RADIO AGE

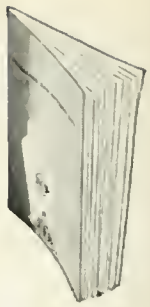
RESEARCH • MANUFACTURING • COMMUNICATIONS • BROADCASTING • TELEVISION

RCA

APRIL

952

Help to Engineers



who are concerned with the future of their careers

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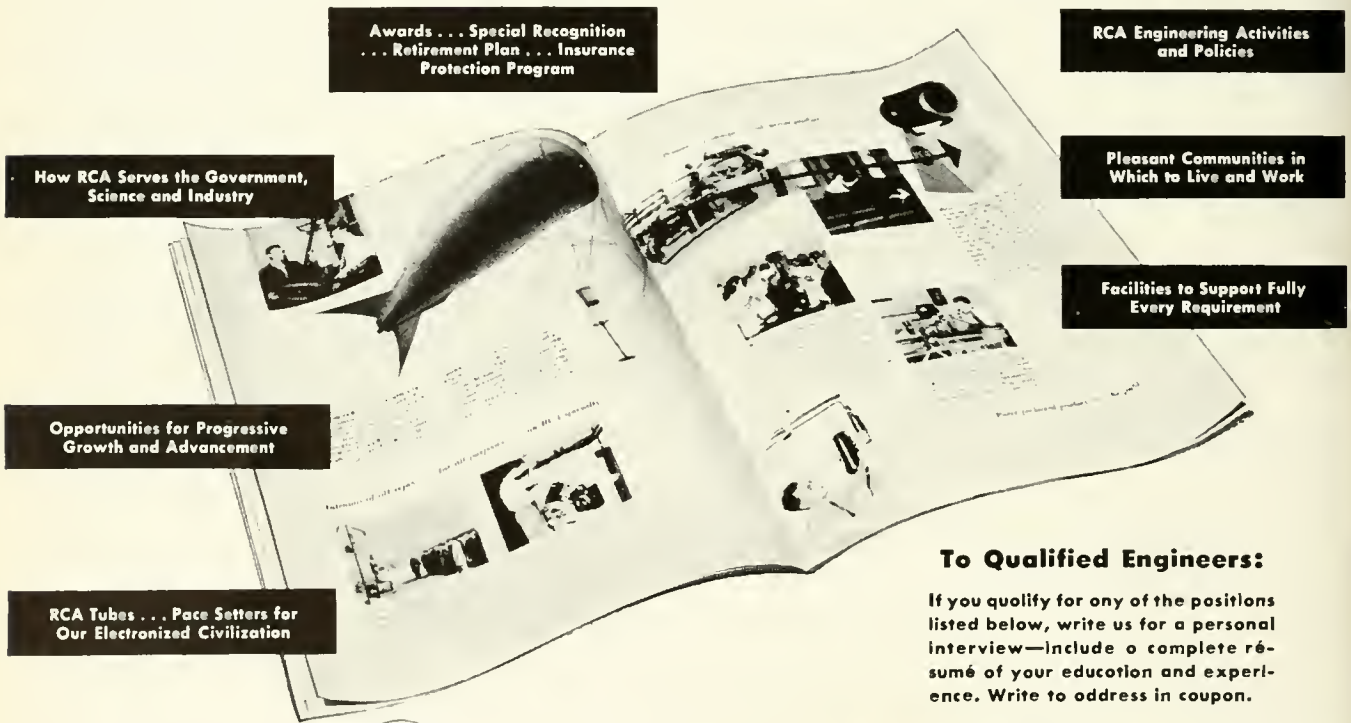

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VOLUME 11 NUMBER 3

Radio Age

I • MANUFACTURING • COMMUNICATIONS

BROADCASTING • TELEVISION

APRIL 1952

COVER

Frank M. Folsom, RCA President (right) and Donald Mossman, Jr., examine the "push-button" switch and its 889 parts which brought nationwide acclaim to the Joliet, Ill., businessmon. (Story on page 6.)

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NOTICE

When requesting a change in mailing address please include the code letters and numbers which appear with the stencilled address on the envelope.

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RADIO CORPORATION OF AMERICA

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DAVID SARNOFF, *Chairman of the Board* — FRANK M. FOLSOM, *President*

LEWIS MacCONNACH, *Secretary* — ERNEST B. GORIN, *Treasurer*

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RCA Communications, Inc. • RCA Laboratories Division • RCA Institutes, Inc.

Antennas for five TV and three FM stations are supported by this 200-foot mast atop the Empire State Building. The array was designed by RCA engineers.

