RADIO AGE

RESEARCH · MANUFACTURING · COMMUNICATIONS · BROADCASTING

RCA

JULY

1945

THE NEW YORK CITY SYMPHONY CONCERTS DIRECTED BY LEOPOLD STOKOWSKI

★ While New Yorkers gathered at City Center to hear *Symphonies at Six*, other music lovers far away from Manhattan heard those brilliant concerts in their homes. NBC, through the facilities of its great New York station WEAF, was the only network to broadcast the winter season's Tuesday programs.

The New York City Symphony and its renowned conductor, Leopold Stokowski, increased NBC's contribution to fine music—added their talents to those of orchestras such as the Chicago, Baltimore, Indianapolis, Kansas City, Eastman School, and NBC Symphonies; men such as Defauw, Stewart, Sevitzky, Kurtz, Hanson, Ormandy, Black, Sargent and Toscanini.

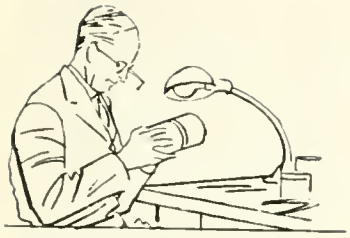
NBC pays tribute to all of these—and NBC honors the New York City Symphony for its cultural achievement in bringing great music to a great audience—not only in New York, but in the homes of those who make NBC *The Network Most People Listen to Most.*

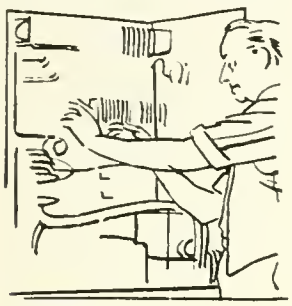
National Broadcasting Company

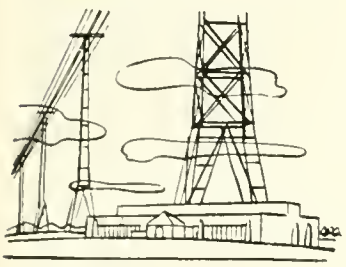
America's No. 1 Network

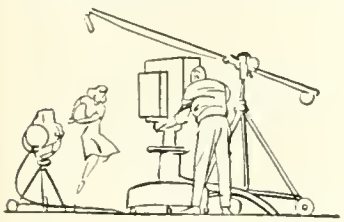
1945—RADIO'S 25th ANNIVERSARY—PLEDGED TO VICTORY!

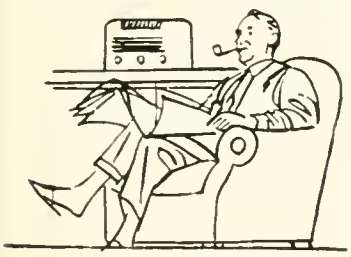
A Service of Radio Corporation of America











COVER — The Stars and Stripes and signal flags flutter from halyards against a background of radio antennas, blinkers and other forms of marine communications.

—U. S. Navy Photo.

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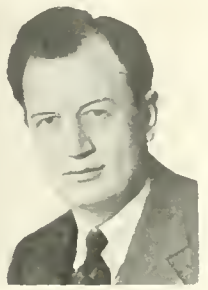
Radio Age, published quarterly by the Department of Information of the Radio Corporation of America, RCA Building, New York, N. Y., for the RCA services: RCA Laboratories, RCA Victor Division, RCA Communications, Inc., Radiomarine Corporation of America, National Broadcasting Company, Inc., RCA Institutes,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

WITH THE NEW YORK BLACKOUT ENDED, THE HUGE RCA SIGN ATOP RADIO CITY SHINES AGAIN, AFTER BEING "OFF THE AIR" SINCE DECEMBER 11, 1941.

Television Dollars and Sense

CONTRARY TO GENERAL IMPRESSION, BROADCASTERS CAN INSTALL AND OPERATE A BASIC VIDEO UNIT ON A SMALL INVESTMENT, TO BE INCREASED LATER, ENGINEER REVEALS



By Philip Merryman

Director, Facilities Development and Research, National Broadcasting Company.

AT the beginning, I want to make it clear that I have no "prevision" on television. I have looked at the facts—learned by experience while developing sound broadcasting—and I have examined most of the evidence available, good and bad, concerning the problems we expect to meet in television. From these explorations I have drawn the conclusions that follow.

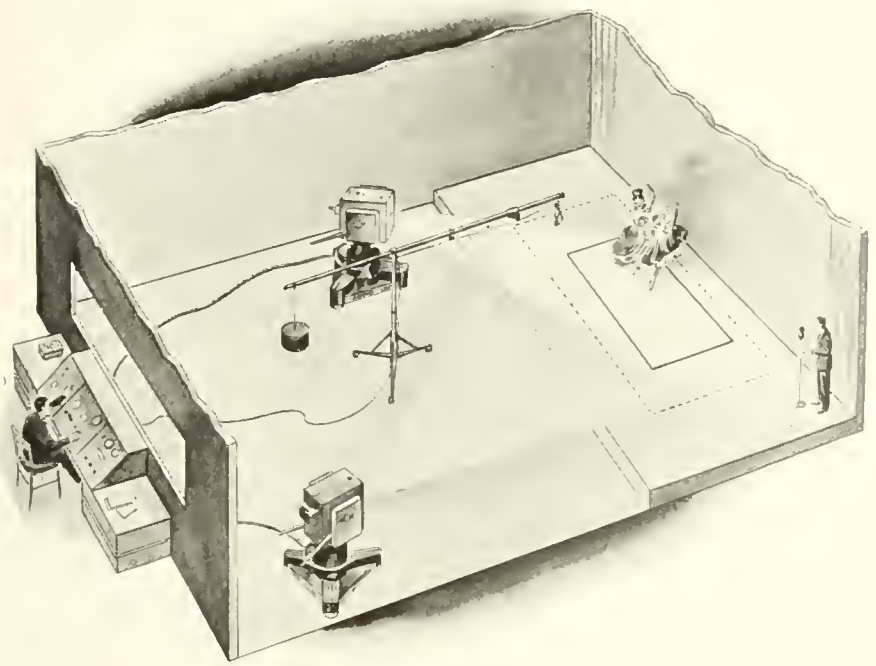
It is not my purpose to argue with anyone regarding the technical standards for television. That is a mental blind alley that yields little comfort to the careless thinker. For instance, I prefer to let the public decide whether six megacycle black-and-white television is satisfactory. Mr. and Mrs. Public will make the ultimate decision anyway. The pent-up demand for postwar television is apparently so great that it will reach flood-tide as soon as new sets appear on the market. If we are to deprive the public of these sets we need very convincing reasons. King Canute could not stop the tide. It is just as foolish to believe that television can be withheld from an eager public.

One fact is certain—a television picture cannot be evaluated in the same terms as an oil painting. Television pictures were not intended to grace the walls of the world's art galleries. They were created for the specific job of bringing into the homes and public meeting places, the living, vital, instantaneous reproductions of the pictures and sounds associated with interesting human or natural events wherever they may occur. Any attempt to evaluate the television picture on any other basis leads to fundamental errors of interpretation.

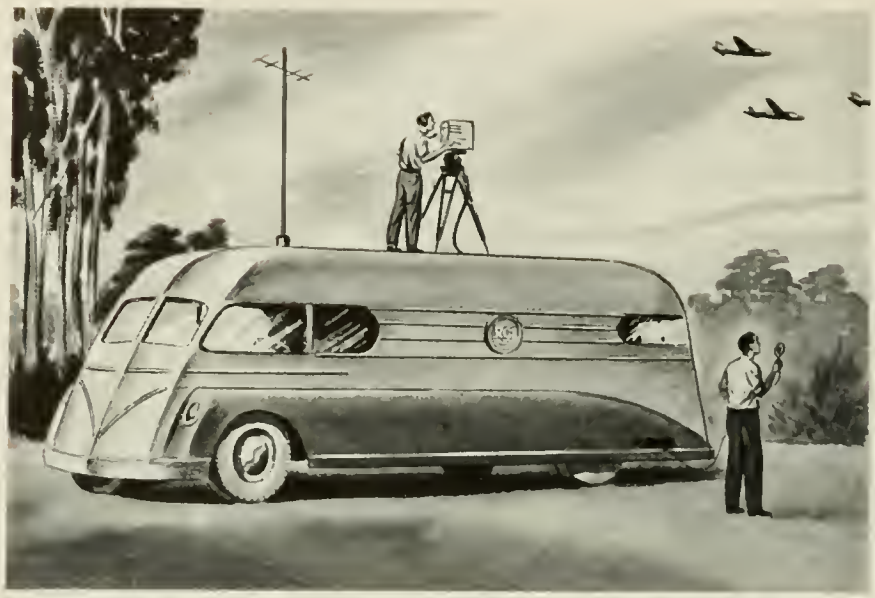
Flawless Image is Objective

Of course, the television industry will not be content until it achieves a picture as flawless as nature itself but this ultimate goal cannot be reached through laboratory research alone. Like the automobile its final perfection will be attained only after millions of people have contributed to its improvement. The names of the engineers who have devoted major efforts to the development of television can be counted by hundreds—perhaps by thousands—but the names of the program, advertising and business men who have devoted creative thought to the development of a television service can be counted on the fingers of two hands. Television's real progress as a public service will begin when thousands of such men think constructively on television's problems.

Orderly progress in television is dependent on far more than the initiative of broadcasters. They cannot do the job alone. They must have the sympathetic support of all factions concerned. With little financial return from their pioneering activities at this time, any additional burdens the television companies are forced to bear because of the extreme demands of any group might easily retard the extension



IN THIS TYPE OF BASIC TELEVISION STUDIO, ONE ENGINEER AND AN ANNOUNCER SHOULD BE SUFFICIENT FOR NORMAL OPERATIONS. THE CAMERA IN THE FOREGROUND IS USED FOR LONG SHOTS WHILE THE OTHER GIVES CLOSE-UPS. EITHER MAY BE SWITCHED IN BY THE OPERATOR AS HE SCANS THE PICTURES PRODUCED BY EACH CAMERA ON HIS CONTROL BOARD. CAMERA AND MICROPHONE LOCATIONS ARE FIXED.



SPEEDY, COMPACT MOBILE UNITS, RUSHED TO SCENES OF ACTION, WILL COVER EMERGENCIES AND SPECIAL NEWS EVENTS FOR THE POST-WAR TELEVISION STATION. SIGNALS WILL BE FLASHED BACK TO THE MAIN STUDIO BY MICROWAVE TRANSMISSION.

of the service to the public.

Television is willing to pay a fair price for contributed services during the present developmental stage but if supporting costs are lifted so high that resources are threatened, the industry will face a critical situation. There must be fair play and generous treatment by all concerned if television is to become a national medium of entertainment with consequent opportunities for mass employment.

Sees 400 Cities With Television

Last October in testimony before the Federal Communications Commission I stated that I believed television stations could be supported in towns having populations as low as 25,000. I submitted cost and operations statements to support my contention. I can now expand that statement to say that it is my belief that within ten years more than 400 cities in the United States will have television stations, all operating at a profit.

Unfortunately, sound broadcasters have been led to believe that the installation and operation of television facilities entail a very considerable outlay from the start. This is not so. Television programming can be started in a small way and expanded as receiving sets and commercial sponsors increase. How this can be done is suggested in the illustration on page 3. It will be seen that one operator, handling cameras and lights by remote control, would be sufficient for simple productions. By restricting their movements to the areas outlined, the actors would always be within the focus of the camera. The latter, once adjusted, would then operate unattended throughout the performance, eliminating need for an operator at each camera. If the announcer is to be visual, he would merely move from the position shown into the inner or outer staging areas as called for.

A studio arrangement such as the one shown, supplemented by one or two 16-millimeter motion picture projectors, would comprise all essential equipment for a start. As program time is increased and additional studio space secured, the transition from these limited facilities to those that will be required eventually could be carried out in gradual and logical steps.

Now what about the other advertising media — newspapers, magazines, car-cards, billboards, direct mail and so on? I predict that all of these media, including sound broadcasting, will be more prosperous than ever, even after television becomes a commonplace. It has been the history of advertising that no new form ever completely displaces the older ones. On the contrary, history reveals that the resulting increased volume of advertising increases the distribution of goods and services so that the overall national wealth is increased.

Between 1927 and 1943, for example, newspaper circulation increased from 63,000,000 to 82,000,000 and magazine circulation mounted from 36,000,000 to 63,000,000. This was the period during which broadcasting was growing most rapidly. There is no fundamental reason why this experience should not be repeated with television even though television should prove to be the most powerful advertising medium devised by man.

Cannot Copy Older Media

Television programs cannot simply ape the older forms of entertainment if they are to fulfill their promise. Although the scope of program material available to television broadcasters will be fully as great as that now available to sound broadcasters, the technique of presentation must be different since the television broadcaster will be presenting pictures themselves — not just sounds which create mental pictures. The technique of the stage will not be suitable since television will use the world for its stage and the usual fifty- by a hundred-foot space behind the footlights will be only a small fraction of its area of activities. Nor can it be the technique of the movies, because television will broadcast events as they happen. Furthermore, there can be no takes and retakes which, after the final cutting, may lie in cans for months before they are released. No; television's technique must be different from any entertainment technique yet developed.

No one questions that television techniques will improve as time goes on, but that improvement will be made for six-megacycle television as well as for eighteen- and twenty-megacycle television. We don't know how long it will take to develop twenty-megacycle television. We do know that we can plan post-war television on the six-megacycle basis and every rule of common sense tells us that we should go ahead on that basis.

CANADA'S NEW RADIO VOICE

Two RCA Short-wave Stations Go Into Action At Sackville, N. B., to Carry the Dominion's Story to All Parts of the World.

WITH the opening on February 25 of the first units of Canada's new shortwave plant at Sackville, New Brunswick, the Dominion joined the family of nations which are using radio beams to carry news and entertainment to soldiers on foreign soil and to promote good will among the citizens of other countries. Power for "Canada's Loudest Voice," as the new station has been called, is supplied by two RCA 50,000 watt transmitters, installed under the supervision of Engineers J. M. Conroy, F. Quance and Bud Seabrook of RCA Victor Limited of Montreal. A third RCA unit of 10 kilowatts power is expected to go into operation on January 1, 1946.

Travelers out of Sackville see the stations' tall towers rising from a salt marsh along the banks of the Tantramar River. The site was selected because of its freedom from unfavorable magnetic conditions and also because the moisture laden earth is helpful in the propagation of radio waves.

The transmitter building, located on one side of the 213 acre tract, is constructed of white stucco and tile. From it, long feed lines extend outward to three sets of directional antennas which have been positioned to cover all desired areas of the globe. Not only has each antenna been designed to radiate energy in either of two directions, 180 degrees apart, but the beam can be steered a few degrees to one side or the other of the normal direction merely by pressing a few buttons in the transmitter house. In this way, maximum power can always be concentrated along the great circle route which passes through the part of the world for which the program is intended.

Purposes of Plant

Canada had several specific purposes in mind when the million dollar project was started. Like England and the United States, it wanted, first, to talk to its soldiers fighting overseas, giving them a constant flow of news from the homefront and the familiar type of entertainment they had enjoyed before their call to the colors. Canada also saw the advantages in placing the Dominion's point of view before the Allied nations of Europe. And finally, the people above the border were anxious to join their fighting allies in telling the enemy the real uncolored truth about the war's progress.

