, president of Columbia University, and Niles Trammell, president of NBC, described the courses as the most comprehensive series ever presented by an institution of higher learning in collaboration with a radio network.

This action follows logically on the heels of the recent agreement between NBC and the New York City Board of Education to present a series of courses aimed at training teachers in the use of radio as a classroom supplement; and at creating an experimental center for training talented high school seniors in radio fundamentals. How neatly these two projects dovetail is seen in the inclusion of the Columbia courses by the Board of Education for teacher credit toward salary increments in its in-service teacher training program.

NBC Supplies 10 Teachers

According to the Columbia plans, twenty-two courses are included in the newly-constituted radio unit and in related fields of study under University Extension. Of these, thirteen are specifically in the new sound and television broadcasting project, and nine are offered in the divisions of physics, electrical engineering and sociology. Eleven of the thirteen courses in the radio unit will be given next September.

The courses will be under the direct supervision of Dr. Russell Potter, director of the Institute of Arts and Sciences at Columbia, and Sterling Fisher, NBC Assistant Public Service Counselor and director of

the NBC Inter-American University of the Air. Class meetings will be held at Columbia University and in studios at the network's Radio City headquarters. Ten of the initial eleven courses will be staffed by teachers selected from NBC's operating personnel.

As in other units of University Extension, prospective students will be required to satisfy the instructors on their qualifications for admission, and the courses may be counted for credit toward one of the University's degrees with the approval of the appropriate dean or director.

Butler Welcomes Opportunity

In announcing the new courses, President Butler declared:

"It is significant that in the arts and techniques of radio, a new channel of communication has been established of no less consequence in its social and educational implications than the invention of the process of printing from movable type. Columbia University welcomes this opportunity of cooperating with a great national network in developing trained leaders in radio."

President Trammell said in the joint announcement:

"By all standards this is one of the most far reaching developments of studies in the field of sound and television broadcasting ever undertaken at an institution of higher learning. The National Broadcasting Company welcomes the opportunity to cooperate with one of the nation's oldest and most distinguished universities in throwing more widely open the doors of education in radio to qualified students and teachers. While this new radio unit is, perhaps, the most comprehensive of its type yet developed, we confidently expect that the courses of studies will be broadened in the future to include many other phases of radio and television

broadcasting, professional and technical.

"This project, along with the plan of studies recently announced by NBC in connection with the New York City Board of Education, immensely widens the area for training talented students and teachers in fields hitherto little explored by them."

Workshop on Campus

In several respects, this new radio unit resembles the work currently done at Chicago, Los Angeles and San Francisco through the NBC Summer Institutes at Northwestern, U.C.L.A. and Stanford Universities. However, it is pointed out that the Columbia project involves the regular session of Columbia rather than the Summer Session.

The Columbia University Radio Club, a low-powered station with a radiation confined to the Columbia University campus, will be used as a workshop for the radio students in several of the courses. Classes may also use the facilities of WEAP-FM, the network's outlet in the New York area.

The following courses, designed under the supervision of Harry M. Ayres, acting director of University Extension, and Dr. James Rowland Angell, NBC Public Service Counselor, will be offered during the 1944-1945 university session:

Introduction to Radio Writing. Three points each session. Instructor is Morton Wisengrad, staff writer, NBC Inter-American University of the Air, and author of "Lands of the Free." Course will give a detailed examination of current theories, techniques and markets in radio writing.

Advanced Radio Writing. Three points each session. Instructor is Wade Arnold, assistant manager of the NBC Script Division. Course is an advanced workshop for those actively interested in professional radio writing as a career.

Radio Publicity and Promotion. Two points, Spring session. Instructor is John McKay, Manager of NBC Press Department. Course offers practical picture of the relationships among publicity department and station, sponsor, program producer and advertising agency.

Speech for Radio. Two points, Winter session. Instructor is Professor Jane Dorsey Zimmerman, Associate in Speech at Teachers College. Course in voice and diction for those who wish to prepare for speaking, reading and acting in radio.

Radio Announcing. Two points, Winter session. Given at NBC. Instructor is Patrick J. Kelly, head of the NBC announcing staff. Course deals with the fundamentals of commercial and sustaining copy for radio, with extensive laboratory work.

Uses of Broadcast and Television Equipment. Two points, Winter session. Given at NBC. Instructor is Ferdinand A. Wankel, NBC Eastern Division Engineer. Lectures and demonstrations explain the use of microphones, transcription turntables and studio control booth equipment.

Sound Effects. Two points, Spring session. Given at NBC. Instructor is Dr. Frederick G. Knopfke, manager of the NBC Sound Effects Division. Course designed to familiarize students with the purpose and use of sound effects, and problems connected with the work of the sound effects technician.

Production of Radio Drama. Three points each session. Instructor is Frank Papp, NBC Production Director of "American Story," "Here's to Youth" and others. A laboratory course in the performance and direction of radio plays.

Advanced Production of Radio Drama. Three points each session. Given at NBC, instructor to be announced. A practical workshop for students who have had previous experience and training in radio acting and producing.

Television Production Problems. Two points, Winter session. Given at NBC. John F. Royal, NBC Vice President in Charge of International Relations, Television and Shortwave. Lectures and demonstrations will familiarize students with production of television programs in the studio, in the field and from films.

Music for Radio. Three points, Winter session. Given at NBC. Series of 15 lectures by members of the NBC Music Division and others. Lecturers include Samuel Chotzinoff, Manager, NBC Music Division; Ernest La Prade, Director of Program Preparation; Thomas H. Relviso, Manager, Music Library; Dr. Frank Black, General Music Director; Morris M. Mamorsky, composer and conductor; Gilbert Chase, of the Inter-American University of the Air; David Hall, Script Division; Arthur Austin, producer of "Music of the New World," and Thomas A. Bennett, Assistant Production Manager in charge of Popular and Variety Shows. Course deals with planning, personnel, talent, conducting, composing, production, writing, musicology and clearance and copyright.