TV and Radio
Plan Convention Coverage

By William R. McAndrew
Director of Public Affairs
Television Division, National Broadcasting Co.

THIS July millions of Americans will have a time-honored political custom, the national conventions, laid bare in their living rooms. Through television and radio the deliberations and sometimes the antics of these great quadrennial gatherings will be seen and heard coast-to-coast for the first time.

The effect of these two mediums of communications upon the electorate and the traditional system of political campaigns is unpredictable. Such a widely read columnist as Walter Lippmann wonders if it might not be a change in the whole method of national campaigns. Lippmann suggests that candidates for national office may have to confine themselves to TV campaigns in the last few days or weeks before election rather than make frequent nationwide personal appearances.

Certainly, the preparations going into television coverage of the conventions indicates that they will be the best covered events in the history of the epoch-making industry. This can be understood when some of the facts and figures of NBC convention coverage are considered.

NBC will move more than two hundred people to Chicago for a period of two to four weeks. More than $1,500,000 worth of equipment will be utilized. Miles of cable will be installed. Two television studios, capable of holding from twenty-five to fifty people will be built in the International Amphitheatre, on Chicago's south side, the site of both conventions. Teletype printers of the three major press associations will be installed in the network's combined radio and TV newsroom. Office furniture, typewriters, paper, pencils, even paper clips, must be obtained for the use of more than fifty commentators and reporters who will cover for NBC. A full-time 24-hour news desk will be manned to service the various regular news programs, which will originate from the convention city. A complete film developing plant will be leased. Motorcycle messengers will transport film from camera to developer and back to the studios for projection. Two private NBC telephone switchboards will be set up. Direct telephone lines from the convention hall back to New York must be installed for instantaneous communication with NBC headquarters in Radio City. A special teletype circuit will connect all television stations taking NBC service to keep them informed of last minute changes in the con-

RCA's TV "Walkie-Lookie," shown in action at left, is examined below by NBC's William F. Brooks, Bill Henry, O. B. Hanson and William McAndrew.

Through a control room such as this will pour the news and pictures supplied by scores of reporters, commentators and cameramen working inside and outside Chicago's Amphitheatre.

vention schedules and the scheduling of special programs that cannot be predicted more than minutes in advance of their taking the air.

To provide roving coverage NBC will concentrate four mobile units in Chicago. These include a new "crash" truck which is completely equipped to transmit live TV pictures or 16 mm. motion pictures direct from the 35-foot truck. The new "crash" truck, to be used for the first time at the conventions, was built to NBC specifications and will carry three RCA television cameras and several movie cameras.

The mobile units will serve NBC's specially created "Human Interest Team", which will provide the audience with feature material to brighten the political reports direct from the floor of the International Amphitheatre. This team will consist of a staff of directors, writers and reporters whose sole job in Chicago will be to ferret out the side stories which will amuse as well as inform televiewers.

This staff is already at work on a series of sixteen pre-convention telecasts which will give NBC viewers latest reports on the race for the Presidential nomination prior to the actual balloting in Chicago as well as a picture history of past political conventions.

Meanwhile, NBC engineers have blue-printed the 7,500 square feet NBC convention headquarters in the North Wing of the Amphitheatre. The headquarters will be completely air-conditioned and will contain two large television studios and three radio studios specially constructed by NBC for the conventions. A newsroom housing teletypes, switchboards, operations desks for both television and radio, and NBC's central news desk, will occupy 1,200 square feet. To the central desk will pour news from more than fifty reporters and commentators which then will be funneled to both radio and TV networks.