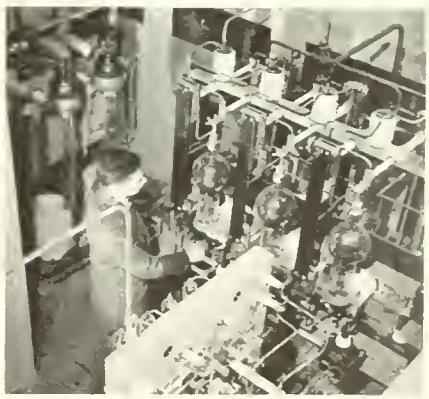
Further reasons for the short-wave development were expressed by Gerald Noxon, CBC commentator in a broadcast over the trans-Canada network:

"The rapid development of international radio under the stress of war," he said, "has opened up a new field of possibilities in the realm of international relations. Canada has now achieved a new importance in the world. We have our own responsibilities to bear in international affairs and our own purposes to further in the organization of world peace and world prosperity."

To man the station, Peter Aylen, CBC supervisor of international service, assembled a staff of expert writers and experienced linguists. Several of the commentators were refugees from enemy countries.

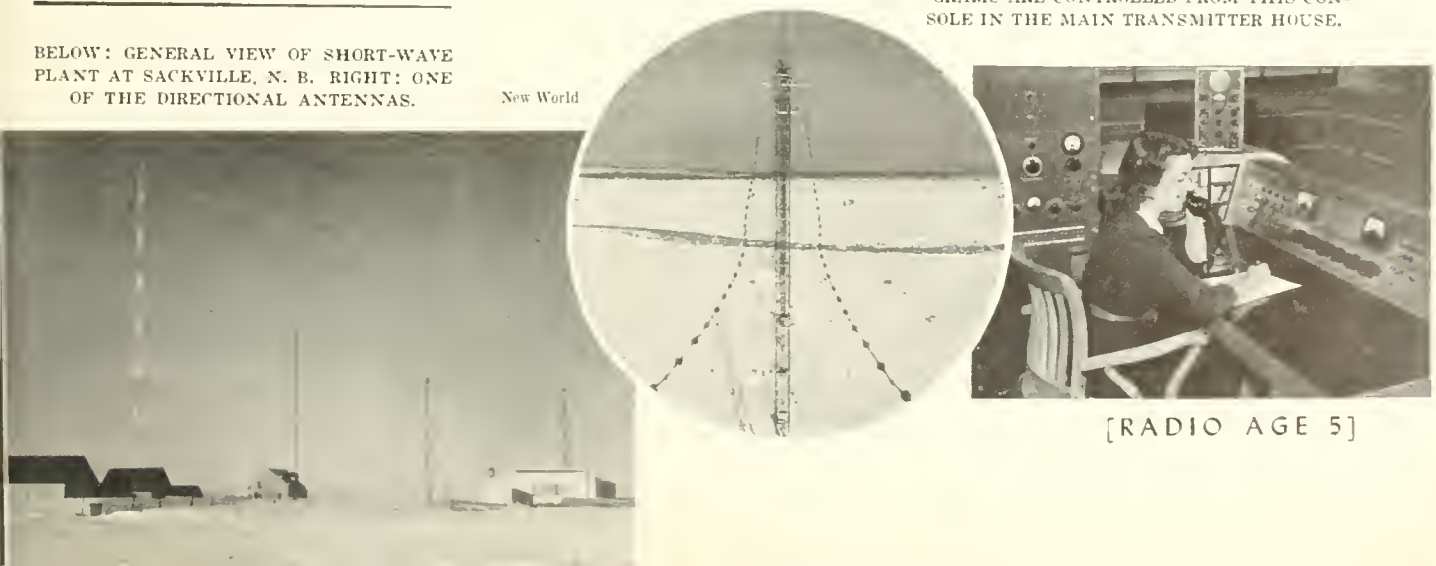
Up to this time, Sackville has not been in operation long enough for the program staff to round out its full schedule of multi-language broadcasts but before the summer is far along, the Voice of Canada will be heard regularly in Holland, Germany, Italy, France, West Indies, Mexico, South America, New Zealand and Australia.

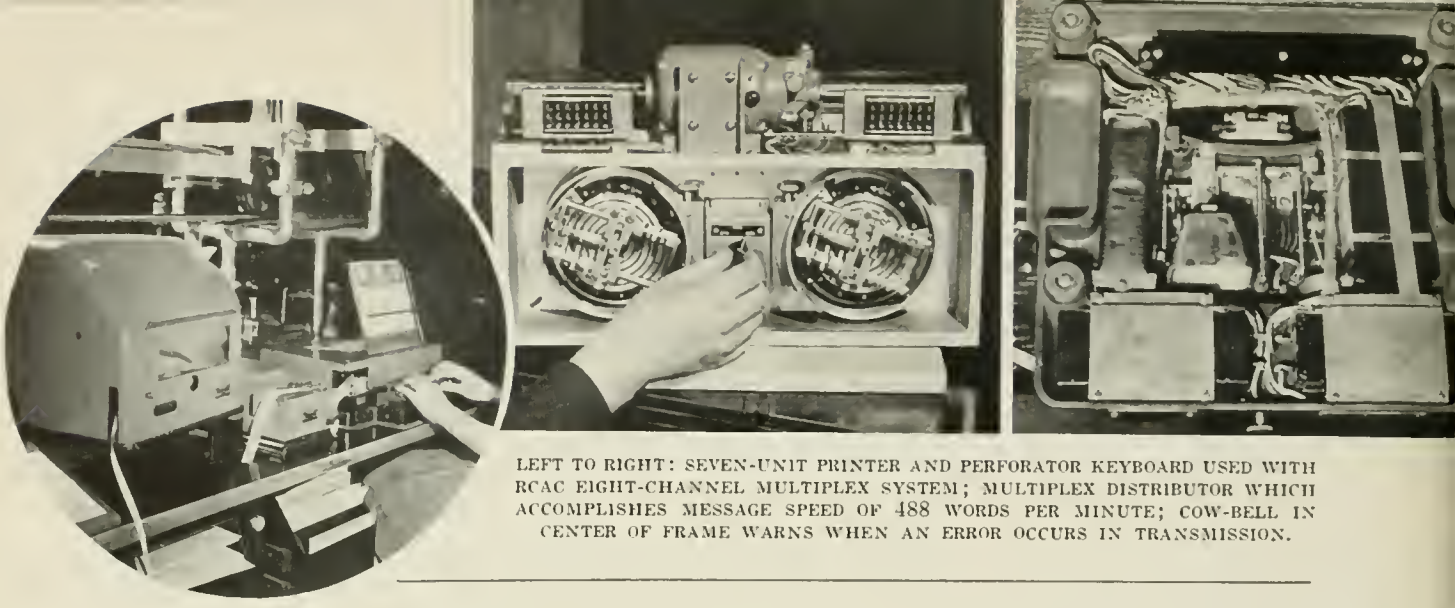
V-E Day ended the need for certain types of programs but other features will be continued and expanded. Already from the two powerful RCA transmitters, Canada is sending the story of problems that affect the lives and welfare of her people, interspersed with accounts of the country's plans for social service, the promotion of industry and farming and the re-employment of returning veterans.



REAR VIEW OF ONE OF THE 50,000-WATT RCA TRANSMITTERS AT SACKVILLE. BELOW: ALL CANADIAN SHORT-WAVE PROGRAMS ARE CONTROLLED FROM THIS CONSOLE IN THE MAIN TRANSMITTER HOUSE.

BELOW: GENERAL VIEW OF SHORT-WAVE PLANT AT SACKVILLE, N. B. RIGHT: ONE OF THE DIRECTIONAL ANTENNAS.





LEFT TO RIGHT: SEVEN-UNIT PRINTER AND PERFORATOR KEYBOARD USED WITH RCAC EIGHT-CHANNEL MULTIPLEX SYSTEM; MULTIPLEX DISTRIBUTOR WHICH ACCOMPLISHES MESSAGE SPEED OF 488 WORDS PER MINUTE; COW-BELL IN CENTER OF FRAME WARNS WHEN AN ERROR OCCURS IN TRANSMISSION.

8 MESSAGES—1 TRANSMITTER

New Multiplex System Developed by RCA Communications Can Handle 488 Words a Minute Outward and Inward—Virtually Error-proof.

DEVELOPMENT of a system of word transmission by which eight channels can be employed simultaneously to carry messages thousands of miles over a single radiotelegraph transmitter was announced on May 24 by Lieut. Colonel Thompson H. Mitchell, Vice President and General Manager of RCA Communications, Inc. The new system—regarded as a major advance in international communications—has been placed in operation between New York and London to increase communication capacity between the United States and Great Britain, and, with extension of channels to San Francisco, expedited the flow of government and press traffic to and from the United Nations Conference.

By means of specially designed RCA equipment which employs what is known in the industry as "time division multiplex telegraph" principles, the equipment can handle 488 words per minute inward and outward simultaneously, corresponding to eight channels each way with an individual channel speed of 61 words per minute. The equipment also permits operation of four or two channels instead of eight channels, when desired.

All eight channels may be utilized for two-way communication with one distant station. Alternatively, they may be set up in such a way that four channels with a total capacity of 244 words per minute may be operated in both directions simultaneously between two different stations, with automatic retransmission of one or more of the channels to a third station.

Moreover, printing mechanism incorporated in the new RCA multiplex system accomplishes the feat of making the circuit virtually error-proof, despite its high speed. Let any letter be mutilated or garbled in transmission and a warning bell rings under the receiving printer. At the same instant, in lieu of the mutilated character, a maltese cross appears to mark the exact spot of the error and facilitate correction.

System Virtually Error-Proof

Colonel Mitchell, appraising the results, pointed out that it was appropriate for the world security parley at San Francisco to be served by the first operations of the new installation, since the chief aim in its creation was to help meet demands for increased communication and understanding between nations. As an example of mounting traffic accruing from America's enlarged scope of operations, the RCAC alone is expected to handle 200,000,000 words of world-wide communications this year, compared with 63,000,000 words in the pre-war year of 1938, an increase of more than 300 per cent.

While actual development of the new multiplex equipment began less than two years ago, it was disclosed that for some time before that date, RCAC research engineers had been working on kindred apparatus and had succeeded in achieving a high degree of efficiency in its use and in the use of the RCA Seven-Unit Printer employed in the new system. In fact the printer, which is an exclusive RCA development, has been employed continuously since 1939 for handling commercial traffic over the New York-San Francisco radio circuit.

This printer is completely automatic and through its use, in conjunction with the multiplex mechanism, the system functions with a minimum loss of circuit time, it was explained. Each incoming letter is comprised of three marking (signal) impulses, plus four spacing (no signal) impulses. The name—Seven-Unit—stems from this fact. Automatic counting features incorporated in the receiving printer check the arriving impulses, and if the marking impulses vary from three, the warning bell sounds and the maltese cross notes the error.

Although the new multiplex equipment is specifically designed to utilize the RCA Seven-Unit Printer System, it is also able to handle other telegraphic signalling codes. In fact, a different signalling code can be used if desired on each of the four pairs of channels forming the eight channel total.

Vital to the system is a newly

perfected method for keeping the receiving channeling devices in exact step with the distant transmitter and the signal elements being sent through the air.

Improvement in time division multiplex operation has been achieved through the inclusion in the same mechanism of the devices that perform the basic channeling function and also of the face plates which pass the signal elements from or to the seven-unit printing equipment in the proper sequence and at the right time intervals for transmission and reception.

In physical appearance, transmitting and receiving equipment used in the new RCA system varies only slightly from conventional radiotelegraph apparatus, in spite of its amazing performance. At each terminal of the circuit are two cabinet racks, 84 inches in height, each containing a multiplex distributor, visible about halfway between top and bottom. One rack is primarily for receiving and the other primarily for transmission. Other equipment includes printers, keyboard perforators and tape transmitters.

Equipment Speeds Up Relays

En route to London, traffic from San Francisco passes through the synchronized equipment in the New York office of RCAC, at 66 Broad Street, where the channels are separated automatically. Thence the messages flow, first, to the transmitting station at New Brunswick, then across the Atlantic. Routing from the British capital also includes passage through New York. Nevertheless, a mechanical delay of only one-sixth of a second occurs in the transmission in either direction.

It was pointed out that, while the system makes possible simultaneous transmission over four channels each way between San Francisco and London through New York, the routing may be shifted, for instance, to send messages from either metropolis to the Argentine over the three-channel New York-Buenos Aires circuit.

One of the valuable features of the new system in the opinion of RCAC engineers, is the use of bells for signalling. Each channel utilizes two of them. One rings only when an incorrect group of signal elements reaches the receiving printer. The other, of noticeably different pitch, is operated by means of a switch similar to a telephone dial. With it, the receiving operator can pass a number of stock phrases for service instruction to the other end of the circuit, thereby saving channel operating time.

Outlines News Policy

HEAD OF NBC NEWS AND SPECIAL EVENTS TELLS STAFF REPORTERS THAT NEW PLAN OF GLOBAL COVERAGE IS POST-WAR NECESSITY

As the world turns to peace, the flow of news from all parts of the globe will be greatly accelerated, in the opinion of William F. Brooks, NBC director of news and special events, who outlined the network's future policy in a statement recently sent to all NBC reporters. This quickening of developments, Brooks predicted, will continue for the next 3 to 10 years and will require a new type of news coverage.

"Censorship," he told his staff, "will be lifted shortly in many countries. Facilities which have been tied up by war needs will be freed. People who have been terrorized into speechlessness will once again speak. Equipment which has been impossible to get will eventually be ready so that microphones can be taken into almost any spot in the world. Two-way transmissions between the field and the home office again will be possible. All this will break some of the dams which have channelized news through the Army, Navy and other Governmental agencies, and enable the use of ingenuity and real thought in funneling happenings of the world through NBC."

News Perspective Required

The staff, he said, must have perspective and understanding of what this news means to the people of Terre Haute, Milwaukee and other typical American towns.

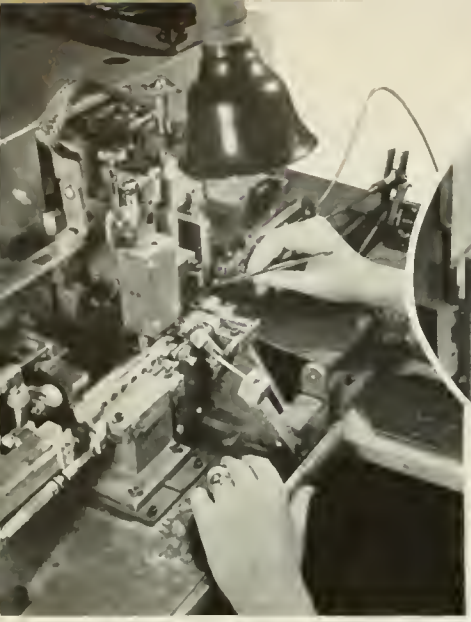
"We have a terrific responsibility along with the press to report and analyze in a completely impartial way happenings which at the time of their occurrence will be confused and obscure.

"We must not attempt to preach or crusade for causes which, however meritorious they may seem, have any selfish or underhanded motives. Ours is the job to report . . . and to report accurately and impartially. This is not an easy task, but if we exercise care and make sure that our staff is experienced and unselfish, we will make fewer mistakes. Transmission facilities which have been developed as a result of the war will give us here at home on-the-spot broadcasts of history in the making these next few years. We must have men who realize their responsibility, and who will dedicate themselves to this cause."

Radio, Brooks informed his staff, has built up an audience which depends on radio reports for a good percentage of its information.

"The past five years," he said, "have ingrained news listening habits into the people of this country in a way which was never envisioned before. The National Opinion Research Center at the University of Denver has recently completed a poll which shows that 47 percent of the people get most of their news from radio and that 46 percent believe that radio news is more accurate."

As a specific move to lay the foundation for the new regime, the NBC head announced shifts in personnel which will place the men in key news-centers where their experience and contacts will keep "the National Broadcasting Company out in front in the future as it has been in the past with accurate, reliable and comprehensive on-the-spot reports."