Plans for the future call for additional courses in the fields of script writing and broadcasting for radio and television news services; programming, sales, and classroom utilization.

RCA Workers Donate Blood

War workers in six plants of the RCA Victor Division of Radio Corporation of America have thus far contributed 9,942 pints of blood to the Red Cross since inception of drives conducted on the factories' premises during hours of employment.



DR. FRANK BLACK

MUSIC CRITICS CIRCLE IN SYMPHONY AWARD

*"Jeremiah" Wins First Prize
In Chamber Music Competition
Presented on NBC Program*

COOPERATING with the Music Critics Circle of New York, the National Broadcasting Company—for the second year in a row—provided facilities for the group's annual quest for the outstanding symphonic work introduced in public concert. Also, NBC extended studio and musical assistance which helped make possible the circle's first competition for new chamber music compositions.

The symphonic competition was presented over the network Thursday, May 11, as a special presentation of the NBC Inter-American University of the Air, with Frank Black conducting the NBC Symphony Orchestra in the three works nominated for the selection of "best." The works heard included: Leonard Bernstein's "Symphony No. 1" ("Jeremiah"), William Schuman's "Symphony No. 5 for Strings" and Norman Dello Joio's "Magnificat." At a subsequent meeting, the scroll award went to the Bernstein work.

Nan Merriman, NBC mezzo-so-

prano, was the vocal soloist in the broadcast "rehearing" of the "Jeremiah" symphony which won the prize.

Following the Critics Circle symphonic broadcast in Radio City's Studio 8-II, the NBC Press Department was host to the members of the circle—music reviewers of metropolitan newspapers and several magazines—at a supper party.

Because of limited air time—and the long list of nominated compositions—just one of the candidate selections in the Critics Circle chamber music competition was presented over NBC on May 21. Two string quartets—formed from the ranks of the NBC Symphony—performed the nominated works heard in the Radio City studio.

The broadcast work—Randall Thompson's "Quartet No. 1 in D Minor"—was played by Mischa Mischakoff, first violin; Daniel Guilet, second violin; Carlton Cooley, viola and Benar Heifetz, cello. Non-broadcast compositions heard by the critics in the same studio included "String Quartet in E Minor" by Leroy Robertson—rendered by Joseph Gingold, first violin; Bernard Robbins, second violin; Milton Katims, viola, and Harvey Shapiro, cello—and "Sonata for Piano and Violin" by Aaron Copland. The latter work was presented with Lukas Foss at the keyboard and Mischa Mischakoff handling the bow. Sergeant Andrew Imbrie's "String Quartet," which was "re-heard" by the critics earlier in the day at Station WQXR's studio, performed by the Bennington Quartet, won the year's chamber music award.

A condition of the Critics Circle symphony and chamber music contests was that each nominated work had to be by an American composer and introduced in public concerts during the season just ended. Compositions which had air premieres only were not eligible for awards. However, the radio-introduced works are permitted to be entered in the competition in subsequent seasons when they have New York concert hall renditions.

A vote of thanks was given by the Critics Circle to NBC and the cooperating musicians.



MAJ. GEN. HARRY C. INGLES, CHIEF SIGNAL OFFICER, U. S. ARMY, PRESENTS THE SIGNAL CORPS' "CERTIFICATE OF APPRECIATION" TO WILLIAM A. WINTERBOTTOM (CENTER), VICE PRESIDENT AND GENERAL MANAGER, R. C. A. COMMUNICATIONS, INC., IN THE PRESENCE OF LIEUT. GEN. JAMES G. HARBORD, CHAIRMAN OF THE RCA BOARD OF DIRECTORS.

SIGNAL CORPS HONORS RCAC

Certificate of Appreciation for Outstanding Assistance to Armed Forces Rendered by Company Presented to Winterbottom by Major General Ingles.

DECLARING that it would be impossible to pay for the assistance that has been rendered to the armed forces by R.C.A. Communications, Inc., a service of the Radio Corporation of America, Maj. Gen. Harry C. Ingles, Chief Signal Officer of the United States Army, on June 23 presented to RCAC one of the first Certificate of Appreciation awards of the Signal Corps, as "concrete" evidence of how much the Army appreciates what has been done.

The presentation was made to William A. Winterbottom, Vice President and General Manager of RCAC, at the company's offices, 66 Broad Street, in a brief ceremony attended by Lieut. Gen. James G. Harbord, Chairman of the Board of RCA, and other officials, together with Col. Jay D. B. Lattin and Maj. Wilbur H. Moody, of the 2d Service Command.

"The matter of finding a way of expressing our appreciation to RCA for the immense benefit it has been to all of the Army during this year is something we have been

studying over," General Ingles said "for it is a service and we have a contract for it, and there is the usual money transaction, which does not cover the transaction at all. You can't pay for the service which RCAC has been rendering to the armed forces. Not only has RCAC given freely of facilities but also of personnel."

In replying to the presentation, Mr. Winterbottom said that relationship between the Army Signal Corps and RCAC has always been cordial, cooperative and helpful, because "we are all good communication men, speaking the same language and thoroughly understanding the extreme importance of speedy and accurate communications."

Mr. Winterbottom expressed regret that the President of RCA, Col. David Sarnoff, was unable to attend the ceremony, but remarked that he was certain the duty to which he had been assigned by the Signal Corps in Europe was much more important. Colonel Sarnoff is special consultant to the Communi-

cations Branch, Public Relations Office, Supreme Headquarters of the Allied Expeditionary Force.

In conclusion, Mr. Winterbottom told General Ingles that "the Army Signal Service can always depend upon the men and women of RCA."

Award to Beverage

DR. HAROLD H. BEVERAGE, Associate Director of RCA Laboratories in Charge of Communications Research, on June 28 was presented the United States Army Signal Corps' coveted Certificate of Appreciation in his office at R.C.A. Communications, Inc.

The presentation was made by Colonel Jay D. B. Lattin, Signal Officer of the Second Service Command, representing Major General H. C. Ingles, Chief Signal Officer of the U. S. Army Signal Forces.