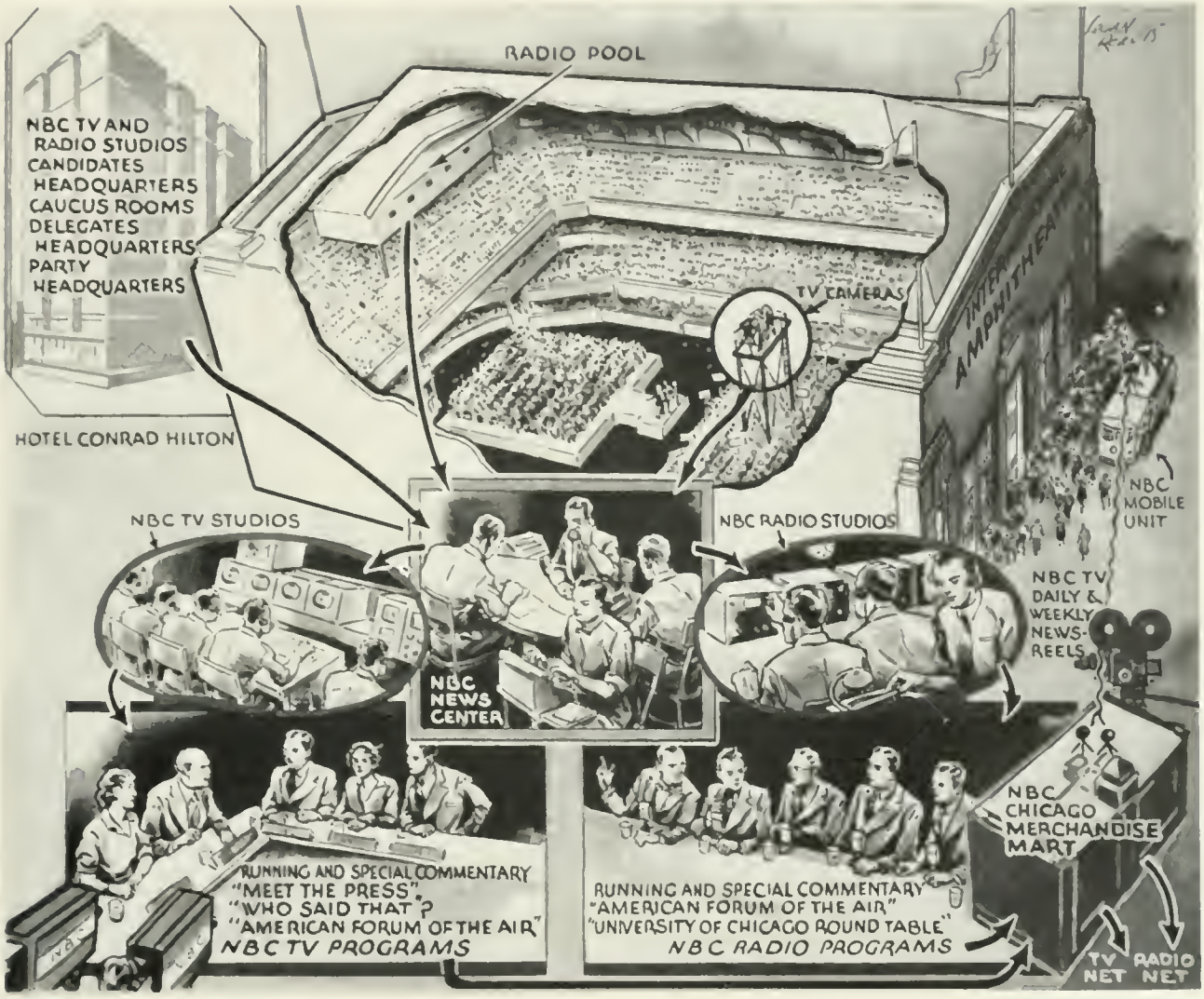
NBC headquarters also will include dark rooms for movie and still picture developing, make-up rooms, staging facilities, dressing rooms, tape recording rooms, studios for NBC affiliate stations and an office for the sponsors of NBC's conventions coverage.

Convention TV to be Sponsored

Another "first" for the 1952 conventions is sponsorship. Negotiations were opened with the two national committees in August of 1951 for permission to sell NBC coverage to a commercial sponsor in order to help defray the huge expense. On January 2nd of this year, executive vice president James H. Carmine of the Philco Corp. and president Joseph H. McConnell of NBC agreed on preliminary details for sponsorship of NBC radio and TV coverage of the conventions.

The convention hall was chosen by the national committees this year to provide better facilities for television. However, even this decision will not make available enough space inside the hall itself for each network to install its own cameras. Therefore, the proceedings from the convention sessions will be "pooled" and fed to all networks. Each network will have its own commentator

One of the mobile units, carrying TV cameras and film equipment, which will increase the political convention coverage that radio and television will provide the American people.



Artist's interpretation of NBC's extensive TV and radio operations planned for the two political conventions which are to be held in Chicago in July.

describing what the viewer sees on his screen. For NBC, Bill Henry, long-time newspaperman and radio commentator and now a featured performer on "Who Said That?" and on NBC news programs, will do the "running" story of the convention. Among other famous NBC "names" who will be seen and heard during the convention are John Cameron Swayze, Ben Grauer, H. V. Kaltenborn, Morgan Beatty, Earl Godwin, and others.

The "pooled" scenes of the convention sessions will be fed to the more than two score stations taking the NBC-Philco coverage. The "pooled" picture will actually go from coast to coast but different commentators will be heard in the east and middle west and the west coast. Only one television facility is now in operation from Omaha west to the Pacific coast. To provide sponsor identification for Philco Corp., commercial messages will have to be inserted, on a regional or local basis, by west coast stations. Thus, in effect, two networks carrying the same picture but different commentators will be operated from Chicago by NBC.