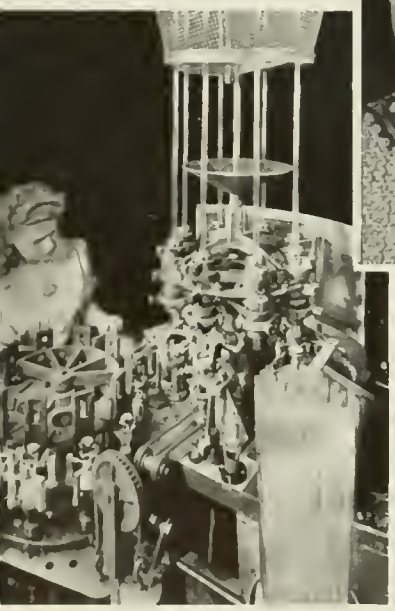


TABS ARE PLACED ON FILAMENTS IN THIS MACHINE.

TURE PARTS ARE HEATED TO HIGH TEMPERATURE IN THIS HYDROGEN OVEN.

MINIATURE TUBES AN MOUNTINGS UNDERGO CO STANT INSPECTION.

THIS MACHINE MAKES BULBS FOR THE RCA "ACORN" TUBE.



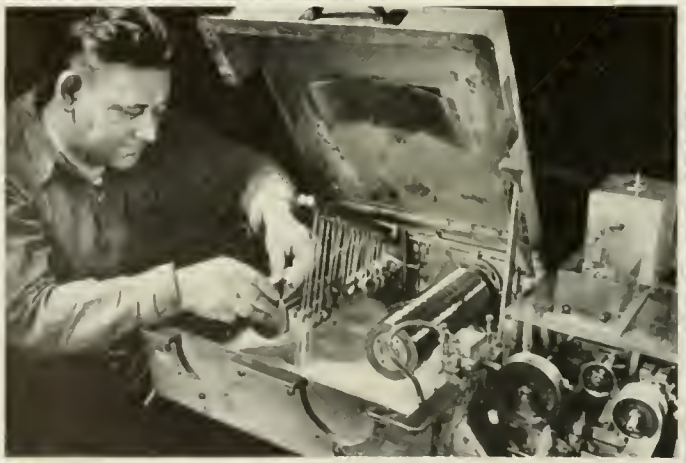
CEMENTING CERAMIC INSULATION FOR MINIATURE TURES.

HAIR-LIKE TUNGSTEN WIRES ARE FOLDED INTO SHAPE ON THIS MACHINE.

TUBES ARE GIVEN FINA TESTS BEFORE SHIPMENT

MAKING RADIO TUBES AT RCA VICTOR DIVISION

IRCULAR JIGS SPEED UP THE "THREADING" OF METAL TUBES.



FILAMENTS OF FINE WIRE ARE DRAWN IN THIS MACHINE.

AN OPERATOR FEEDS MINIATU TUBES INTO THIS REVOLVING SE ING DEVICE.

HARRISON, NEW JERSEY

MUSIC IS A WAR WEAPON

Special Recordings for Armed Services Designed to Weaken Spirit of Enemy and Bolster Morale of Our Soldiers and Sailors.

By William R. Seth, Jr.

Director, Advertising and Promotion, NBC Radio-Recording Division

THE siege of Cherbourg had been hard and costly. American forces had overrun most of the great French port but German artillery and mortar fire was still plastering the city. In the midst of this holocaust a radio, beamed at the German lines through powerful loud speakers, blared forth with popular melodies. As the music faded, a Yank announcer commenced to talk. He described the futility of further enemy resistance and exhorted the Germans to lay down their arms. Soon the gun-fire stopped and the enemy began to surrender. Once again, the effective combination of music and words had demonstrated its potency as a weapon of war.

How did this music get into the front lines of such an important battle? There were no musical instruments, no musicians on the spot. But many weeks before, instruments and musicians had been assembled in an NBC studio back in New York. They had played these tunes which the enemy heard through the loud speakers and every note had been truly recorded on thin black discs.

On all fronts, NBC-RCA recordings have played and are still playing an essential part in the lives of fighting men. V-disks, training records and full length recorded shows are doing the job in camps and often in the forward battle areas. On the domestic scene, entire NBC Recorded War Bond campaigns, used on hundreds of broadcasting stations, have urged the public to invest in government securities as a war measure. Recruiting programs for the WAC and WAVE, vital messages from the OPA, War Manpower Commission, Office of Economic Stabilization and many other important Government Departments have been brought into American homes through the medium of radio recordings produced and manufactured by NBC and RCA Victor.

Especially recorded for GI's overseas are such well known radio shows as "Command Performance," "Mail Call," "GI Jive" and "Jubilee." Prepared under the supervision of the Armed Forces Radio Service and recorded by the NBC Radio - Recording Division, these programs are taking radio's finest talent to our fighting forces wherever they may be stationed.

Best Talent Makes Recordings

American soldiers confined to German concentration camps were entertained by a series of programs supplied by the War Prisoners' Aid of the Y.M.C.A. and recorded by NBC. While waiting release from their days and nights of boredom, officers and GI's alike were sustained by such network shows as the "Hour of Charm," "Cavalcade of America," "The Eddie Cantor Show" and many others.

Of the numerous services offered by Radio-Recording, the NBC Thesaurus musical program service is probably the best known. Leased to radio stations in all accessible countries, this library of recorded music provides the finest musical talent in the field for local broadcasts. Some 250 U.S. stations currently are using Thesaurus as a basis for much of their musical programming. Many of them build local shows with the scripts which are supplied as part of the service.

One of the most recent and successful additions to Thesaurus is "The Music of Manhattan," a musical program consisting of a basic 28-piece orchestra of radio's finest musicians supported by a corps of outstanding arrangers and including many specialty ensembles. This organization gives Thesaurus subscribers the finest in exclusive music, patterned for local broadcasting requirements.

Some of the top-notch musical artists represented in the library are Vincent Lopez, Ted Steele, Edwin Franko Goldman, Xavier Cugat, Allen Roth, The Golden Gate Quartet, and Norman Cloutier.

Programs Are Syndicated

Syndicated Programs represent another major expansion of the Division's products. These are recorded radio shows of network caliber produced for sponsorship on local stations.

Custom-built programs, spot announcements and instantaneous recording fall into another interesting category of activity at NBC Radio-Recording. These include programs built for an advertiser for selected broadcasts in various markets throughout the country.

New technical improvements already incorporated in NBC transcriptions have noticeably improved the program standards. Yet these are only a promise of the many quality achievements that will be realized in the post-war world.

A COMPLETED TRANSCRIPTION IS INSPECTED FOR FLAWS IN RECORDING.

TELEVISION SCENERY DESIGN

WNBT Staff Evolves Novel Method of Erecting Stage Settings by the Use of Interlocking Units—Idea Cuts Costs and Speeds Construction.

By N. Ray Kelly

Manager, Television Production Facilities,
National Broadcasting Company

IN planning television studio facilities at NBC, it was recognized at the beginning that the economical design and construction of scenery was to be a problem that would grow in importance with the expansion of program schedules. The reason for this lies in the fundamental nature of the new visual medium. Unlike the legitimate stage or the movies, a television show is seldom produced more than once. The cost of stage settings therefore, cannot be spread over numerous presentations but must be charged against a single broadcast. For that reason, it was obvious that anything that could be done to reduce the interval between the decision to produce a play and the actual production would contribute toward a lower over-all cost.

Standard sound broadcasting escapes this problem because there the imagination of the listener, aided by the lines of the actors and accompanying sound effects, create the setting. But television can mask nothing. The viewer sees all and is stimulated to the maximum dramatic reaction only when the background of the scene is strictly in keeping with the action taking place on the television screen. This means that new stage settings, freshly decorated, should be devised especially for each production. Under such circumstances, the preparation and erection of scenery may account for an appreciable part of the total cost of the show.

Units Are Interchangeable

Realizing these limitations, the NBC television staff, more than a year ago, began a study of the subject, out of which came the unit structure of scenery design now in constant use. The basis of the plan are interlocking panels and connecting parts which can be assembled to produce an unlimited number of different stage settings.

The mechanical construction of each unit follows a specific pattern. A ridge along one edge of each section fits into a corresponding groove on another unit and the joint is held firmly by clamps or bolts. This bead-and-slot, functioning like the "tongue" and "groove" of wood flooring, insures rigidity of long wall surfaces and prevents buckling when weights must be suspended from the flats.

Erection of unbroken walls can be carried out rapidly with these units. The standard panels are placed edge-to-edge and clamped in position. Narrow connecting strips of various dimensions and contour allow for the formation of room corners and angular changes in wall surfaces. Where the scenery design specifies an opening for door or window, this is taken care of by special units. These individual units may also be mounted horizontally, rather than in a vertical position to provide parapets, lintels, wide-arch openings of various sizes and forms, store counters and hotel desks.

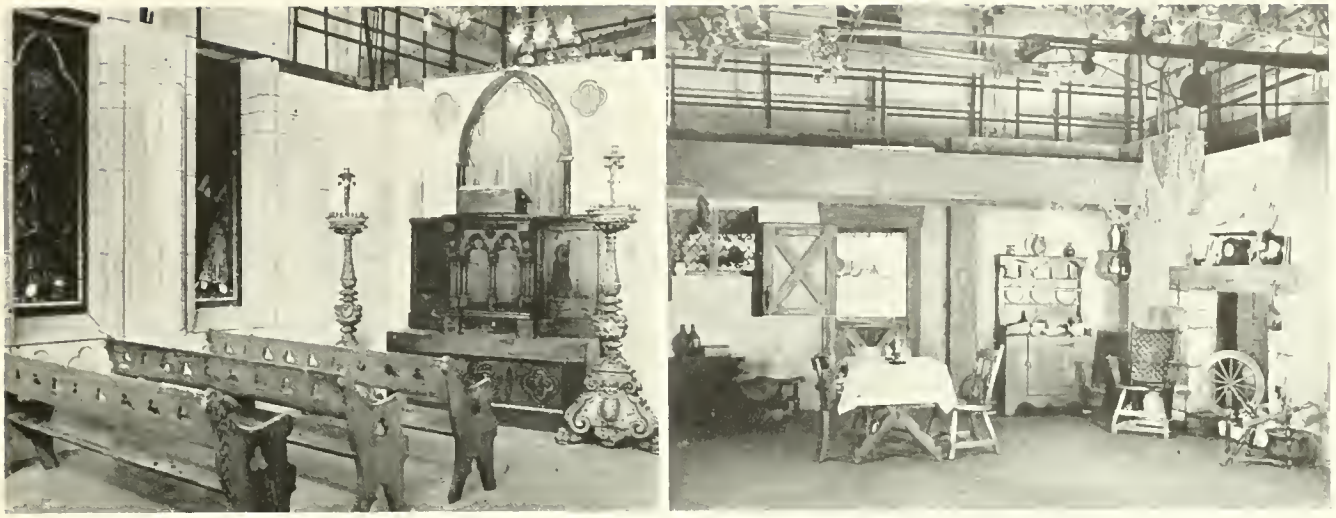
Wall Openings Easily Formed

The small units, normally used to form corners and odd wall surfaces, may also be combined to provide columns in numerous sizes, pilasters and buttresses. But the wide flexibility of the units really becomes evident in making windows and doors. Illustrations on these pages show how individual units have been assembled to provide either a standard window, a Gothic or a bay window. Just as easily, a wall opening may be made to accommodate a full size door, or the space can be partially blocked off to become a window of prescribed size and style. New ways of combining the units are revealed with each new production.

From time to time, as the need arises, special elements, such as period windows, doors, mouldings and modeled detail of various types, are added to the existing stock of scenery, thus providing an ever-increasing versatility in set con-

RIGHT: A TYPICAL TELEVISION SETTING FORMED BY COMBINING A NUMBER OF INTERLOCKING UNITS.

BELOW: STAGE HANDS MATCH "TONGUE AND GROOVE" OF SCENERY UNITS IN SYSTEM DEVISED BY NBC FOR THE RAPID ERECTION OF TELEVISION STAGE SETTINGS.



THESE STAGE SETS ILLUSTRATE THE VERSATILITY OF THE NEW UNIT STRUCTURE IN BUILDING WALLS, GOTHIC WINDOWS, DUTCH DOORS AND FIREPLACE OPENINGS. THE SAME UNITS ARE APPLIED IN VARIOUS WAYS ACCORDING TO THE DESIGN.

struction. All new features, of course, embody the same basic interlocking idea which is the key to the system.

However, stage scenery, to be practicable, must do more than merely serve as background. It must be sufficiently sturdy to serve as a support for essential properties, yet possess the characteristics of portability and flexibility to permit re-combination as required. These advantages and many others are embodied in the unit structures.

Formerly, it was necessary to build at least 50% new scenery for each production. The new units eliminate much of this waste. They are built of three-ply panels and can be used repeatedly. By covering them with canvas they may be redecorated as often as needed, with paint or wall paper. Each unit is braced and counter-braced to provide a strong support for balconies or other hanging properties.

Fireplace openings, Dutch doors, archways and porch entrances are merely a few of the variations in stage architecture that have been fabricated by matching the proper units.

It is interesting to note that in adopting these unusual structural units, television seems to be favoring the Hollywood rather than the Broadway stage technique. Whether or not this should be considered a trend of television development will be revealed in time. Experience gained so far indicates that television will continue to borrow worthy ideas wherever they may be found, adapting them, as in the case of NBC's unit scenery construction, to the special needs of the industry.

NBC'S TELEVISION CREW SETS UP ITS CAMERA EQUIPMENT IN TIMES SQUARE TO CATCH THE STIRRING CROWD SCENES OF V-E DAY.

Viewers Want Sports

Ninety-seven percent of the television set owners in the metropolitan area recently polled by NBC approved the sports programs picked up at Madison Square Garden and St. Nicholas Arena, and transmitted over station WNBT. Ninety-four percent of the responses accurately identified the sponsor of the bouts.

NBC'S TRIO OF WOMEN ENGINEERS IN STUDIO CONTROL ROOM. LEFT TO RIGHT: MARJORIE ALLEN, KATHERINE REYNOLDS AND RUTH THOMAS.

Women in Radio

WARTIME BRINGS OPPORTUNITY TO TRIO WHO MAKE THE GRADE AS FULL-FLEDGED ENGINEERS IN NBC CONTROL ROOM.

A GROUP of actors entered an NBC studio in Radio City several months ago. The director pulled a script from his pocket and motioned towards the mike. "Let's run through this once, cold," he said, "then I'll make the cuts before we go into the 'dress'."

As an after-thought he glanced into the control room. Seeing only a girl there he remarked, half to himself and half to the players: "Wonder where the engineer is? He ought to be here by now." Through the sound-proof glass, he made expressive motions with his hands, indicating, he hoped, that she should tell him where the engineer was.

The girl understood the sign-language. She walked to the panel board, plugged in a patch cord, dialed power into the studio mike, and said tersely: "I'm the engineer on this show today." And that was that.

War Created Opportunities

All of which points to the fact that today women are in radio on both sides of the control board. At the present moment, there are three full-fledged engineers on the staff of the National Broadcasting Company. Marjorie Allen, Katherine Reynolds and Ruth Thomas are the three newcomers whose presence in Radio City makes NBC the first network in the United States to have women engineers putting network programs on the air. Their opportunities to invade a man's world arose when the war emergency cut sharply into the ranks of radio engineers, just as it has in practically every other technically exacting profession in industrial life.

Inherited Mechanical Aptitude

Ruth Thomas inherited her aptitude for things mechanical from her father, an aviation engineer. Born in Woodstock, New York, she was graduated from New York University where she took courses in radio production and script writing. The course in theory, which has stymied many a male student, made such a favorable impression on her that she decided some phase of broadcasting was to be her life's ambition. Miss Thomas, pretty, blue-eyed and brunette, landed a job as an apprentice engineer on another network in New York. Four months later, she went to the OWI as studio engineer to handle shortwave broadcasts to Europe and Africa.