As stated in a letter of citation received by Dr. Beverage from Major General Ingles, the award was in recognition of Dr. Beverage's "tireless effort and valuable advice during the installation of a radio circuit in the North Atlantic route" which "constituted a great contribution to the Signal Corps in its gigantic task of furnishing the United States Army the world's greatest communication system."



DR. H. H. BEVERAGE RECEIVES "CERTIFICATE OF APPRECIATION" FROM COL. JAY D. B. LATTIN.

WINTERBOTTOM MARKS 30th YEAR WITH RCA

*Toss of Coin in 1903 Led
Vice President, General Manager
of RCAC Into Radio.*

AFATEFUL toss of a coin resulted in William A. Winterbottom's leaving his native Liverpool to come to New York in 1903 as a cable operator and later joining the Marconi Wireless Telegraph Company as a stepping stone to his present position as the Vice President, General Manager and a Director of R.C.A. Communications, Inc.

Mr. Winterbottom, who today administers 52 international radio circuits for the public and other services for the Government, was presented a 30-Year Diamond Service Emblem on June 1, 1944, 30 years to the day after he sat down at his desk in the Woolworth Building as Commercial Manager of the Marconi Company. Presentation of the emblem was made by a fellow director, Colonel Manton Davis on

behalf of RCAC employees.

Mr. Winterbottom first heard the call of wireless in 1902 while he was a junior operator in the British Post Office at Manchester. He took a half day off and went to the first commercial radio installation—a ship-to-shore station in the north of England. After proving his ability to hold down an operator's job, he declined an offer to go to work, although he had great faith in wireless, and instead sought out the local cable companies' offices in Liverpool. He stood in the doorway between two windows; one read "Western Union" and the other "Commercial Cables". He tossed a coin. Commercial Cables won.

This company sent him to New York and the following eleven years he worked successfully as cable operator, Branch Manager, Solicitor and Director of Traffic Production. Meanwhile he followed the development of wireless. He built and operated his own station before the days of Government licenses. Deciding that the future of communications was in the newer art of wireless, he quit the North Atlantic cable service and went to work on

June 1, 1911 for Edward J. Nally, then Marconi Company's General Manager, who five years later became RCA's first president. Contract Manager for the Marconi Company at that time was Colonel David Sarnoff, RCA president now on active duty overseas.

In 1919, Mr. Winterbottom was appointed Traffic Manager, and when the newly formed RCA took over the Marconi Company properties, he continued in the same office. RCAC was organized as a communication subsidiary in 1929 and he was elected Vice President in charge of communications. He has been Vice President and General Manager since 1930 and a Director since 1932. He has travelled widely in the negotiation of traffic agreements.

Born on May 31, 1884 at Liverpool, England, Mr. Winterbottom became interested in electricity as a boy and was only 16 when he entered telegraphy.

Today he lives at Bayside, L. I. His hobbies are woodworking, growing rare orchids, photography and, until the war, sailing his 48-foot cruiser the "Randa."

CONVENTION FILMS TELEVISED

*NBC Station WNBT Begins Historic Coverage of Chicago Political Meetings
with Week-Long Presentation of Motion Pictures of Republican Sessions.*

WWNBTV, National Broadcasting Company's television station in New York on the night of June 26 began its historic video coverage of the Chicago political conventions. The coverage continued all week until the gavel fell announcing the adjournment of the Republican meeting; it will pick up again with the Democratic meeting in the same city.

Preceding the telecasting of special motion pictures which were shot by four crews in the Chicago Stadium on opening day was the premiere of "The Republican Party on Parade." This reel traced the history of the Republican Party, its conventions and its candidates from 1860 to the present. It began with sketches by Thomas Nast,

dean of American political cartoonists, who created the elephant as the symbol of Republicanism.

Following a quick sight-seeing "tour" through Chicago, the picture moved on to the personalities of the G.O.P. The Republican conventions of 1932, 1936 and 1940 were traced.

The shots taken on June 26 and televised on arrival in New York included the call to order of the convention, the singing of the "Star Spangled Banner," the invocation, Governor Dwight H. Green's welcoming address, close-ups of practically all State delegations, the press section of 400 news men and women, and all the color which surrounds these meetings.

WNBT, located on the Empire

State tower in New York, acted as the basic transmitter feeding WPTZ, Philadelphia, by a radio relay link in South Jersey, and WRGB, Schenectady, which also serves Albany, by direct signal into that transmitter, 129 miles away.

In the Chicago Stadium, a battery of film cameras ground away alongside numerous news reel crews, recording the many-faceted scenes for the television audiences in the four eastern cities. Supplying these large and important areas with this visual service would be considered a progressive step in itself, but with Gov. Dewey of New York an outstanding presidential possibility, NBC's pioneering move becomes of far greater importance.

Express planes shuttled the exposed reels of convention films from the Chicago airport to LaGuardia Field in New York.

Buy War Bonds

50,000 PRODUCTION IDEAS

RCA Victor and Radiomarine Employees Strike Heavy Blow at Nation's Enemies Through the Adoption of 35% of Suggestions for Improvements.

RCA employees, using their natural ability and ingenuity to figure out ways to do their jobs better and easier, and save valuable production time and materials, are setting a high standard of "thinking for Victory" for the war plants throughout the nation.

More than 50,000 production ideas—averaging at least one for each member of the RCA family composed of 41,000 men and women—have been dropped into suggestion boxes since Pearl Harbor was smashed in the sneak Japanese attack on December 7, 1941.

High National Ranking

That these suggestions dropped into the special boxes provided at the various plants have had an effect as deadly as bombs dropped upon the Axis by Allied war planes is indicated by the fact that a single RCA plant—RCA Victor Division at Harrison, New Jersey—stands fourth among more than 4,000 war plants and shipyards in the entire country in point of total national honors conferred by the War Production Board to labor-management committees sponsoring suggestion systems.