Katherine Reynolds, tall, slender and blonde, was born in Little Rock, Arkansas, and moved to Dallas, Texas, when she was five. After graduating from Buckner Academy, Dallas, she worked as a stenographer and secretary. When war was declared, Reynolds enrolled in a radio course at Texas Christian University, and at its completion landed a job as a radio engineer at Station WBAP, Fort Worth, Texas.

Miss Reynolds re-enrolled at T.C.U. in 1942 to work for her engineering degree, while continuing as an operator at night. Two years passed. Then came the urge to see New York. Her next stop was at NBC as an apprentice engineer.

Versatile Work and Avocations

Marjorie Allen, last of the trio to complete her apprenticeship at NBC, has been equally versatile in her life's work and avocations. Born in New York City, she was graduated from the Gardiner School for Girls, attended Skidmore College and graduated from the American Radio Institute.

Marjorie is believed to be the first woman radio transmitter engineer in the East. It happened this way. The chief engineer at Station W47NY, FM station in New York, was in need of an experienced engineer. The chief wasn't too impressed until he saw her work. Then he changed his mind.

Miss Allen joined NBC in February, 1945. Three and a half months later she became a full-fledged studio engineer. Her views on the permanence of women in the field of radio engineering are revealing and provocative. In a recent interview with a feature writer of the Associated Press she said that it is possible for women to make better studio engineers than men.

"They have a sensitive touch," she added. "They put their heart and soul into their work."

Glass Loses Its Glare

METHOD OF SURFACE TREATMENT DEVISED FOR TELEVISION USE MAY HAVE MORE IMPORTANT APPLICATIONS IN EVERYDAY LIFE

By Dr. F. H. Nicoll,
RCA Laboratories, Princeton, N. J.

TO the layman, glass is a substance through which light-rays pass without difficulty. To the physicist, this common conception is not wholly true. Under certain conditions, an appreciable part of the light striking a sheet of glass does not pass through but is reflected from the outer surface, as by a mirror. It is this characteristic of glass that is undesirable in many applications, particularly in television.

The relationship between low-reflecting glass and television is not readily apparent but our work in this field was nevertheless initiated with a view to providing a glass surface which would be free from glare and extraneous reflections and would help to produce better television pictures by improving contrast. Possible applications for the process are, however, far from limited to the field of television.

Although, in recent years, many processes have been proposed for reducing the reflection from glass, RCA became interested in the problem some years ago when the field was comparatively new. At that time experiments were initiated in our laboratory along the lines suggested by some early literature on methods of dissolving glass.

One solvent for glass, which is known better for its effect than by its name, is hydrofluoric acid. Its action on glass can be observed in the common electric light bulb. Here the acid is used to produce a rough, diffuse surface. The papers of Lord Rayleigh, a great English scientist, revealed that as early as 1900 he had observed that very weak solutions of the acid would remove a few millionths of an inch of glass and still leave the surface of the glass smooth. Since it was known theoretically that glass reflections could be reduced if the surface was altered in the correct manner, it was, therefore, of interest to observe whether the action of the hydrofluoric acid had any effect on the reflection.

Secret Found in Use of Vapor

The experiments of Lord Rayleigh were repeated, but the glass was exposed to the vapor of the solution as well as to the liquid. Lord Rayleigh's results in the liquid were confirmed, but what was much more important to us, our hopes had been realized in the vapor. The glass in the vapor had become low-reflecting. This first piece of low-reflecting glass had an area of only a small fraction of an inch but it was enough to stimulate further work. From this small beginning it has now become possible to treat pieces of glass three feet square or even larger. The time of treatment, which was originally many hours, has now been reduced by a large factor.

It took a considerable period of concentrated research to discover just why the reflection was reduced and how the acid vapor was able to produce such a result. It is now known that the acid vapor removes only a part of the glass and does this to a depth of only a few millionths of an inch. This surface layer is rather like a sponge or sieve. The holes are actually too small to be seen in an ordinary microscope but the electron microscope developed by RCA has made them visible.

Treated Glass Has Many Uses

The possible uses of low-reflecting glass are many. Wherever one wishes to look through glass without being bothered by reflections, treatment of the surface by the method described above will greatly increase visibility. Meter faces, clock crystals and picture cover glasses are all possible applications, and samples of many of these have been made.

The future for low-reflecting glass looks promising. The use of such glass in various manufactured articles may prove advantageous in a competitive post-war market. As the demand for glass treated by the RCA process grows larger, the Company again will receive credit for a development which, though not in the field of radio, will make for better and more comfortable living.

THE AUTHOR (LEFT) AND DR. S. M. THOMPSEN PREPARE AN EXPERIMENT IN THE REDUCTION OF REFLECTIONS FROM A GLASS SHEET.

SHARE-WORK PLAN SUCCEEDS

Typists and Clerks in Insurance Office Become Part-Time Workers on Radio Components in Novel Project Sponsored by RCA and Prudential.

TYPISTS and office clerks for four hours; assemblers of radio tube parts for the remainder of the day—that is the unusual but regular routine of nearly a hundred employees of the Prudential Insurance Company of Newark, New Jersey, who form the nucleus of a unique manpower sharing plan operated cooperatively by the insurance firm and the Radio Corporation of America. By installing the factory operation of a war manufacturer on the premises of a civilian-essential company where part-time labor is obtainable, the plan taps a new source for war labor, providing additional man-hours of needed production. The arrangement is seen as a pattern for adoption in areas of critical manpower shortage.

Forty Prudential girl typists and clerks, working in two shifts of four hours each, comprised the group assigned originally to the RCA tube assembly operation. However, both companies expect eventually to have 200 girls on the job as special work benches become available.

Pointing out that this number of workers will provide nearly 5,000 man-hours of new production each week, L. W. Teegarden, General Manager of the RCA Tube Division, estimated that the Prudential project will enable RCA to increase by 25 percent its output of urgently needed miniature tubes for radar and other radio and electronic equipment. It represents, he said, one of numerous measures undertaken by the Corporation to meet increased Government requirements for miniature and other electron tubes.

WMC Approves Plan

The plan was originated by Robert M. Green, Prudential Vice-President in charge of personnel, and has been approved by George Pfaus, Newark Area Director of the War Manpower Commission.

Advantages of the plan, it is pointed out, are many. The armed services get additional material. The war manufacturer is supplied with more workers ready for production after a nominal training period, and also with convenient working space and other facilities. The civilian-essential industry is enabled to keep its organization intact, continuing to utilize the participating employees on a part-time basis thus avoiding the loss of experienced personnel. The workers are given an opportunity to participate in war production without giving up their regular jobs.

The work at the Prudential-RCA project is a simple, clean operation consisting of assembling the "cages", or inner parts, for RCA's miniature electron tubes. These tubes, about the size of a peanut, are used in the Army's famous walkie-talkies, the paratrooper's handie-talkies and in aircraft radar equipment.

Retained on the Prudential payroll on a part-time basis, the girls are placed on the RCA payroll for the rest of their work-day, receiving wage rates that prevail for similar work at the company's tube manufacturing plant at nearby Harrison. Under another feature which considers the convenience of workers, RCA has rented floor space in one of Prudential's buildings, where the necessary benches and equipment have been installed.

The plan was presented to the Prudential employees on a purely voluntary basis, according to Mr. Green. An initial group of 200 girls in wage brackets comparable to earnings on the RCA project, attended a rally at which the plan was outlined. Within 48 hours, ninety-six girls, almost 50 percent of the group, had volunteered for the war work.

RCA Provides Instructors

Two shifts were organized. One group works for RCA from 8 A.M. to noon and for Prudential in the afternoon; the other group reports to its regular jobs in the morning and replaces co-workers at the RCA project from 12:40 to 4:40 P.M. The Radio Corporation of America assigned instructors to provide on-the-job training.

Although the girls were inexperienced in this type of work, production got off to a good start. Within 10 days after they reported for duty the girls were "on their own," requiring no more supervision than is needed for experienced assemblers.

INSURANCE OFFICE EMPLOYEES CONTRIBUTE TO THE WAR EFFORT BY DEVOTING PART OF THEIR TIME TO AN RCA TUBE ASSEMBLY OPERATION.

THREE LATE-MODEL KINESCOPES FOR TELEVISION. LEFT TO RIGHT: 5-INCH FLAT-FACE AND 3-INCH FLAT-FACE FOR REFRACTIVE SYSTEMS; 5-INCH CURVED-FACE FOR REFLECTIVE OPTICAL SYSTEMS.

TELEVISION PROJECTION TUBES

Design of 5-Inch Kinescope for Large-Screen Home Receiver Involved Long Study by RCA of Glass, Phosphors and Electronics.

WHEN representatives of the press witnessed the first public demonstration of RCA's advanced development model large screen television receiver on March 15, they gave unanimous praise to the size, brightness and clarity of the picture. But few of the observers realized the number and complexity of the problems that had been met and solved in the long process of producing a practical instrument.

The earliest television images were about 1 inch square and were poorly lighted. The latest model has a picture area 350 times larger with illumination that compares favorable with that of theatre movie screens and well above that of the average home movies. How that progress was made is a story of carefully planned research conducted at the RCA Laboratories, Princeton, and at RCA Victor Manufacturing plants.

The problem of providing a television image large enough for comfortable viewing by a group of people was on its way to solution before the war when RCA introduced a receiver with a 12-inch kinescope which provided a 7⅜ by 9¾ inch image. While it is believed that this size picture will continue to satisfy many users, there will also be a definite demand in post-war days for a deluxe-type receiver having a much larger image.

How Image Size is Increased

Larger television images may be produced in two obvious ways. The kinescope tube diameter may be increased for direct viewing, or the image from the face of a smaller tube may be projected through a suitable optical system. Sealed-off glass tubes as large as 24 inches in diameter have been made but unfortunately glass is not a good structural material for such large kinescopes. As the size is increased, the glass must be made very thick and the viewing screen must be made nearly spherical in order to withstand the atmospheric pressure.

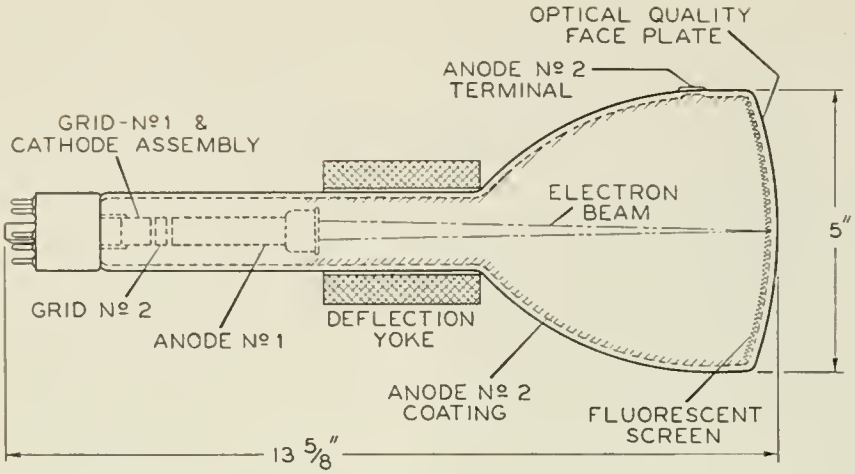
The technique of motion picture projection led investigators to the idea of projecting large television images from a kinescope. But here, another problem appeared. Few people appreciate the low efficiency of a projection lens in transmitting light. An f4.5 lens, for instance, is considered fast; an f1.5 lens is in the realm of super-speed. Yet the former transmits only about 1/200th, and the latter only 1/25th, of the available light. Thus, even with the f1.5 lens, the image on a kinescope would have to be so brilliant to begin with that four percent of it, when spread over a screen surface 30 times greater than the tube face, would still supply a screen image of satisfactory brightness.

How well these difficulties were overcome is evident in the fact that the RCA reflective optics system, the heart of the large-screen television set, has an efficiency four times that of previous fast projection lenses.

Three Factors Govern Design

Three basic factors govern the design of a satisfactory projection kinescope: the electron gun, which generates the electrons, controls them, accelerates them and focuses them into a beam; the fluorescent screen and the over-all cost of the unit.

Since the brightness of fluorescent screens increases rapidly with the voltage used in the tube, the 5-inch developmental projection type used in the RCA receiver operates at 27,000 volts. This compares to the 7,000 volts of the 12-inch kinescope. The presence of the high voltage introduces numerous other difficulties which have been overcome by continued research. For one thing, the surface of many elements within the tube must be highly polished to prevent the emission of unwanted electrons. If not suppressed these faults would affect



CROSS-SECTION OF 5-INCH CURVED-FACE KINESCOPE USED IN RCA'S DEVELOPMENT MODEL PROJECTION TELEVISION RECEIVER FOR HOME USE.

the quality of the screen picture. Such important items as the focussing of the electron scanning beam —in the 5-inch tube it is only 0.005-inch in diameter — have been gained, not through radical changes in gun design, but by refinement of parts and accurate control of mechanical dimensions. The result is an electron gun which generates the desired beam of electrons, modulates its intensity to conform to the picture signals and streamlines the beam to the ithnness of a human hair, so that it can be moved back and forth across the screen along a path directed by signal pulses from the transmitting station.

Screen Determines Tube Life

The fluorescent screen determines the life of the projection tube. Years of research were necessary before a suitable phosphor was developed that would withstand the high voltage of the scanning beam. It is interesting, however, to observe that the actual time of electron bombardment of the screen is extremely brief compared to the life of the tube. For an assumed tube life of 500 hours, the screen is bombarded for a total time of less than six seconds. This sound incredible but a few figures will prove the statement's accuracy. At any instant during use, the electron beam covers only one picture element. Since there are about 300,000 picture elements in a 500-line picture, any particular element is bombarded for only 1 300,000th of the time. 500 hours amount to 30,000 minutes; therefore, the actual time of bombardment is one tenth of a minute or six seconds. Actually the picture is black at least half the time so the bombardment period of any element may be less than three seconds for a tube-life span of 500 hours.

The size of the fluorescent screen is closely related to the cost of a projection optical system. While the available light increases with the size of the tube, the cost of both tube and lens rises rapidly when the tube diameter goes above 5-inches. Conversely, little is saved on smaller tubes; hence the 5-inch tube works out as an economical choice. However, it is expected that a three-inch tube will also be available for use where a more compact, lower-priced projection receiver is desirable.

Present models of home projection kinescopes are of development design. Further refinements will be made before they are produced commercially. However, results already achieved through these early models promise a satisfactory solution of one important part of the problem of producing television pictures sufficiently large and clear for use in the home.

Folsom Made Executive V. P. In Charge of RCA Victor

Frank M. Folsom, Vice President in Charge of RCA Victor Division since January, 1944, has been elected Executive Vice President in Charge of RCA Victor Division, it was announced by Brigadier General David Sarnoff, President of Radio Corporation of America, following a meeting of the Board of Directors on June 1. At the same time, John G. Wilson was elected Operating Vice President of RCA Victor Division.

Mr. Folsom joined RCA after serving in Washington as Chief of the Procurement Branch of the Navy Department. In addition to being in charge of RCA's manufacturing division, he is a Director of RCA and of the National Broadcasting Company. Before entering Government service, Mr. Folsom was Vice President in Charge of Merchandise and a Director of Montgomery Ward & Company.

Mr. Wilson has been in charge of financial administration at the RCA Victor Division for the last year. He came to RCA from Chicago where he had been Executive Vice President of the United Wallpaper Company. Previously, Mr. Wilson served as Assistant Controller of Montgomery Ward & Company.

Wins Fourth Star

A fourth star for continued outstanding achievement in the war effort has been added to the Army-Navy "E" Flag won in 1943 by RCA Laboratories at Princeton, N. J., Dr. C. B. Jolliffe, Vice President in Charge of the Laboratories, announced recently. The renewal is for a year instead of the usual six months.

In a letter of notification, Admiral C. C. Bloch, USN (Ret.), Chairman of the Navy Board for Production Awards, wrote:

"Each and every man and woman of the RCA Laboratories, Division of Radio Corporation of America at Princeton, is to be heartily congratulated for the splendid production record that has been established and maintained since the time that the original Army-Navy "E" was granted."