Keyed up by the long-heralded invasion, labor-management committees at Harrison and Camden launched special pre-invasion suggestion drives in May, while a month earlier President Charles J. Pannill announced the Radiomarine Corporation of America Suggestion Plan, which in its first two weeks stimulated 568 suggestions, of which eighty-two were granted prizes.

D-Day, which electrified the world on June 6, was an appropriate occasion for announcement of results of the 15-day pre-invasion suggestion drive staged under labor-management committee auspices, May 16-31, at RCA Victor Division, Camden. In this fruitful "Suggest for Victory Campaign,"

3,255 suggestions were jammed into the suggestion boxes, representing an average of 200 a day to add to Axis woes.

Donald M. Nelson, Chairman of the War Production Board, told Harrison workers that their production ideas "have helped make invasion possible," in a telegram recently received by Chairman Joseph N. Mayer and Vice Chairman W. L. Van Keuren of the plant's War Production Drive Committee, representing employees and management respectively.

Aptly titled "Suggestion Armada", Harrison's pre-invasion drive commenced May 29 and closed June 10. By the time General Eisenhower's record invasion armada got under way across the English Channel, Harrison's "Suggestion Armada" had enlisted 300 ideas. The final total for the two weeks was 871.

Because every outstanding employee idea adopted at Harrison is automatically forwarded to Washington by the War Production Drive Committee and the suggestion sub-committee, headed by Miss Mildred Parks, Harrison has long been identified among the leading committees of the nation for quantity and quality of production suggestions.

Evaluated by Experts

Ideas submitted to War Production Drive Headquarters in Washington are regularly evaluated for WPB honors by distinguished technical experts comprising WPB's Board for Individual Awards. Highest honor attainable by a war worker is the Citation for Production Ideas, rarely given. Highly coveted are the Certificate for Production Ideas and the Honorable Mention.

These three categories of national honors have been bestowed by WPB for approximately two years. RCA Victor Division, Har-

ison, has received a total of 75 national awards, including 13 Certificates and 62 Honorable Mentions, as of July 1, 1944.

RCA Victor Division, Camden, leads all RCA manufacturing plants, however, both for total ideas submitted and percentage adopted since Pearl Harbor through April, 1944. Camden employees have responded to the call of their War Production Drive Committee with an avalanche of 24,334 suggestions, of which 10,617, representing 43.6 per cent, have been adopted, thereby accelerating and improving tremendously the output of RCA equipment for the armed forces of the United States and our Allies.

Plant Totals Listed

The following table eloquently tells the story of RCA "thinking for Victory" from Pearl Harbor until last May 1:

Plant	Number of Suggestions	Number Adopted	Percentage Adopted
Bloomington	4,924	710	14.4
Camden	24,334	10,617	43.6
Harrison	9,926	3,485	35.1
Hollywood	213	84	39.4
Indianapolis	6,329	1,423	22.5
Lancaster	2,223	569	25.6
Total	47,949	16,888	35.2

On two occasions in Washington, the spotlight has been focused upon RCA employees especially invited to the Nation's Capitol to receive signal honors for ideas.

Radiomarine, latest RCA company to install a suggestion system, in awarding eighty-two prizes for the best of 568 suggestions submitted for its opening two-week period, gave two top prizes of \$25 each to James Dooley of the Machine Shop and Harold L. Grant of Shop No. 2. Ernest J. Patane, Personnel Chairman, is the Suggestion Committee Chairman. Widespread in scope, contributions received to date include ideas affecting improvements in efficiency and production, safety and benefits to health, and cures for tardiness and absenteeism.

Buy War Bonds

HARBORD IS CONFIDENT OF INVASIONS OUTCOME

RCA Board Chairman, A.E.F. Chief of Staff in World War I, Outlines Difficulties of Landing Forces.

WHEN the great invasions of Europe get under way, Americans can be confident of the ultimate results, Lieut. Gen. J. G. Harbord, Chairman of the Board of the Radio Corporation of America, told members of the Historical Society of Pennsylvania meeting in Philadelphia on May 19, but he warned that "we will do our fighting men an injustice if we overlook the tremendous difficulties involved and expect an overnight miracle."

General Harbord, who served as Chief of Staff of the American Expeditionary Forces in France in the last war, cited what he described as a "hypothetical invasion" by an army of 250,000 men to bring out the multiple problems of establishing a foothold on enemy-held soil. He said that for a force of that size more than 1,750,000 tons of equipment would have to be landed with the invaders, and at least 250,000 additional tons of supplies would have to be landed each month, to say nothing of replacements in men and materiel.

"Suppose the leader of the inva-

sion encountered no special problem because of enemy air attacks or enemy submarine attacks," General Harbord declared, "he would still have enough regular and routine problems. When supplies come ashore, warehouse space and storage space must be found for them. He would need 2,000,000 square feet of open storage space and some 1,750,000 square feet of covered storage space. He would need to arrange for the arrival of more than 30 cargo ships a month and their unloading.

Problem of Supply

"If the invasion leader intended to push the enemy back—and make the invasion more than a mere landing—he would have to discover what rail facilities were available for taking his supplies forward, what their capacity was, the state of the rolling stock and the roadbed, what the census of the motor truck pool was, how many trained men would be available to keep the railroads functioning and the trucks running."

These are only part of the task, according to General Harbord, who commanded the 2nd Division during the battles of July, 1918, in the great Soissons offensive. He related how, in addition to the supply problem, there are always the fundamental problems of strategy and tactics, involving skillful use of

sea and air power, landing forces and reserves.

"Theories, as well as men, perish by the sword," the general declared. "What is important is to make certain that we are armed against the chances and changes and accidents of war. The commander who brings 250,000 men to solid footing on a hostile shore is at the end of one chain of chances, changes and accidents. We must remember that he is only at the beginning of another chain of chances, changes, and possible accidents."

Aside from the problem of defeating the enemy and throwing him back, a multitude of problems arise the moment an invasion starts, General Harbord continued. In Sicily, for example, the Allied Forces took on, simultaneously with the task of expelling the enemy forces from the island, the job of restoring the life of the civil population to as nearly normal as possible. Other problems run the gamut, he said, from caring for the wounded, fighting disease and maintaining morale, to mastering new topography, bridging rivers and repairing enemy demolitions.

In the opinion of General Harbord, the American soldier faces these obstacles armed not only with the finest equipment but with an ingenuity typical of those who have fought successfully before for freedom and democracy.



Lancaster Wins "E"

On April 24, the Army-Navy "E" Award for Production Achievement was presented to the workers of the RCA Victor Division's plant at Lancaster, Penn. The "E" flag and pins, emblematic of the award, were presented respectively by Brig. Gen. John H. Gardner, U. S. Army, and Capt. L. B. Blaylock, U. S. Navy. Holding the flag in the picture at left are, left to right, J. A. King, Lancaster Plant Manager; Captain Blaylock, Brigadier General Gardner, and Walter L. Kohr, President of Local B1165, I. B. E. W. Lancaster is the fourth plant of the RCA Victor Division to receive the coveted "E" award, the others being Camden, Harrison, and Indianapolis.



LIEUT. GEN. JAMES G. HARBORD, CHAIRMAN OF THE RCA BOARD OF DIRECTORS, PRESIDES AT THE ANNUAL MEETING OF STOCKHOLDERS. IN THE BACKGROUND ARE THE SIX ARMY-NAVY "E" FLAGS, THE VICTORY FLEET FLAG, AND THE "M" PENNANT WON BY VARIOUS UNITS OF RCA FOR OUTSTANDING ACHIEVEMENT IN THE WAR EFFORT.

RCA STOCKHOLDERS MEET

Company Has Developed for the Armed Forces More than 150 New Electron Tubes, 300 Types of Apparatus Not Manufactured Before, Harbord Reports.

THE Radio Corporation of America has developed for the armed forces more than 150 new electron tubes and approximately 300 types of apparatus not manufactured by any one before the war. Lieut. Gen. J. G. Harbord, Chairman of the Board of RCA, disclosed May 2 at the 25th annual meeting of RCA stockholders in a studio of the National Broadcasting Company in New York. He reported that unfilled orders for RCA products form a backlog of approximately \$300,000,000.

General Harbord, speaking for the Directors in the absence of Colonel David Sarnoff, President of RCA, who is overseas on active duty with the Army of the United States, announced a gain in volume of production of the Company in the first quarter of 1944, but revealed that net profit, after Federal Income taxes, was \$2,401,000—a decrease of \$191,000, or 7.5 per cent, compared with the same period last year.

Consolidated gross income of RCA during the first quarter of 1944, was reported to be \$78,809,000

compared with \$67,284,000 in the first quarter of last year, an increase of \$11,525,000 or 17 per cent. Net profit before taxes amounted to \$10,413,000, 16.5 per cent above the same period in 1943.

General Harbord said Federal Income taxes amounting to \$8,012,000 are provided for in the first quarter of this year. This represents an increase in taxes of \$1,671,000 or 26.3 per cent over the first quarter in 1943.

Earnings for First Quarter

Earnings per Common share of stock before estimated Federal Income taxes for the first quarter in 1944 were 69.3 cents, while earnings per Common share after the taxes were 11.6 cents a share. Estimated Federal Income taxes were 57.7 cents per share. A year ago the first quarter earnings per Common share before Federal Income taxes were 58.6 cents per share, the taxes 45.7 cents per share, and after taxes were 12.9 cents per share.

Recalling to stockholders that

RCA's production of vital radio, sound, and electronic equipment for the armed forces and the United Nations in 1943 exceeded by more than 100 per cent that of 1942. General Harbord declared:

"Victory, while surely ahead, is not yet in sight. We, too, must be untiring in our efforts to defeat the enemy. It is for us to do our utmost on the production line, on the invisible lines of communications and on the home front—to work as never before to support the valiant efforts of our fighting men."

General Harbord said that RCA's scientists and those of other laboratories are given primary credit for decisive victory over the U-boats, and expressed the belief that "this epic of the sea and the triumph of science will be one of the great stories" for future generations. He remarked that while it now is possible only to mention the "magic term radar", radio is achieving "almost unbelievable" results in navigation and collision prevention and peacetime application of radar will contribute to the safety of all kinds of travel.

"In attaining our excellent record of wartime production and communication services," General Harbord asserted, "both management and workers have cooperated harmoniously and with constantly increasing efficiency. Labor-Management War Production Drive Committees, sponsored by the government, have been successful in operation."

The production achievements of RCA, it was pointed out, have been recognized by the government in the award to RCA plants and Laboratories of six Army-Navy "E" flags, and eight stars, each representing an additional six months of continued excellence in accomplishment. These flags were on display at the meeting.

Further recognition of the skill and industry of RCA war workers has been evidenced by many individual awards from the War Production Board for suggestions that have aided production, and many commendatory letters and messages have been received from Government officials and leaders of the Army, Navy and Air Forces.

The magnitude of the production task, it was stressed, "is only realized when we consider the tremendous demands of war in equipping an Army of more than 7,000,000 men, a great two-ocean Navy, and an ever-expanding Air Corps of thousands of planes." There has been a demand on the radio industry for "millions" of electron tubes of all sizes, and great numbers of transmitters, receivers, antennas and other vital instruments and equipment.

"RCA has handled a vast amount of research and engineering for the armed forces," General Harbord reported. "This fact is illustrated by the number of new devices—including more than 150 new electron tubes and approximately 300 different types of apparatus—built since the beginning of the war but not previously manufactured by any one."

Refunds to Government

Military secrecy prohibits disclosure of the nature of these devices.

He declared that RCA was proud of the opportunity to share with American industry the gigantic undertaking of supplying the fighting fronts. Volume of products and services of RCA manufacturing plants was revealed to have increased to \$222,000,000 in 1943, or 73 per cent over 1942, and unfilled orders total a backlog of approximately \$300,000,000, he reported.