TRANSMITTER PANELS LINE BOTH SIDES OF THE CONTROL ROOM OF THE SHORT-WAVE PLANT AT DIXON, CALIFORNIA.

DESTINATION: ORIENT

Powerful Short-Wave Plant Built and Operated at Dixon, California, by RCA-NBC Engineers, Carries United Nations' Story to the Far East

By Raymond Guy

Radio Facilities Engineer
National Broadcasting Company

ON a square mile of flatlands near the town of Dixon, 28 miles southwest of Sacramento, California, the combined efforts of radio engineers and construction experts have erected one of the world's most powerful short-wave voices, a modern Stentor now making itself heard in all parts of the Pacific and the Far East, and to the south and southeast in Latin America and South America.

The Dixon plant is a war-born infant with the vocal power of a giant. It was started soon after this country entered the war and was rushed to completion as part of a government project to extend the use of short-waves in carrying the story of the United Nations' ideals throughout the globe.

At the beginning of the war, when European developments had top priority, the first stations in the general plan were located in the East. Notable among these installations were the six powerful transmitters at Bound Brook, New Jersey, erected and operated by NBC for the Office of War Information and the Committee on Inter-American Affairs.

Once these facilities were under way, OWI contracted for additional outlets with greater power to perform similar functions in the Orient and Pacific areas and to the south. China, Russia, Japan, the mid-Pacific islands, Australia and New Zealand were the goals in one direction. The Spanish and Portugese speaking countries below the Mexican border and in South America were objectives in the reverse direction.

Accordingly, at the request of OWI, operating through the Defense Plants Corporation, the National Broadcasting Company and the Columbia Broadcasting System pooled their engineering resources in the design and installation of two complete transmitting plants at sites to be selected by the respective networks. Further to speed the work and thereby meet the increasingly urgent calls for the new services, it was decided that the two stations would be identical in architecture and equipment. It was also part of the agreement that NBC and CBS should operate the stations after their completion, with OWI supplying program material.

NBC's first move was to conduct searches to determine the most suitable location for the plant and the extensive array of directional antennas that would be needed for the specified global coverage. The Dixon acreage on level terrain, unobstructed for many miles in all directions, was found to meet all requirements.

Larger Unit Added Later

The transmitter building at Dixon was laid out to accommodate one 200 k.w. and two 50 k.w. units, but for several months it operated with four 50 k.w. transmitters. The larger unit was put into action later as materials became available.

Built of reinforced concrete, the central structure has a floor area of more than 16,000 square feet, arranged in three sections: transmitter room, cooling room and administrative quarters.

In the main transmitter room, switchboard panels extend along both sides for a total length of 124 feet. The operator's console is placed at the far end, facing racks containing the audio-input amplifiers and test equipment. Behind each row of panels is a fireproof vault housing the power transformers.

Across one end of the building, a complete wing provides space for offices, store rooms, machine shops, laboratories and sleeping quarters for the staff.

The dual 50 k.w. units referred to, as well as the 50 k.w. driver on the 200 k.w. transmitter, were designed and built by the RCA Victor Division and are the type which has been installed at points all over the world in the prosecution of the war. Their design incorporates provisions for conveniently and quickly changing frequencies and for utilizing the type 880 tubes which are widely used in this type of equipment.

All transmitters utilize high level modulation. One modulator is connected to the 200 kilowatt transmitter. A separate modulator is connected to the two 50 kilowatt transmitters. The power supply for the 200 k.w. unit utilizes twelve 857-B tubes and the rectifier for the 50 k.w. units embodies an additional six 857-B tubes.

Many innovations were included in the design of the transmitters. Among the most interesting features are the tuning condensers mounted on motor driven carriages. When operations require a change in frequency, these condensers are moved on tracks beneath long copper pipes acting as part of the tuned circuits, until the proper point for resonance is reached. Movement of the carriages is controlled from the transmitter panel.

Adequate cooling of the huge tubes in the transmitters is a necessity. To take care of this item, an elaborate water circulating and rotating fan system is installed in the transmitter building. More than 10,000 gallons of cooling water flow through the transmitter tubes during each day's operations while a constant stream of cooled air supplied by large fans maintains an even temperature in each transmitter chamber.

Because of the high voltages involved, extreme precautions have been taken to protect the operating personnel from injury. Supplementing this protection are numerous devices to guard the apparatus against damage due to overloads or to failure of some major unit to function properly.

Lies on Great Circle Route

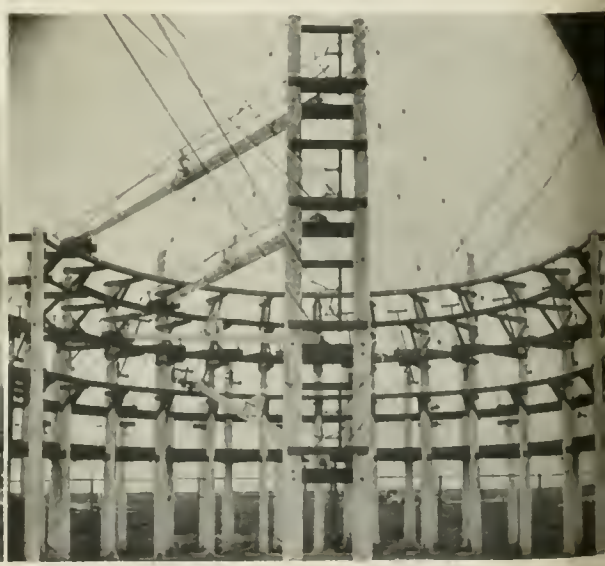
By a fortunate circumstance, Dixon lies on the great circle route which passes through the Far East and down the Latin American peninsula into South America. Because of this, an antenna which beams a program westward from Dixon, can perform a similar service to the south of the United States merely by reversing its direction. If this seems to be a paradox to those familiar with the common maps of school geographies, its truth becomes apparent when the surface of the globe is reduced to azimuthal projection. Then only do the continents appear in their true, great circle relation.

The antenna system comprises several groups of rhombics which are positioned to deliver the maximum signal strength to the selected sectors. Each group consists of several antennas designed for optimum efficiency on any one of three frequencies in the 6 to 21 megacycle region of the spectrum. The direction of any beam can be changed from the Far East to South America by means of a manually-operated switch located beneath each antenna.

As changes take place during the 24-hour day in the ionized layers far above the earth's surface, and as beam schedules change, it becomes necessary to shift from one frequency or antenna to another in order to obtain the best signal propagation. This adjustment is carried out at Dixon by means of an outdoor switching bay. Feed lines from each of the nine antennas are brought to the bay and attached to terminals arranged on the rims of three horizontal arcs, placed one above the other. Movable booms, connected with the transmitters through power lines, swing around the arc until contacts on the boom-ends coincide with the terminals of the antenna feedlines, thus completing the circuit.

From the transmitter building it is possible to see in the distance two separate mountain ranges. These peaks complicate the location of short-wave stations in the San Francisco area and dictated the location of this station 60 miles from that city. The directional antennas provide radio beams which are transmitted at very low angles above the earth, requiring that there be no mountain ranges within distances where they would intercept the beams.

BELOW: EXTERIOR OF DIXON, CALIF., SHORT-WAVE STATION. RIGHT: ANTENNAS ARE SELECTED IN THIS SWITCHING BAY.



STORY OF A RADIO SCRIPT

An Imaginary Drama, Submitted by a Free-Lance Writer, is Traced as It Moves Through the Customary NBC Routine.

By Richard McDonagh

Manager, Script Division, National Broadcasting Company

RADIO broadcasting has a gargantuan appetite for scripts. It consumes literary material at a rate far in excess of any other entertainment medium. The layman who sits in front of his radio receiver listening to the uninterrupted flow of dramas, comedies, skits, talks and news reports may be impressed by the sustained quality of the programs that come to him without cost, hour after hour, day after day. But it is unlikely that he ever gives a moment's thought to the great bulk of manuscripts that must be conceived and produced in order that radio stations may supply a continuous schedule of programs for even a single 18-hour broadcasting day.

To explain what goes on behind the scenes, let us follow an imaginary script as it moves through the different steps that lead eventually to its actual production on the air. After we have done this and have been duly impressed, we could multiply the motions by one hundred and have a fair idea of the highly organized activities that go on constantly behind the doors of a network script department.

The script which we have chosen for this merry chase, is, let us say, the work of a free-lance writer. As such, it is only one of the hundreds of similar brain children mailed in to NBC each week.

When the script is taken from the envelope, a record of its receipt goes into the files, together with all known facts about its author. It then goes to the "Play Reading" division. Here, like all other program ideas that come in, it is read carefully by experienced play readers. If it is found unsuitable at this stage—unfortunately, this is the verdict in a majority of cases—it is returned to its owner. Where conditions warrant the special attention, a letter goes with the rejected script suggesting ways by which the material might be improved.

Occasionally, a script is received which bears the unmistakable mark of talent. The author's name and address are filed for future consideration when the services of a free-lance writer are needed for a special assignment.

Medium Should Be Studied

Although authors have been warned repeatedly that the writing of radio scripts should not be attempted until a thorough study of the taboos, restrictions and styles of the medium has been made, writers continue to submit scripts which completely ignore this fundamental precept. Amateurish offerings make little impression on play-readers.

But when the unusual does occur—as happened to our imaginary script—and the literary work meets NBC's rigid requirements, the play-reader submits a detailed report on it. Script and report are placed on the desk of the Script Division Manager who, if he agrees with the favorable report, in turn submits it to the Production Division and to Program Management. Once our script has been accepted by these two additional groups it has started its routine. The next stop is in the "Literary Rights" section of the Script Division.

The primary purpose of "Literary Rights"—it has been called "the legal watchdog of NBC"—is to protect all literary rights owned by the network, and to guard the Company against the use of material that infringes on the copyrighted

THREE STEPS IN THE LIFE OF A RADIO SCRIPT. TOP TO BOTTOM: ASSISTANT SCRIPT MANAGER WADE ARNOLD WATCHES AS FREE-LANCE WRITER MORT GREEN SIGNS A "RELEASE FORM;" MANAGER MC DONAGH DISCUSSES THE SCRIPT WITH PLAY-READERS MARGO PHILLIPS AND ROBERTA BARRETT;; AUTHOR GREEN SIGNS AN NBC CONTRACT FOR THE PURCHASE OF HIS SCRIPT AS MARION NOYES (SEATED), LITERARY RIGHTS MANAGER, WITNESSES HIS SIGNATURE.

properties of others. But this little-known office has other important duties. Under the direction of the Script Division Manager, "Literary Rights" not only authorizes payment for accepted material but draws up a contract for the author to sign. The contract covers several items. It names the program on which the work will be used; it specifies whether or not NBC is purchasing all rights to the scripts, including movie and book rights, etc., and, in the case of serials, it lists the number of scripts to be purchased.

Our script, of course, must have a title. This means more work for "Literary Rights." Every title used on the air is checked carefully to be certain that it has not been used previously. A title may consist of only one word but generally, if someone already is using it, a new title must be chosen.

Now let us take a closer look at our mythical script. In several places, we find that the author has inserted quotations from other sources. These, too, must be investigated. "Literary Rights" acts at once to obtain the necessary authorizations from the original authors or the owners of the authors' rights. And finally, since this is to be an NBC production, the script must be copyrighted in its produced form. If its success on the air brings subsequent requests from other domestic or foreign stations for its broadcast use, it is the job of "Literary Rights" to attend to the details of leasing and payment.

Scripts Must Be in Good Taste

Our hypothetical manuscript has cleared all hurdles so far and seems to be well on the way to its final objective — an actual broadcast from the studio. Up to this point, the text has been examined for literary form, writing skill and originality. Now it must stand trial for Good Taste and Public Policy. This "trial" takes place in still another section of the Script Division, labeled, on Company organization charts, "Policy Reading." If words of questionable meaning, or statements that might be objectionable to certain classes or groups, are found, they are singled out and brought to the attention of the Script Division Manager or his assistant, who arranges for the debatable material to be altered or deleted. This is done to safeguard the morals of the public and maintain the high standards associated with network broadcasting. This statement may sound stuffy but the precaution is extremely necessary.

At last, our perambulating manuscript, purged of its faults, protected as to its property value, clarified in its literary message and dressed up in a manner befitting its purpose, has completed its journey and is ready for production. The attention given it since its receipt may appear to be extreme but only by such treatment can NBC be assured that the material is suitable to be heard by every member of the audience family and acceptable to all races and creeds.

Our sample script, it will be remembered, was submitted by a free lance writer. A much greater volume of written texts reaches the Script Department from commercial clients and their agencies. These, also, are scrutinized in much the same manner and follow a somewhat similar routine. The principal difference lies in the handling of recommended changes. Since the client and agency have approved the script, courtesy demands that any alterations be approved by them.

But the same standards of good taste apply and only rarely—speaking in comparative terms, of course —is there a conflict on the propriety of material. The American sponsor, like the American network, realizes his great responsibility in providing millions of homes with programs that will entertain and inform without offense to any listener.

RCA TO MAKE LINE OF RADIO BATTERIES

A FULL LINE of dry batteries, especially engineered for radio, will be added to the growing family of RCA products, beginning this month. In making the announcement, L. W. Teegarden, General Manager, RCA Victor Tube Division, said that initially, because of war demands, only a limited number of types will be made available through distributors but these types will account for 80 to 90 percent of the demand. As conditions permit, he added, the program will be expanded to include a full line.

Pointing out that radio batteries make up more than 60 percent of the total sales of the battery industry, Mr. Teegarden said that this is the first time a complete line of batteries will be offered by a radio manufacturer—one who knows radio and its requirements intimately from experience, and who is a leader in the manufacture of battery-radio sets.

Tests have proved that RCA batteries far exceed the minimum requirements of the U. S. Bureau of Standards, according to Mr. Teegarden, thus assuring maximum service and long life of operation in both portable and farm-type radios.

Application of "preferred-type" classifications, which have been used by RCA with outstanding success in the electron tube field, will make it possible, with relatively few types of batteries, to care for the bulk of all radio and general utility requirements. This, he pointed out, means smaller inventories and quick turnover for distributors and dealers, while for owners of battery-radio sets it will facilitate renewals.

The sale of RCA batteries will be handled by the Tube Division in conjunction with RCA tubes and parts. Sales to distributors will come under the supervision of David J. Finn, Manager, Renewal Sales Department.

An RCA replacement battery guide has been prepared covering all standard makes of radios, phonographs, and combinations, and a complete advertising and merchandising program has been organized to introduce the new line.

OFFICIALS OF RCA INTERNATIONAL DIVISION ENTERTAIN THREE MEMBERS OF THE NATIONAL RESOURCES COMMISSION FOR CHINA. LEFT TO RIGHT: LIEUT. COLONEL J. E. HORTON, RCA; T. ROBINSON COX, RCA; K. Y. YIN; J. A. BIGGS, RCA; W. K. CHOW; J. G. MACKENTY AND T. S. WANG.

RADIO AIDS WORLD TRADE

Faster Tempo of Global Business Expected to Call for Greater Use of Communications—American Firms Ready With New Products.

By John G. MacKenty

Managing Director
RCA International Division

RADIO will play an active role in broadening world trade following the war. This will mean progress not only for the United States but for all the friendly nations which seek more security for their people by productive export-import business. As an implement of trade, point-to-point radio communication will help to quicken the pace of business and bring import buyer and export seller together more rapidly, thereby aiding many industries in their search for products, markets, or more efficient turnover.

Following the war, the pace of international trade will be stepped up considerably. The speed of radio communication itself will aid in this process along with another modern tool of overseas trade, faster transportation.

Particular industries, such as mining, petroleum, agriculture, as well as shipping and aviation, will expand their uses of radio in serving the two hemispheres and promoting the interflow of goods and services between them.