"It is the basic policy of the Company in its war effort," he added, "to reduce the prices of manufactured equipment as fast as designs are final and lower costs in manufacturing are possible. As a result, voluntary price reductions and refunds to the Government apart from renegotiation proceedings, totaled upwards of \$22,000,000 in 1943."

In the field of broadcasting, General Harbord told the stockholders, the "war needs of the Nation and the public interest are our guiding factors in our activities." He recalled that within the last two months the National Broadcasting Company has announced its policy regarding the future of television and FM, recognizing television as

the capstone of the radio structure. He said NBC proposes to "contribute the utmost to the earliest possible development of television as a national service and industry."

In order to establish anchor points of a television system NBC has filed applications with the Federal Communications Commission for construction permits for stations in Cleveland, Chicago, Denver, San Francisco, and Los Angeles, it was reported. NBC plans to operate these stations as it now does WNBT, its pioneer television station in New York. Applications have been filed for permits for FM stations in cities where the network maintains studios.

Describing RCA's world-wide circuits as "vital arteries of communication," General Harbord disclosed that RCA's automatic transmitters and receivers now are able to handle 650 words a minute compared with the rate of 30 to 40 words a minute handled by wireless during World War I. With the cooperation of the War Department, RCA has built and is operating in Italy the first all-American commercial radio station on the Continent of Europe.

Marine radio activities, conducted by the Radiomarine Corporation of America, since the outbreak of the war have been devoted to the design, production, installation and servicing of marine radio apparatus for the armed services, the Maritime Commission and the War Shipping Administration, General Harbord reported.

New Products Planned

In conclusion, General Harbord said:

"Alert to its post-war responsibilities and opportunities, RCA looks ahead without slackening its effort to win the war. National conversion to peace will be a stupendous task. It cannot be accomplished overnight. Therefore, it must be planned with foresight for the benefit of the Nation, the American economic system, and the maintenance of employment. New products, new efficiencies in production and in merchandising are being planned by RCA. We are determined to do our utmost to keep

America in the forefront of industrial progress and particularly in the art of radio and television.

"When this conflict is over, much of the radio we knew at the time of Pearl Harbor will be old and obsolete. The trumpets which signal 'Cease Firing' at the end of this war will sound the reveille for the Age of Television.

"Our Corporation will answer the epoch-making challenges of peace with efficiency and speed. RCA research and pioneering—the spearheads of progress—will open the future to new inventions and services for the benefit of a better world."

Laboratories Win Star

In recognition of continued achievement and meritorious service in the United States war effort, a second star has been added to the Army-Navy "E" Flag won in 1943 by RCA Laboratories, Princeton, N. J., a letter from the Navy Department announced June 21.

Writing to O. S. Schairer, Vice President in Charge of RCA Laboratories, Admiral C. C. Bloch, USN (Ret.), Chairman of the Navy Board for Production Awards, said: "The men and women of your plant have continued to maintain the high standard they set for themselves when they were originally awarded the Army-Navy 'E'. They may well be proud of their achievement."

The new star represents six months of continued achievement and is the symbol of appreciation of the armed forces. RCA Laboratories—one of the world's foremost centers of radio and electronic research—received the first star on January 15, six months after winning the flag.

Retailers See Television

A practical demonstration of the possibilities of postwar television in the field of retail store merchandising was staged May 25 in Radio City by NBC and RCA for 22 representatives of retail organizations comprising the Associated Merchandising Corporation.

NBC RECORDING STUDIO PRODUCES ARMY SERIES

*Urgent Needs for Fighting Men,
Wacs and Nurses Described in
Recruiting Service Programs.*

U. S. ARMY paratroopers land behind Jap lines in Burma! Engineers construct new airfields on recaptured Dutch New Guinea! Over Europe our Army Air Corps men deal death and destruction to the enemy! Within earshot of Nazi artillery on the Italian front Army nurses and doctors mend the wounded and save American soldiers' lives a thousand times a day! At Army installations here at home and abroad Wacs are performing 239 vital Army jobs!

Transcribed Radio Series

On the surface all of these may seem remote from an NBC recording studio in New York's gigantic RCA Building but many of the men and women in the Army are on their victory-winning assignments as a direct result of the work that goes on in NBC Studio 9B every other Saturday afternoon. On these alternate Saturdays, the Army produces the "Voice of the Army," an official transcribed radio series devoted to recruitment of Army personnel for all branches of the service. Through this program, the U. S. Army Recruiting Service has obtained thousands of additional men and women needed to bring about a speedy victory. The "Voice of the Army" has made it possible for the War Department to notify millions of radio listeners, in the shortest possible time, of its urgent needs for fighting men, Wacs and nurses.

The program, now in its 198th week of continuous presentation, is prepared and produced under the supervision of the Recruiting Publicity Bureau, U. S. Army, headed by Col. LeRoy W. Yarborough.

"Voice of the Army" transcriptions are manufactured and distributed by RCA's Camden, New Jersey, plant. Every two weeks, the double-faced disks are shipped to 800 radio stations throughout the United States. The program is

heard locally outside our continental limits in Alaska, Puerto Rico, and Hawaii.

Presentations are based on the Army's current personnel needs as they arise from time to time. In the past, when there were calls for paratroopers, engineers, and aviation cadets, the program devoted many in its series of dramas to these Army components. Because of the Army's present requirements for more Nurses and Wacs, current programs deal mainly with the Army Nurse Corps and the Women's Army Corps.

All "Voice of the Army" programs are produced under the supervision of Major North Callahan, executive officer of the Recruiting Publicity Bureau. Earle McGill, radio veteran, is director.

The musical signature of the show is a rousing song titled the "Voice of the Army", composed by Major Callahan and Norman Cloutier, NBC composer and conductor. Recently, the War Department adopted the tune as the official song of the U. S. Army Recruiting Service.

BEAL SEES TELEVISION AS TOOL OF INDUSTRY

*Tells Detroit Engineering Society
of Potential Applications of New
Service to Manufacturing.*

DISCLOSURE of potentialities of television as a new and effective aid to industry after the war enlivened a meeting in Detroit on April 21 at which Ralph R. Beal, Assistant to the Vice President in Charge of RCA Laboratories, told members of the Engineering Society of Detroit of the imminent expansion of this promising art and science.

Declaring it "indeed appropriate" to make his revelations in "one of the world's most forward-looking and busiest industrial communities," Mr. Beal envisaged television as the coming "eyes" of factories, the "means of coordinating activities in giant manufacturing plants, such as those in Detroit, and the means also of peering into places and situations that might be inac-

cessible or extremely hazardous to man."

Mr. Beal said that those like himself who are close to television foresee the day after fighting ceases when this type of television application may be in wide use.

"We know now," the research engineer declared, "how it can be used to extend the eyesight of the plant manager to critical operations that ordinarily would require much time and effort to reach for personal inspection or which might even be inaccessible — how television can aid immeasurably in plant control.

Assembly Line View

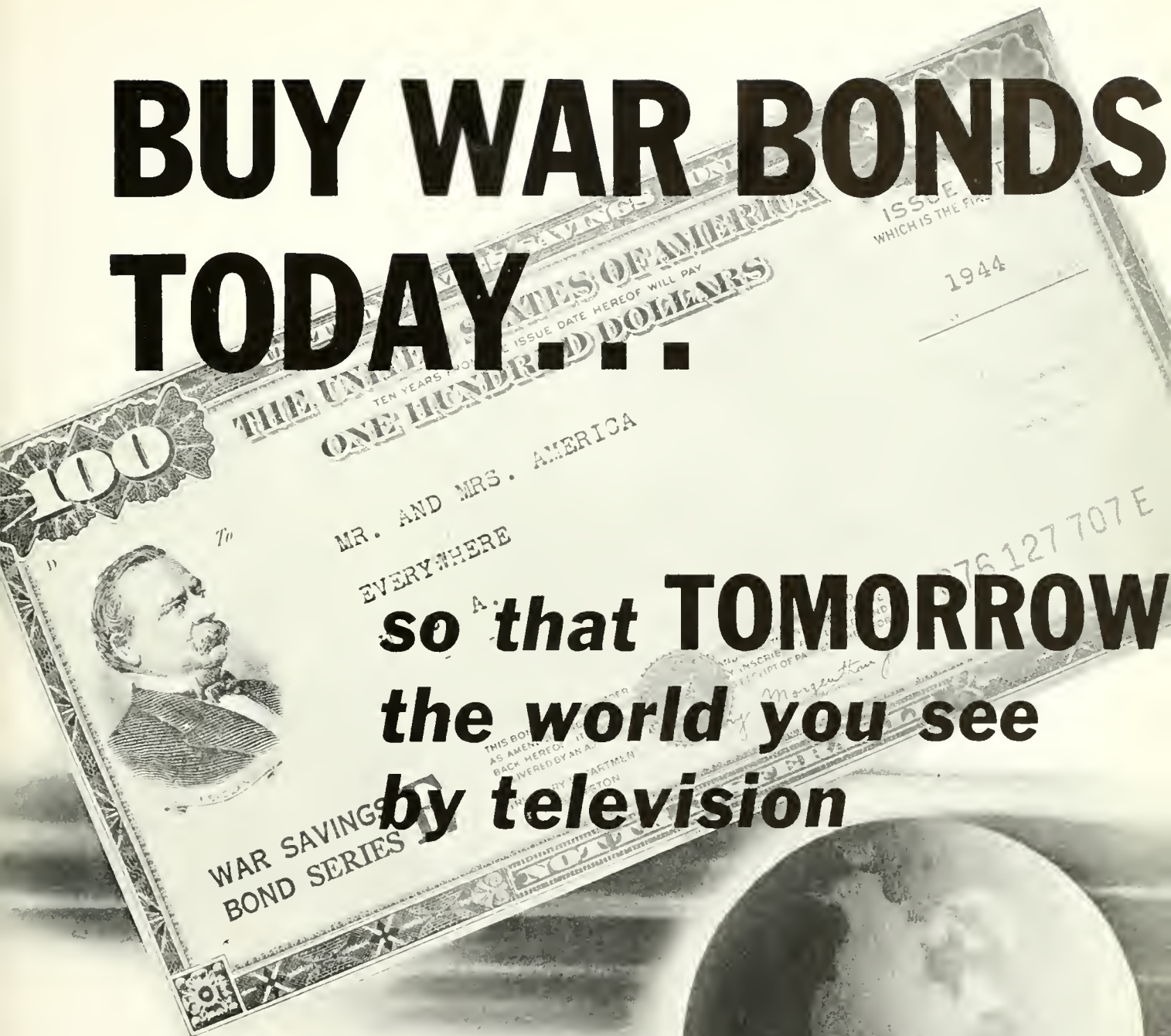
"Television cameras at strategic points can be connected by wire to receivers where production experts, foremen and supervisors can follow the flow of fabricated or raw materials and watch the progress of the work. Such setups will be particularly valuable in mass production assembly lines, and they may be extended to include loading platforms and shipping rooms."

According to Mr. Beal, television cameras may be used in connection with chemical reaction chambers, making visible to the operator without personal risk the chain of events occurring in complicated chemical production units, and thus enable him to control the process with optimum results. He said specially-built cameras may be used in furnaces to observe steps in the formation of alloys, and others may solve vital problems of analysis in important industrial processes.

"In addition," Mr. Beal declared, "television equipment may facilitate port movements of ships. The cameras located fore and aft, and on port and starboard sides of vessels, could lessen the hazards of docking and insure safety in crowded shipping lanes.

"We likewise foresee the use of television in metropolitan traffic control and along congested motor routes. Cameras may be installed permanently at busy inter-sections to flash to traffic headquarters running, up-to-the-minute picture accounts that should greatly aid traffic experts in easing congestion."