The battle for world trade will also involve world opinion; nations must and will be articulate. High power radio transmitters will help them to speak, via short wave and re-broadcast, to the rest of the world. Freedom of speech internationally, in the post-war period, will mean that nations will speak to each other, not only about their culture and their social and political problems, but also about their industries, their products, the inviting beauties of their countries.

Nations Must Use Radio

During the war we learned a great deal about psychological warfare. A nation promoting its interests abroad must be prepared to make good use of radio broadcasting. World opinion is not formed exclusively by radio, but by its nature this medium matches the tempo of world affairs. "Getting there first with the most" is a fundamental precept of good radio technique.

Many nations will modernize their internal communication systems by means of new, high speed radio equipment. This will mean a speeding up of business generally. New developments in radio transmission will help not only isolated areas, but those which are more highly developed. Television, when available internationally, will be an important instrument in the exchange of products and services.

The radio industry in the United States is prepared to aid international trade in a broad sense. RCA, already well established overseas, recently announced the formation of the RCA International Division to administer the corporation's operations outside of the United States. With headquarters in New York, the new Division is responsible for the selling of all products manufactured by all of the various RCA companies. The hundreds of distributors of various RCA products long established within the activities of the RCA Victor Division will continue to function as an important asset of the RCA International Division. Under the new International Division will also be included the sales of the specialized ship-to-shore radio equipment manufactured by the Radiomarine Corporation of America, an RCA company, which formerly handled its own sales abroad.

NBC 10-YEAR CLUB

Induction of 36 employees into the NBC 10-Year Club at the organization's annual dinner held May 3 at the Waldorf-Astoria Hotel, increased the membership to 629. Speakers at the dinner included Brigadier General David Sarnoff, President of RCA and Chairman of the Board of NBC; Niles Trammell, President of NBC, and Clay Morgan, assistant to Trammell. Dr. James R. Angell, NBC Public Service Counselor, was toastmaster.

NEW SHIPBOARD RADIO SET

16-Tube Receiver, Designed by RCAC to Provide Entertainment for Crew, Can Be Used Without Betraying Ship's Position.

By I. F. Byrnes

Chief Engineer,
Radiomarine Corporation of America

IN connection with the large wartime shipbuilding program of the U. S. Maritime Commission, one of the factors which has received careful attention has been adequate provision for the reception of broadcast programs. Shipboard personnel, by the nature of their duties, must spend long periods of time isolated from events on land. In wartime, with its attendant maritime hazards, the absence of news and entertainment would put an additional strain on the men who "go down to the sea in ships." Therefore, an efficient broadcast receiver capable of receiving the standard broadcast band, as well as the short wave bands, is an essential part of the radio equipment on our modern wartime merchant fleet.

Prior to the war many members of the crew, wishing to tune in their favorite programs while at sea, would bring aboard their own broadcast receivers. The conventional superheterodyne type of radio receiver, which includes an oscillator, is capable of radiating a signal that might be picked up over distances of several miles. With the submarine menace, the use of such receivers would endanger the safety of the ship and crew because the radiated signal would disclose the ship's position. Accordingly, it was necessary to prohibit the use of any type of receiving equipment aboard ship unless that equipment complied with rigorous specifications which limit the radiated power to an extremely small value. Just how minute this value of power is may be visualized by stating that it would require the combined output of two and one-half billion receivers to equal one watt.

New Receiver is Versatile

Engineers of Radiomarine, using their long experience in the design and development of communication equipment for shipboard service, have developed a new model AR-8511 receiver to meet the specifications of the U. S. Maritime Commission. In the design of the new unit particular attention was directed toward achieving highly reliable equipment, simple in operation, and capable of being powered directly from a source of 115 volts D.C. The large majority of merchant ships have a primary power supply which is direct current. Therefore, the use of a basic A.C. type of receiver would involve additional power converting apparatus, such as a motor generator or vibrator. Since a shipboard broadcast receiver may be used twenty-four hours a day, it is highly desirable to eliminate completely all power converting accessories which are subject to considerable wear and tear.

The new receiver is constructed in an aluminum cabinet, provided with built-in rubber shock-mounts to protect the equipment from the effects of shipboard vibration. A cast aluminum chassis is employed to insure maximum rigidity of all components. Convenient access for tube replacements or routine maintenance is obtained through a hinged top cover. The receiver front panel and the chassis are assembled as a unit for easy removal from the cabinet.

Four tuning ranges chosen by means of a band selector switch permit coverage of the standard broadcast band of 530 to 1600 kilocycles, as well as all short wave channels between 5 and 23 megacycles. The tuning scale is of the full vision type and is constructed of Lucite with indirect illumination for use in a darkened pilot house or chart room.

Selectivity May Be Varied

A feature, not ordinarily found in a broadcast receiver, is the control of selectivity characteristics. This is accomplished by means of a three-position selectivity control which changes the intermediate frequency amplifier circuits for

STURDY, COMPACT AND EFFICIENT, THIS NEW RADIOMARINE RECEIVER WAS DESIGNED TO PROVIDE ENTERTAINMENT FOR CREWS ABOARD SHIP.

"sharp", "medium" or "broad" band-pass conditions. In the "broad" position, the receiver circuits will pass audio frequencies from 50 cycles to 8,000 cycles, thereby enabling reception of high fidelity programs. In the event of excessive atmospheric noise or interference, the selectivity control is used in the "sharp" or "medium" positions. The receiver is also fitted with a fidelity or tone control so that the higher audio frequencies may be attenuated when desired.

Receiver Has 16 Tubes

Sixteen vacuum tubes are used in the AR-8511. The circuits comprise one stage of radio frequency amplification, three stages of intermediate frequency amplification, and the usual mixer, high frequency oscillator, second detector, phase inverter and audio amplifier stages. The second detector is arranged so that it also functions as a noise limiter which may be switched in or out of circuit by means of a panel control. In addition, a C.W. (continuous wave) oscillator stage is provided so that the receiver may be used as a communications unit for reception of telegraph signals. Facilities are also provided for connection to an electric phonograph pickup.

The average shipboard installation, using a broadcast receiver of this type, includes four or five 12-inch loud speakers located throughout the vessel. The receiver itself is located in the chart room or pilot house, and has connected to it a 6-inch monitoring loud speaker. Such an arrangement requires that the receiver be capable of delivering considerable power to the loud speaker system. The AR-8511 is designed to provide 10 watts of audio power with a harmonic distortion not exceeding approximately six percent. An output of 13 watts is possible before the distortion exceeds ten percent.

The low radiation characteristic of the receiver is accomplished by means of careful filtering, isolation, and shielding of the oscillator circuits. Furthermore, the use of a comparatively high intermediate frequency, 1700 kilocycles, provides additional discrimination between the tuned R. F. amplifier and the oscillator stages. The use of 1700 K.C. as the intermediate frequency also enables a high image-rejection ratio to be maintained. These ratios are in the order of 5,000 for the broadcast band and 1,000 for the band between 10 and 15 megacycles.

Adapted for Different Antennas

The receiver is designed for use with either a doublet type of antenna or the conventional single wire. The sensitivity is such that signals to the order of 10 or 15 microvolts per meter may be used on the basis of a signal-to-noise ratio of one hundred-to-one. The automatic volume control circuits hold the output substantially constant with inputs of 100 microvolts to 1 volt.

In addition to the normal application of the AR-8511 for reception of broadcast programs, the unit is also well suited for service as a communications receiver. A panel controlled C.W. oscillator permits reception of continuous wave telegraph signals, and the coverage of the short wave bands from 5 to 23 megacycles includes all of the channels normally used for long distance code communication. The receiver panel is provided with a phone jack so that telephone receivers may be used for this service.

Special Rectifier for A. C.

As previously mentioned, the receiver is designed for operation from a direct current source of 115 volts D.C. For installation at shore locations or other points where the power supply is alternating current, a compact rectifier unit is used. This rectifier unit delivers 40 watts at 115 volts D.C. for the plate and screen circuits of the receiver.

In the overall design of the AR-8511, advantage has been taken of many improved electrical components developed during the war. Ceramic tube sockets are used throughout to maintain high insulation under marine moisture conditions. All coils are thoroughly wax impregnated to resist moisture. American War Standard capacitors, resistors, and other components are employed. Ceramic type trimmer capacitors which maintain their adjustments under severe operating conditions are utilized in the R.F. circuits. Adjustable iron cores for the R.F. inductors are provided. The use of aluminum for the cabinet, panel, and chassis reduces overall weight.

RCA TERMINATES V-LOAN CREDIT

Company Repays Balance Due On $75,000,000 Advance.

Through repayment on May 7, 1945, of $35,000,000, the Radio Corporation of America terminated the $75,000,000 V-Loan credit which it made in September 1942 with thirty-five banks and trust companies, Brigadier General David Sarnoff, President of RCA, announced May 8.

The Corporation originally borrowed the full amount of the V-Loan Credit and gradually repaid $40,000,000. The final repayment leaves the Corporation with no loans or fixed indebtedness outstanding.

RCA was one of the first corporations to arrange for a V-Loan Credit under regulations issued by the Board of Governors of the Federal Reserve System to facilitate and expedite war production. At that time, it was the largest loan of its kind to be made.

RCA Declares Dividend

Following the meeting of the Board of Directors of the Radio Corporation of America, held June 1, in New York, Brig. General David Sarnoff, President, announced the declaration of a dividend of 87½ cents per share on the outstanding shares of $3.50 Cumulative First Preferred stock, for the period from April 1, 1945, to June 30, 1945. The dividend was made payable July 2, 1945, to holders of record at the close of business June 11, 1945.

RCA VICTOR TRAINS SALESMEN

New Course is Laid Out to Give Field Force a Basic Understanding of Company Products, Policies and Markets.

By W. Boyce Dominick

Personnel Administration, RCA Victor Division, Camden, N. J.

TO prepare sales representatives to meet the keen competition which will be encountered in the postwar market, RCA Victor has developed a new basic training course designed to give its field force a comprehensive understanding of the RCA organization, its policies, background, markets, products, and postwar plans. It is believed that by giving sales representatives a broad, well-rounded picture of their Company they will be in a better position to present to the best advantage the specific lines manufactured or sold by RCA Victor and to build goodwill for the Company.

The new training course was developed by a special Sales Training Committee appointed by the General Managers of RCA Victor. With the writer serving as chairman, the committee members were George R. Ewald, A. Goodman, J. L. Hallstrom, E. T. Jones, E. N. Madden, C. G. O'Neill, and T. A. Smith, Secretary.

Students Suggest Agenda

The committee's first step was to address a questionnaire to RCA Victor sales representatives to secure their help in developing a basic training course which would meet the specific needs of the field force. Representatives who had been active for some time were asked to enumerate the subjects they themselves would like to have presented in a "refresher" course. They were also requested to suggest, on the basis of their own sales experience, the type of training they felt would be helpful to newly-appointed field representatives.

The response to this questionnaire was almost 100%, a fact which strikingly illustrated the general desire of sales representatives for such a program. Many of those queried offered valuable suggestions for the development of the new course. Commercial managers and Regional managers were also asked for their suggestions as to the material to be incorporated in the basic training course. It was interesting to note that their recommendations coincided with those made by sales representatives themselves.

Among the leading subjects on which these men wanted information were competition, service policies, sales techniques, customers' problems, markets, and electronics; specifically, they wanted product information which would help them to sell RCA products in a highly competitive postwar market.

Plan Has Two Objectives

On the basis of the returned questionnaires, a careful overall study was made of the training requirements of the field force, both from the standpoint of the representatives themselves and their commercial departments. A tentative plan was evolved by the Sales Training Committee and objectives of the proposed training were crystallized into two major phases:

1. To present an over-all picture of RCA, its products, markets, merchandising policies, methods of distribution, competition, conditions of sales, and customer problems, so that each RCA sales representative would be equipped with the basic information needed to perform an intelligent sales job in a highly competitive market.

2. To further develop the attitudes and morale of RCA sales representatives through acquaintanceship with the executives of the Company and their plans, and the progress that is being made, through research, on established products and new products.

The training course subsequently developed was skillfully prepared and directed to cover a broad range of subjects in an original and stimulating program. Several months ago the first group of forty sales representatives were brought together in Philadelphia for the program. Five and a half days were devoted to the course, including three evening sessions. These meetings were addressed by executives of the Company, sales specialists, engineers, and other members of RCA.

One of the highlights of the program was a panel discussion held on the concluding day when questions accumulated during the sessions were submitted by sales representatives and answered by a panel composed of J. K. West, Chairman, H. P. Alspaugh, Meade Brunet, Edward C. Cahill, W. L. Jones, Allan B. Mills, J. W. Murray, Robert Shannon, and L. W. Teegarden. Many leading questions based on products, markets, and merchandising policies for the postwar period were clarified through this panel discussion so that each representative was given a direct answer to his specific question. The panel discussion proved so lively that a number of those present declared they had gained a fresh concept of the Company and its postwar possibilities. Another highlight of the course was a visit to the RCA Laboratories at Princeton.

Visual Aids Widely Used

Throughout the training program the various commercial departments made generous use of charts, slides, and sound motion pictures in connection with their presentation. At the conclusion of the presentation by each department, a question and answer period was held.

Product booklets, sales promotional literature, books on electronics, and helpful material on selling and salesmanship were made available to sales representatives. A bibliography of reference works on advertising, selling, and marketing was provided as a part of the printed program for the week.

Voluminous notes taken during the course by the forty sales representatives in attendance were evidence of the keen interest aroused by the presentations. Personal in-

FORTY RCA VICTOR SALES REPRESENTATIVES PARTICIPATE IN A NEW COURSE OF LECTURES AND INSPECTION TRIPS TO ACQUAINT THEM WITH THE COMPANY'S POLICIES, PRODUCTS AND POST-WAR PLANS. TOP RIGHT—FRANK M. FOLSOM, EXECUTIVE VICE PRESIDENT IN CHARGE OF RCA VICTOR DIVISION, ADDRESSES ONE GROUP OF SALESMEN. LOWER RIGHT—C. N. HOYLER OF RCA LABORATORIES EXPLAINS THE ALL-ELECTRONIC PENICILLIN PROCESS TO ANOTHER GROUP.

terviews with a cross section of the sales representatives and questionnaires addressed to all of them at the conclusion of the course showed that the following values were obtained from the project:

a. A good understanding of the background, products, merchandising policies, and methods of distribution of the RCA Victor Division;

b. An appreciation of the thought and effort that have been put into postwar planning on the part of company executives; and

c. A new concept of the progressive spirit exhibited by the Company in its research activities.

Course to be Extended

Substantially the same course was later presented to a second group of sales representatives in Philadelphia. Plans are now projected for making such basic training available to additional groups of sales representatives as soon as transportation restrictions are lifted.

This "refresher" course, designed to give a clearer inside picture of the Company than has been presented heretofore to the sales force, is considered only a good beginning in any well-organized sales training program. It was not designed to take the place of sales product training or training in sales techniques, which of necessity constitute a continuous company activity. It does, however, answer the desire of sales representatives for foundational information on the Company they will represent and the products they will sell in a highly-competitive postwar market.

During the preparation of the course, one sales representative expressed his conviction that "the specialized sales representative should have concentrated training in the products he sells and a good working knowledge of other products and the Company's policies, so he will not appear ignorant of other activities of the Company."

During the course one of the speakers brought out this same thought. He said, "It is not enough merely to do our own jobs well. We shall in effect be doing those jobs better than they have ever been done before if we do them with a better understanding of all our interdependent relationships."

Reasons for Course

It was to meet this need for a basic understanding of the Company as a whole that this course was developed and put into successful operation for the "refreshing" of established representatives and the orienting of newcomers to the RCA selling organization.

Since the course was developed, a Sales Training Program has been built for each new Sales representative on an individual basis. The procedure is to schedule interviews for the Sales representative with specialists in the Company so that the new representative may receive as much as possible of the information provided in the Sales Training Course.

SARNOFF ANNOUNCES RCA SCHOLARSHIPS

A scholarship plan for the encouragement of promising young scientific students has been adopted by the Radio Corporation of America, Brigadier General David Sarnoff, President of RCA, announced on July 9.

Under the plan, approved by the RCA Board of Directors, as many as ten students may receive RCA scholarships during the academic year 1945-1946, thirty during 1946-1947, fifty during 1947-1948, and sixty each academic year thereafter. Each scholarship consists of a cash award of $600. Those eligible will include all students enrolled at universities to be specified later by the RCA Education Committee. Selection will be made upon recommendation of the dean of the specified university and approval by the committee.

Comprising the RCA Education Committee are Dr. James Rowland Angell, Public Service Counselor of the National Broadcasting Company, who is Chairman; Gano Dunn, a Director of RCA; Dr. C. B. Jolliffe, Vice President in Charge of RCA Laboratories, and F. H. Kirkpatrick, Director of Education and Training, RCA Victor Division.

RCA STOCKHOLDERS CROWD STUDIO 6A IN RADIO CITY TO HEAR THE 26TH ANNUAL REPORT BY BRIGADIER GENERAL DAVID SARNOFF, PRESIDENT (INSET ABOVE). DIRECTORS OF THE COMPANY ARE SEATED AT THE LONG TABLE ON EITHER SIDE OF PRESIDENT SARNOFF.

RCA STOCKHOLDERS MEET

New Peaks of Productivity and Service Reached by Company, Sarnoff Reports—Preliminary Steps for Reconversion Outlined.

WITH all of its facilities contributing to the supreme task of helping to win the war, the Radio Corporation of America, during the past year, reached new peaks of productivity and service in every phase of its operations, Brigadier General David Sarnoff, President, announced May 1, at the 26th Annual Meeting of RCA stockholders in an NBC studio in New York. He declared also that all divisions of the company have made plans and are taking preliminary steps to resume peacetime activities and development as soon as conditions permit. The company's present working capital of approximately $60,000,000, General Sarnoff added, should be sufficient for reconstruction and expansion in the postwar period without necessitating the raising of additional capital through long-term borrowing.

In reporting operations in the first quarter of 1945, General Sarnoff revealed a gross income of $85,385,000, an increase of 8% over the corresponding period of 1944. Net profit after taxes was $2,987,000, an increase of 24% over the first quarter of the previous year. Earnings per common share after taxes increased from 11.6 cents per share to 15.8 cents for the quarter. Federal income taxes amounted to $9,157,000, an increase of 14% over the first quarter of 1944.

Unfilled Orders Decrease

Unfilled orders of RCA manufacturing plants on April 1, 1945, totalled approximately $180,000,000 compared with $300,000,000 on the same date a year ago, a decrease of about 40%. Orders booked during the first quarter of this year amounted to $62,000,000 compared with $83,000,000 for the same period in 1944, a decrease of 25%.

After recalling that RCA personnel had increased from 457 in 1919, when the company was founded, to 38,000 today, General Sarnoff outlined the pension plan adopted on December 1, 1944 for the employees of the Corporation and its subsidiaries. The plan, approved by stockholders at the May 1 meeting, is open to all employees and assures them the security of an income upon retiring. "Stockholders," General Sarnoff said, "benefit from a Retirement Plan, for it offers encouragement to younger men to remain in the service of the company during their most effective years and attracts others to enter its service. Systematic retirements keep the ranks younger and the lines of promotion open. Thus the interests of the company and its stockholders are promoted by maintaining vigorous, competent personnel and by a higher morale throughout the organization. Maximum efficiency, loyalty and enthusiasm are stimulated. These are factors upon which the future of the company depends."

General Sarnoff told the stockholders that more than 90% of the employees eligible to participate have enrolled in the Plan and that 98% of the voting stockholders had approved the Plan.

All-Time Gross Profit is 9%

During the first 25 years of the company's existence—from 1919 to the end of 1944—RCA's profits, before Federal Income Taxes, totalled $237,000,000. This, General Sarnoff said, represents a profit of 9% on the gross business. Federal Income Taxes amounted to $114,000,000, leaving a net profit of $123,000,000, an average net profit over the 25 year period of nearly 5%, after taxes.

"During the first year of the company's operation," General Sarnoff stated, "the gross business was

only $2,000,000. The growth and scope of our activities—particularly during the war period—are indicated by the fact that last year our business was more than $326,000,000.

"Out of earnings during its first 25 years, RCA paid approximately 65% or $80,000,000 in cash dividends; $57,800,000 was paid on the Preferred stock and $22,200,000 on the Common stock."

Predicts Record NBC Year

Analyzing the activities of each Division of the Company in 1944 and prospects for the current year, General Sarnoff said that the report of business done by the National Broadcasting Company in the first quarter of 1945 "gives evidence that this will be another record year for the National Broadcasting Company. NBC's volume of business in 1944 exceeded that of any previous year.

"During the past year," he continued, "the world-wide circuits of RCA Communications continued to perform outstanding service in linking the battlefronts as well as the United Nations. Evidence of the tremendous activity on the international wave-lengths is found in the record of 150,000,000 words, largely related to the war, handled by RCA in 1944. It is expected that the 1945 total will exceed 200,000,000 words.

"The war likewise puts increased demands upon radio on the high seas. To serve this greatly increased maritime activity, the Radiomarine Corporation of America has developed and produced radio apparatus of highest efficiency. Hundreds of U. S. Navy vessels and ships of the Merchant Marine carry this latest equipment, including automatic lifeboat radios and direction finders."

100 War Projects Conducted

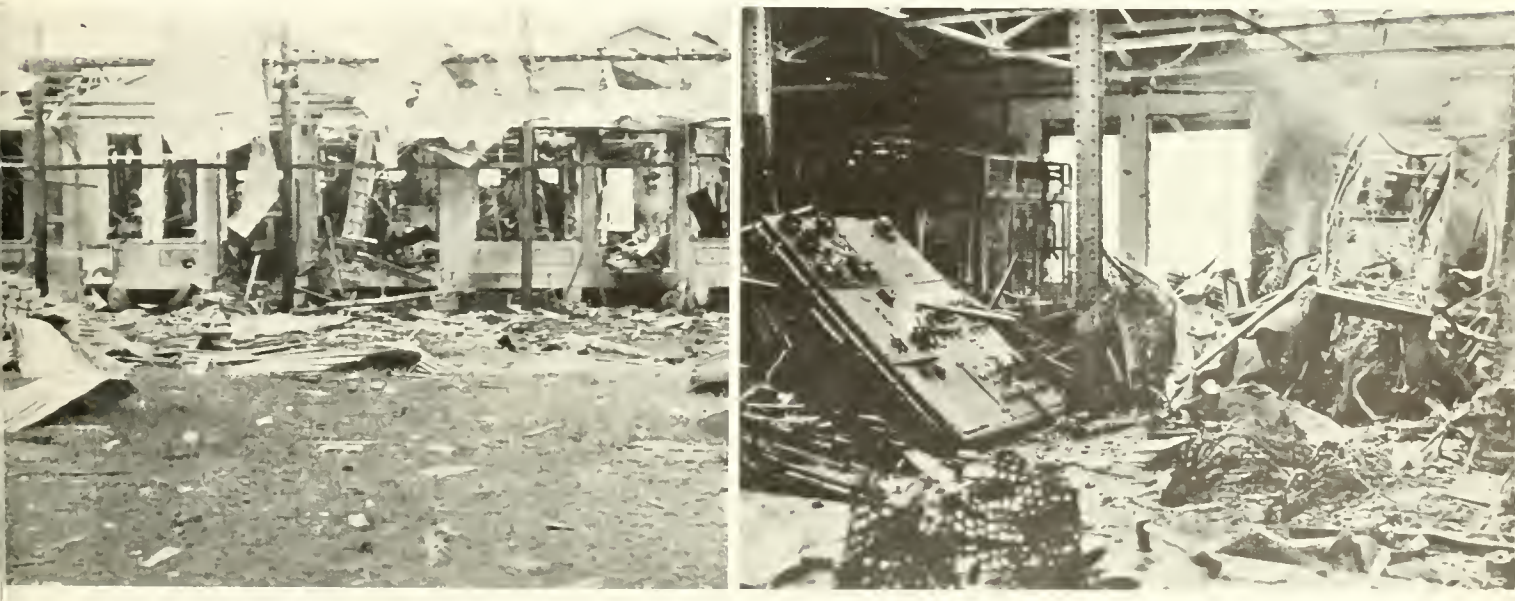
The Laboratories, he said, have conducted more than 100 war projects for the Army, Navy and the Office of Scientific Research and Development. RCA scientists have pioneered in laying the groundwork for network television, facsimile transmission and many other services. Included in this development work is the practical use of microwaves in the radio relay. General Sarnoff revealed that RCA in the near future expects to have in operation a radio relay chain between New York and Washington. Applications for this system have been filed with the Federal Communications Commission. It will provide a large number of channels capable of handling international communications traffic, radiophotos and program transmission.

Over 200 New Tubes Built

Other outstanding wartime accomplishments of the Company, General Sarnoff related, have been the building of more than 200 new types of electron tubes; the greatly extended application of radio heat in industry, and an advanced development model of projection type television receiver with a picture image 16 by 21 inches.

"In the swiftly moving art that is radio," RCA's President concluded, "our direction must be constantly forward. Television holds great promise but it is not the only promise for the future. Every new development of radio and electronics is a new opportunity for increased service to the public, for more employment in the industry and for greater prospects for the company and its stockholders. We will pursue these opportunities to the utmost of our abilities."

Manila Installations Razed to Foil Japanese Invaders



SCENES OF DESTRUCTION AT THE MANILA STATION OF THE RADIO CORPORATION OF AMERICA AFTER THE TRANSMITTER, ANTENNAS AND POWER SUPPLIES HAD BEEN DEMOLISHED IN JANUARY, 1942, TO PREVENT THEIR USE BY THE JAPANESE. FOLLOWING RECONSTRUCTION OF ALL FACILITIES, RCA COMMUNICATIONS RESUMED TRANSMISSIONS FROM THIS COUNTRY TO THE PHILIPPINES ON JUNE 17.

Fungus Fighters

CHEMISTS AT RCA VICTOR DEVISE PROTECTIVE MEASURES FOR RADIO EQUIPMENT DESTINED FOR THE MOISTURE-LADEN TROPICS

By Clifford Eddison

Manager, Chemical Engineering Section
RCA Victor Division

THAT an ounce of prevention is worth a pound of cure is dramatically represented by the "tropicalization" of electronic equipment, where it has been demonstrated that the treatment may extend the useful life of equipment as much as 240 times when exposed to severe atmospheric conditions. The history of "tropicalization" as applied to our equipment is another development created by the exigencies of war.

Any and all equipment for military service in a global war must operate under any condition to be found on the surface of the earth and, in some cases, under the seas and in the air. This is particularly true of electronic equipment. Communications (radio, radar, etc.) must not be impeded. It is more vital than the missing nail from the shoe of the horse, for lack of which a battle was lost.

In normal times, most commercial radio equipment manufactured in the United States was built for the domestic market and usually housed in atmospheres largely independent of external climatic conditions. The materials of construction were sufficiently satisfactory to ensure a long and useful operating life. Reports of material failure, because of exposure to unusual and much more drastic climatic variations, such as high temperature and excessive humidity, had been received from the South American and Caribbean areas, but the number of equipments involved was very small in relation to total production, and remedies for the situation proceeded somewhat slowly.

High Humidity is Common

The full impact of the significance of this kind of exposure on military materiel was not wholly realized until the equipment was operated in the early stages of the war in the South Pacific—in tropical regions such as New Guinea, Borneo, the Solomon Islands, Java, etc.—where the temperature is usually high and the humidity is close to, or at, the saturation point at all times, and where even a slight depression in temperature results in dew point (condensation). When, to these conditions, are added tropical rain storms, swamps, and water drained or trapped in foxholes, it can readily be seen that equipment operated in such environment rarely has the chance to dry out completely, and that the rate of attack on materials is accelerated with consequent early failure of equipment.

The solution to the problem comprised a number of phases:

(a) Redesign of component parts and equipment in order to eliminate water traps and conditions conducive to fungus growth.

(b) Immediate substitution of materials of reduced sensitivity for materials known to be sensitive to moisture absorption or fungus growth.

(c) Provision of a water-resistant, fungus-proof coating for component parts and equipment.

(d) Determination, by thorough study, of the best materials for use in electronic equipment and the optimum method of processing them in order that equipment might operate under any observed or anticipated conditions of use.

Steps (a), (b) and (c) were put into operation as quickly as possible and together formed the basis of what has come to be known as "Tropicalization."

Since fungi cannot propagate in the dry state, the problem of protecting materials from them, with consequent increased life for equipment, would seem to resolve itself into complete water-proofing of component parts and completed equipment. While water-proofing does go a long way towards solving the problem, it cannot be considered a completely satisfactory one, since

LEFT: A SPRAY OF LACQUER IS THE FIRST STEP IN PREPARING A RADIO CHASSIS FOR ITS DESTINATION IN THE TROPICS. BELOW, LEFT TO RIGHT: 1—ALL AIR IS REMOVED BY SUCTION FROM THE WATER-PROOF BAG CONTAINING THE EQUIPMENT; 2—THE PAPER ENVELOPE IS SEALED; 3—A SECOND CARTON IS PLACED

it is difficult to conceive of all water-proofed materials in humid atmospheres being free of surface moisture. In the presence of this surface moisture and nutrient media, the latter provided by natural sources (sand, humus, finely divided soil) and carried by the wind, fungus may develop.

A number of materials were examined to determine their usefulness as water-proofing agents, but many, otherwise suitable, had physical or chemical limitations with respect to other necessary characteristics for communications equipment, making them of small value for the purpose. Many materials having efficient water-proofing properties do not meet all other expected requirements. Some of them, for example, may have too low a softening point. Others crack at low temperatures. Airplanes, though stationed in the tropics, must often fly at extremely high altitudes, which means, of course, exposure to low temperatures. Cracks formed at the low temperatures permit diffusion of moisture to component parts once the plane has returned to the tropical conditions prevailing at its base, with consequent early failure of the parts. Much experimental work had to be done by the services, notably the Signal Corps, and industry before a workable solution to the problem was available. Component parts and equipment are now treated, either by spraying, dipping or brushing with a lacquer or varnish having high moisture resistance as well as other desirable properties and in which fungicidal agents have been incorporated.

A fungicidal agent may be described briefly as an agent restricting the growth of fungus. To be a little more technical, perhaps, it must have fungistatic properties. The evaluation of fungicidal agents brought into communications equipment manufacture an activity and techniques alien to commercial radio manufacture. One of the first steps in this evaluation is the development of proper techniques controlling the growth of fungus.

Nature Develops Fungus Easily

Under tropical conditions of high temperature and humidity(it is not essential to travel to the South Pacific to obtain them—some conditions of storage and packaging simulate them quite well in Boston, Chicago or Washington) nature seems to have no difficulty in developing prolific fungus growth. Nutrient elements, independent of natural sources, are found in many organic construction materials, including those finding use in communication equipment (cotton, paper, wood, some adhesives, felt, leather, etc.), either because of their inherent chemical composition or because, in prior manufacturing processes, chemicals supporting fungus growth may have been used and retained by fibers or cells. In the laboratory, however, exquisite care must be taken with respect to prior sterility, to the kind and amount of nutrient media employed, and to temperature and humidity controls, before specified types of fungus may be grown.