BUY WAR BONDS TODAY...



so that **TOMORROW**
the world you see
by television

will be **FREE!**

RADIO CORPORATION OF AMERICA
30 ROCKEFELLER PLAZA • NEW YORK 20, N. Y.

RCA
RADIOGRAM
R.C.A. COMMUNICATIONS, INC.
A RADIO CORPORATION OF AMERICA SERVICE
TO ALL THE WORLD — "The RCA" subject to the conditions, regulations and rates as set forth in the applicable tariff of R.C.A. Communications, Inc., and as file with the regulatory authorities.

DIRECT
TO MEMBERS OF OVERSEAS FORCES ONLY

Send the following Radiogram "The RCA" subject to the conditions, regulations and rates as set forth in the applicable tariff of R.C.A. Communications, Inc., and as file with the regulatory authorities.

To EFM _____

Test Numbers Desired _____

(Signed) _____

E. F. M. SERVICE
Sender may select at many as three of the numbered texts shown on reverse side for transmission abroad.

CHARGE
40 Cents

Informations necessary in address:
1. Name, full name, rank or number, APN number or code address.
2. Post office, rank or rating, UICG or code address.
3. Name, number or code address.
4. Full name, rank or rating, UICG or code address, name number or code address.
5. Name, full name, rank or rating, UICG or code address.
6. Name, full name, rank or rating, UICG or code address.
7. Name, full name, rank or rating, UICG or code address.
8. Name, full name, rank or rating, UICG or code address.
9. Name, full name, rank or rating, UICG or code address.
10. Name, full name, rank or rating, UICG or code address.
11. Name, full name, rank or rating, UICG or code address.
12. Name, full name, rank or rating, UICG or code address.
13. Name, full name, rank or rating, UICG or code address.
14. Name, full name, rank or rating, UICG or code address.
15. Name, full name, rank or rating, UICG or code address.

Special Low Rate Messages . . . TO OUR FIGHTING FORCES

- STANDARD NUMBERED TEXTS FOR EXPEDITIOUS FORCE MESSAGES**
- CORRESPONDENCE**
- 1 Letter received. Many thanks.
 - 2 Letters received. Many thanks.
 - 3 Telegram received. Many thanks.
 - 4 Parcel received. Many thanks.
 - 5 Letters and parcels received. Many thanks.
 - 6 Letter and telegram received. Many thanks.
 - 7 Telegram and parcel received. Many thanks.
 - 8 Letters sent.
 - 9 Parcels sent.
 - 10 Letters and parcels sent.
 - 11 Many thanks for letter.
 - 12 Many thanks for parcel.
 - 13 Many thanks for telegram.
 - 14 No news of you for some time.
 - 15 Writing.
 - 16 Urgent.
 - 17 Please write or telegraph.
 - 18 Please write.
 - 19 Please telegraph.
 - 20 Please reply. Worried.
- GREETINGS**
- 26 Greetings.
 - 27 Loving greetings.
 - 28 Fondest greetings.
 - 29 Love.
 - 30 Darling.
 - 31 All my love.
 - 32 All my love dearest.
 - 33 All our love.
 - 34 Fondest love.
 - 35 Fondest love darling.
- 36 Best wishes.**
- 37 Greetings from us all.**
- 38 Loving greetings from all of us.**
- 39 Best wishes from all of us.**
- 40 Fondest wishes from all of us.**
- 41 Best wishes and good health.**
- 42 Kisses.**
- 43 Love and kisses.**
- 44 Fondest love and kisses.**
- 45 Well.**
- 46 All well at home.**
- 47 Best wishes for Christmas.**
- 48 Best wishes for Christmas and New Year.**
- 49 Loving wishes for Christmas.**
- 50 Loving wishes for Christmas and New Year.**
- 51 Loving Christmas thoughts.**
- 52 Happy Christmas.**
- 53 Happy Christmas and New Year.**
- 54 Good luck.**
- 55 Keep smiling.**
- 56 My thoughts are with you.**
- 57 Many happy returns.**
- 58 Birthday greetings.**
- 59 Loving birthday greetings.**
- 60 Happy anniversary.**
- 61 You are more than ever in my thoughts at this time.**
- 62 Best wishes for a speedy return.**
- 63 Good show. Keep it up.**
- 64 Best wishes for New Year.**
- 157 My love and Greetings on Mother's Day.**
- 158 My love and Greetings on Father's Day.**
- HEALTH**
- 68 Family all well.
 - 69 All well. Children evacuated.
 - 70 All well. Children returned home.
 - 71 All well and safe.
 - 72 Are you all right?
 - 73 Are you all right? Worried about you.
 - 74 Please don't worry.
 - 75 Hope you are improving.
 - 76 Please telegraph that you are well.
 - 77 Are you ill?
 - 78 Have you been ill?
 - 79 Illness is not serious.
 - 80 Illness is serious.
 - 81 I have left hospital.
 - 82 In bad health.
 - 83 Health improving.
 - 84 Health fully restored.
 - 85 Son born.
 - 86 Daughter born.
- PROMOTION**
- 91 Congratulations on your promotion.
 - 92 Very pleased to hear of your promotion.
 - 93 Delighted hear about your promotion.
- MONEY**
- 98 Please send me _____ dollars.
 - 99 Please send me _____ pounds.
 - 100 Have sent you _____ dollars.
 - 101 Have sent you _____ pounds.
- NOTE:** The actual amount in words to be inserted and transmitted immediately following the text number.
- CONGRATULATIONS**
- 115 Congratulations on anniversary. Best wishes.
 - 116 Congratulations. Lasting happiness to you both.
 - 117 Glad and proud to hear of your decoration. Every-body thrilled.
 - 118 Loving greetings and congratulations.
 - 119 Good luck. Keep it up.
 - 120 I wish we were together on this special occasion. All my best wishes for a speedy reunion.
- MISCELLANEOUS**
- 135 Very happy to hear from you dearest. Am fit and well.
 - 136 Hearing your voice on the wireless gave me a wonderful thrill.