In practice, various kinds of fungi are used for testing purposes, four of the most widely employed species being Aspergillus Niger, Aspergillus Flavus, Penicillium Luteum and Trichoderma T1 USDA. These different species of fungi are used for a number of reasons. In the first instance, amongst them are species most destructive of cellulosic construction materials. In the second instance, under controlled laboratory conditions, they are not the most difficult fungi to grow; and, finally, the fungistatic properties of different fungicidal agents may be more thoroughly determined by using all of them than by testing these preparations against one type of fungus, since all fungi do not react the same way to the same fungicidal agent. Collectively, they present a fairly good yardstick by which the fungistatic properties of all the more common fungicidal agents can be measured. Some of these agents, selected from a long list available for the purpose, are: salicylanilid, copper naphthanate, parabromorthocresol, parachloro-metacresol, anilinomethylbenzomercaptothiazole, phenylmercuric stearate and tetra and penta chlorphenol.

The fungistatic properties of fungicidal agents depend not only on their chemical structure, but also on certain physical properties of which the vapor pressure developed over a useful temperature range is important. Too high a vapor pressure between 30° and 80°C, for example, is not desirable, since the compound may volatilize in too short a period of time. On the other hand, a vapor pressure below a definite value would not give fungistatic protection.

Other considerations involved in

HOWEVER SMALL THE RADIO PARTS TO BE SHIPPED, THEY RECEIVE THOROUGH PROTECTION AGAINST MOISTURE-VAPOR THROUGH THE USE OF SPECIAL SEALING ADHESIVES AND CAREFUL PACKAGING.

OVER THE FIRST; 4—OVER ALL GOES A SECOND WATER-PROOF ENVELOPE, AND 5—THE COMPLETE PACKAGE, NOW MULTI-PROOFED AGAINST THE RUINOUS EFFECTS OF TROPICAL FUNGUS AND CONTINUOUSLY HIGH HUMIDITY, IS PLACED IN A CRATE FOR SHIPMENT TO SOME DISTANT WAR FRONT.

selecting a suitable fungicidal agent include the solubility of the compound in lacquer or varnish solvents and its compatibility with the dried lacquer or varnish film. It is essential that the fungicidal agent stay in solid solution with the dried film. Separation, particularly at the surface, would not only deprive the full thickness of the film of the protection offered by the fungicidal agent, but, in the case of some such compounds, would present a physiological hazard, since many of them are of a toxic nature and may cause dermatitis.

Fungicides are Watched

Another factor involved in the selection of a fungicidal agent, apart from any question of fungicidal activity, is its effect on other materials employed in component parts manufacture or equipment assembly. Some fungicidal agents liberate products capable of attacking certain materials and causing corrosion—a possibility which cannot be tolerated in electronic equipment.

An interesting activity contributing to the success of the "tropicalization" program is the care with which assemblies and parts are packaged for shipment overseas. Materials and processes for packaging have been scientifically selected in order to restrict the access of moisture vapor to the contents of the package when in transit or storage, or, in case of accident or necessity, (sometimes a ship's cargo must be floated to shore on the tide) to prevent the ingress of water.

While, obviously, dissimilarity in type, mass and shape of various materials prohibits entirely uniform packaging procedures, one method pertinent to the shipping of electronic parts and equipment designed to restrict the entrance of moisture vapor may be described as the carton-barrier-carton system. Much of the effectiveness of the system may be credited to the construction and materials of the barrier. The kind used in the RCA Victor organization relies essentially for its moisture-vapor-proofing properties on a thin metal foil of aluminum or lead. The metal foil is backed by a special paper which in turn is backed by a textile known in the trade as scrim cloth. Foil, paper and textile are joined together by water-proof adhesives in a continuous operation. The surface of the metal foil is then coated with a special thermoplastic adhesive selected for its ability to seal perfectly to itself on the application of heat. Envelopes of required size are fabricated from this laminated structure.

In practice, the article to be packaged is placed in a carton of specified paper or cardboard. A suitable amount of moisture absorptive material, such as silica gel, contained in a cotton bag, is introduced. The carton is then placed in one of the moisture-vapor-proof envelopes and the top of the envelope is sealed by means of locally applied heat.

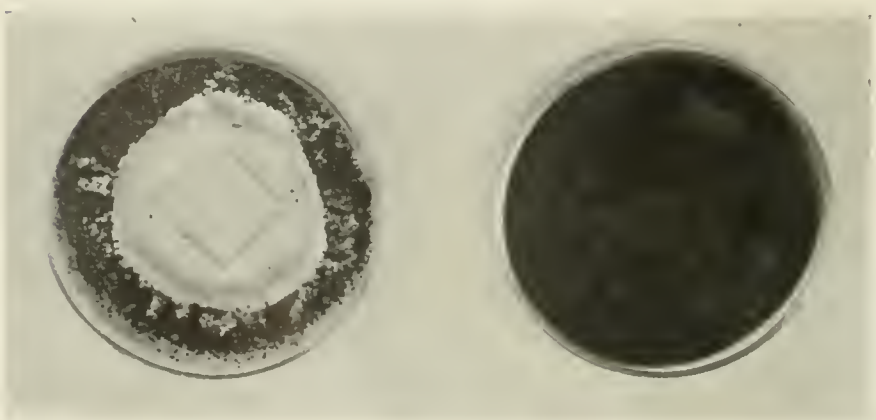
An interesting innovation during the sealing operation is the withdrawal of as much air as possible by means of a suction system similar to an ordinary household vacuum cleaner. This withdrawal of air deflates the envelope, and makes the structure conform easily to the next operation, namely, insertion into another carton of approved paper or cardboard. When this carton is sealed with a water-proof adhesive the process of moisture-vapor-proofing is completed. The value of the method, of course, relies on the inability of moisture vapor to pass through the metal foil. However, it is not entirely impermeable to moisture over long periods of time. Pinholes in the foil may exist and moisture is present in the residual air of the envelope at the time of sealing. The amount of silica gel to take care of these considerations is calculated in advance, based on the size of the package and its probable time in transit and storage.

Water-Proof Barrier Added

Water-proofing, as distinct from moisture-vapor-proofing, is provided by a water-proof barrier, usually in the form of a bag, made of a laminate of paper and an asphaltic material. Sometimes two, sometimes three layers of special Kraft paper are used. To resist mechanical shock, the completed package is held in a wooden case.

The guarding of parts and equipment by "tropicalization" against the effects of adverse atmospheric conditions, from the time of manufacture and assembly through shipping and storage to a useful life wherever operated has become a complete and accepted function—an integral part of RCA Victor manufacturing practice and thoroughness.

DESTRUCTIVE FUNGUS HAS BEEN UNABLE TO DEVELOP ON THE SMALL SQUARE OF TREATED LAMINATED BOARD AT THE LEFT BUT HAS COMPLETELY COVERED THE UNTREATED SURFACE ON THE RIGHT.



CROWDS WAIT TO ENTER THE GATES OF RCA'S LANCASTER, PA., PLANT DURING THE OPENING DAY OF ITS "OPEN HOUSE," JUNE 11-13. AT RIGHT: VISITORS SEE EXHIBITS OF THE LATEST RCA CATHODE-RAY TUBES AND LISTEN TO EXPLANATIONS OF THEIR USES IN TELEVISION APPARATUS AND INDUSTRIAL PLANTS.

"OPEN HOUSE" AT LANCASTER

Thousands Accept Invitation of RCA and Navy to Inspect Tube-Making Plant Closed to Public Since Its Erection.

THE community of Lancaster, Pa., turned out to salute the wartime achievements of the 2½-year-old RCA plant in that city on June 11, 12, and 13, when RCA, in cooperation with the United States Navy, held "Open House" at which visitors were admitted to the plant for the first time.

Tube manufacturing and testing operations in the sparkling work areas of the plant, which is the most modern electron-tube-manufacturing plant in the world, vied strongly for public interest with the many special displays and demonstrations which featured the three days. More than 18,000 visitors, largely from the Lancaster area, and including families, friends and neighbors of the plant's 2,500 employees, participated in the event.

L. W. Teegarden, General Manager of the Tube Division of RCA Victor was a speaker at an employee rally, preceding the inauguration of the "Open House." At the rally the entire personnel rededicated themselves to unrelaxed production efforts in the war against Japan.

A highlight of the rally was the presentation of a second star for the plant's Army and Navy "E" flag, in recognition of continued achievement. The flag was awarded to the plant in April, 1944, followed by the first star six months later.

Looking ahead to postwar prospects, Mr. Teegarden said that radio and electron tubes for civilian use can be made available as rapidly as present wartime restrictions are lifted. Opportunities for continuing employment and advancement with a minimum of reconversion dislocations are better in the tube industry than in most other industries, he told employees, since tubes made during the war are much the same as those that will be made after the war.

Prominent Speakers at Rally

Other speakers at the rally included John A. King, Manager, Lancaster Plant; Earl M. Wood, Manufacturing Manager; O. Richard Heistand, Manager of Personnel Department, who was master of ceremonies; Walter L. Kohr, president of Local B-1165 of the International Brotherhood of Electrical Workers, and the Rev. Dr. James E. Wagner, pastor of St. Peter's Evangelical and Reformed Church, of Lancaster, who pronounced the invocation and led the assemblage in prayer.

Built by RCA in 1941-42 at the request of the Navy, and engaged in producing the power, cathode ray, and special-type tubes which are the heart of radar and other secret military devices, the Lancaster plant had been "under wraps" until now for military security reasons.

Although some areas remain restricted, guarded chalk-line routes guided visitors to the "Open House" through a large and highly interesting portion of the plant. Attendants were stationed at all displays to explain their significance and answer questions, and armed forces personnel as well as RCA experts demonstrated the working exhibits.

Visitors saw and heard the famous RCA "Battle Announce" system used on combat vessels to flash orders and reports during major naval engagements and to communicate with landing parties under fire on enemy beaches. They saw handie-talkie and walkie-talkie radios and witnessed demonstrations of "fire control" equipment used to train anti-aircraft guns on enemy planes. They were permitted to go inside an attack bomber of the type used for strafing and dive-bombing, in the courtyard of the plant, and those who bought War Bonds were taken for rides in one of the Army's 2½-ton amphibious "ducks."

Crowds and traffic outside the plant buildings were scanned by a television camera on the roof and seen by those inside on the screens of RCA advance development models of television home receivers.

Visitors appeared before another television camera inside the plant and saw their friends on receiver screens. Both RCA Victor's large-screen (16 by $21\frac{1}{3}$ inches) and direct-viewing home receivers were used.

Buns were toasted electronically in a "cold oven" in RCA's two-kilowatt electronic power generator. In addition to this novelty application, visitors saw the generator used for its intended purpose in the rapid, uniform heating of industrial materials such as plastics, wood, and insulating materials.

The magic of the thyratron tube as an electronic switch was demonstrated by a control device especially made for the occasion, by means of which a visitor's command, spoken into a microphone, operated a phonograph record player. Visitors saw glass blowers forming technical equipment from glass and watched such operations as evacuating gases from finished tubes and fusing glass to metal. A lifeboat SOS transmitter, special displays of tube parts, tube materials, luminescent substances, and a model of the famed RCA Electron Microscope were among the other electronic wonders demonstrated or displayed.

Pointing out that tubes are the heart of all electronic equipment, Mr. Teegarden said at the rally that a growing list of new and hitherto undreamed-of civilian products and services, many of them outgrowths of wartime research, will provide important peacetime applications for tubes which have been developed for vital functions in military communications and combat equipment.

Tube Demand to Increase

"It is our firm conviction," he said, "that ultimately the demand for power, cathode ray, and special-type tubes will exceed even wartime requirements. For example, from the long-range standpoint,, the advent of television on a nation-wide, and possibly a world-wide, basis holds promise of a vastly expanded demand, particularly for cathode ray tubes.

"In addition, many industries are contemplating the use of electronic heating processes which will require many, many times the power tubes currently employed by the entire radio broadcasting industry."

For the present, he pointed out, all productive effort must continue to be concentrated on the making of tubes for the armed forces.

The Lancaster tube plant provides more than 385,000 square feet of floor space. Air-conditioned and equipped with the latest manufacturing facilities, it has kept pace with rapidly changing war needs by producing many times the variety and quantity of tubes originally intended. Last year more power tubes were made at Lancaster than in any other plant in the world, and the production of cathode ray tubes was approximately double that of the next largest manufacturer.

ELECTED VICE PRESIDENT OF RCA LABORATORIES

Conway P. Coe, formerly U. S. Commissioner of Patents, was elected Vice President in Charge of the Patent Department of RCA Laboratories at a meeting of the Board of Directors of the Radio Corporation of America, on July 6.

Mr. Coe, who was appointed Commissioner of Patents in 1933 by the late President Roosevelt, resigned from that position on June 15, 1945. He was a member of the examining corps of the Patent Office for three and a half years beginning in 1918, after graduation from Randolph-Macon College. He studied law at George Washington University and engaged in private practice in Akron, Ohio, and the District of Columbia from 1923 to 1933.

Mr. Coe served as Chairman of the American delegation to the International Conference for the Protection of Industrial Property held in London in 1934. He has been a member of the National Defense Research Committee and the National Inventors Council since the formation of these organizations, as well as Executive Secretary of the National Patent Planning Commission. He is a member of the American Patent Law Association and is a faculty member of the Law Department of George Washington University.

Mr. Coe was born at Dunkirk, Maryland on October 21, 1897. He served in the Field Artillery, United States Army during the first World War.

RCAC Resumes Service To Six Foreign Capitals

Since mid-April, RCA Communications, Inc., has restored radiotelegraphic service to six important world capitals and, in addition, established a radiophoto circuit to Paris.

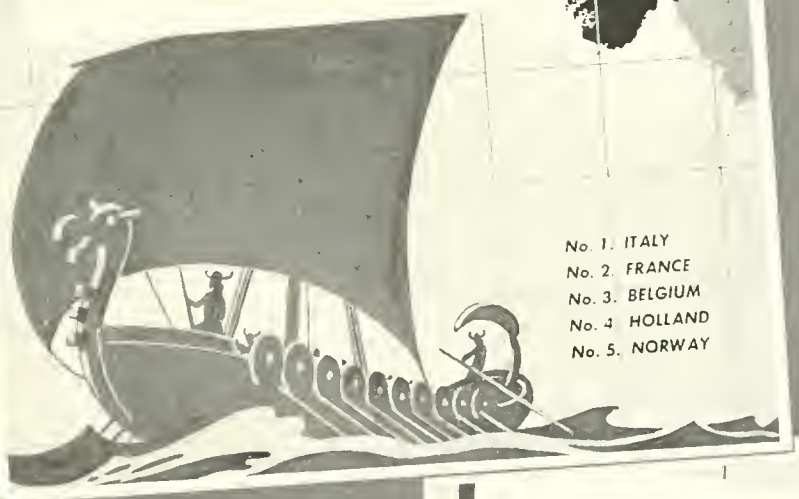
On April 13, RCAC announced the reopening of direct service to Belgium for all types of communications, followed three days later by the restoration of the Paris radiophoto circuit.

During May, commercial and personal messages were accepted for transmission to Italy, beginning May 4; Denmark and Norway on May 18, and to Holland on May 21. Erection at Manila of a new building and antenna and the installation there of new station equipment to replace facilities demolished in 1942, made it possible for Lieut. Colonel Thompson H. Mitchell, Vice President and General Manager of RCAC, to announce on June 17, the reopening of radiotelegraph service from the United States to the Philippines.

RESTORATION OF
DIRECT
RADIO-TELEGRAPH COMMUNICATION
WITH THE LIBERATED
COUNTRIES OF EUROPE

No. 5

NORWAY



No. 1. ITALY
No. 2. FRANCE
No. 3. BELGIUM
No. 4 HOLLAND
No. 5. NORWAY

RESTORATION
of
RADIO-TELEGRAPH
COMMUNICATION
with the LIBERATED
AREAS OF THE WORLD

No. 6
PHILIPPINES

No. 1. ITALY
No. 2. FRANCE
No. 3. BELGIUM
No. 4. HOLLAND
No. 5. NORWAY
No. 6. PHILIPPINES

RCA

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RCA SOUND SYSTEMS

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