The 1952 conventions will bring to bear more manpower and technical equipment than ever before used in covering one event in the history of network radio and television. Until the gavel raps at Chicago the afternoon of July 7th, the 1949 Inaugural of President Harry Truman will stand as the record breaker for TV coverage. But once the 1952 convention coverage begins, this record will be surpassed.

The Republican convention is scheduled to begin in Chicago on July 7th and the Democratic convention follows two weeks later, beginning July 21st.

NBC television will broadcast a minimum of sixty hours coverage of the two conventions. NBC radio will provide full and comprehensive coverage of the sessions.

American "Small Businessman" is Cited for Contributions to Defense

DONALD P. MOSSMAN, JR., an American small businessman of Joliet, Ill., came into prominence recently when political, industrial and business leaders cited him for outstanding contributions to the defense effort. The starting point of these activities was a full-page RCA institutional advertisement which appeared in newspapers in New York, Washington, Illinois and Connecticut.

Mr. Mossman is one of 121 manufacturers who worked with the Radio Corporation of America on a new "push button" master communications console that is capable of instantaneously flashing vital battle information between warships. The console, a basic part of the Combat Information Center on major warships, was developed and built by RCA at the request of the Navy.

Mr. Mossman was honored by Frank M. Folsom, president of RCA, Governor Adlai Stevenson of Illinois, and the Illinois Manufacturers' Association. In addition, he will be commended by the Navy, which is planning a ceremony in his honor at the Great Lakes Naval Base in Illinois.

Mr. Folsom called Mr. Mossman, whose firm employs 45 people, "a typical member of the All-American industrial team."

Telling of the Joliet manufacturer's relations with RCA, Mr. Folsom said:

"When RCA needed a complicated and non-existent push-button switch to complete the Navy's contract for the communications console, Mr. Mossman took on the job after many other switch manufacturers said it was too complicated to make. He made up a rough sample, based on an RCA sketch, and our engineers saw at once that he was at least a year ahead of the only other company willing to try.

Switch Required 889 Parts

"Mr. Mossman visited RCA headquarters at least once a week for three months to coordinate development work on the switch which required up to 889 different parts compressed into the size of a cigar box. To speed the work and get closer to RCA, he went to Danbury, Conn., and made arrangements with the Capitol Machine Company of that city because they had exactly the right kind of tools and skilled craftsmen needed to build the parts for the switch.

"After four weeks of intensive effort, the first engineering model of the switch was completed, and with Navy approval, production of the new Combat Information Center console was started.

"The combined effort of Mossman and Capitol and RCA, in Joliet and Danbury and Camden, made the switch that had to be made."

For two days following publication of the advertisement in Chicago, Mr. Mossman was occupied with a strenuous schedule of radio and television appearances. He was a guest on the Garroway show "Today," and on several television news interview programs. Later, he appeared on the "American Farmer Hour," a full national network program originating in Chicago.

The ceremony in the headquarters of the Illinois Manufacturers' Association, at which Mr. Mossman was cited as the "Small Businessman of 1952" in the presence of some of the nation's leading industrialists, was tape-recorded by NBC's Chicago outlet and broadcast on the day the advertisement appeared.

Mossman Praised by Illinois Governor

Governor Adlai Stevenson went to Chicago from his executive offices in Springfield to honor Mr. Mossman as the "American Small Businessman of 1952." In ceremonies at his Chicago office, covered by NBC television newsreel, he made a speech on the importance of big and little business and on Mr. Mossman's contribution to the defense effort.

The text of the Governor's address follows:

"Mr. Mossman, I want to congratulate you, on behalf of the people of the State of Illinois, for an outstanding contribution to the Nation's defense effort. The work you have done in the design and production of this very complex switch symbolizes the activity of thousands of small businessmen throughout the Nation on behalf of our Armed Services.

"It is my understanding that this switch had to be invented in order for our naval task forces to obtain new communications centers operating with push button speed. The fact that you accepted the challenge of designing a non-existent switch, that you risked your own funds in its development, that you worked long hours to meet the Navy's time schedule,

entitles you to the commendation of every American citizen.

"It is interesting to note that 121 companies from every section of the United States worked on this master communications center which the Radio Corporation of America produced for the Navy. The large majority of them, like Mr. Mossman's firm in Joliet, were small businesses. Without them, and without the teamwork of large and small businesses, the job couldn't have been done.

"This, I think, is the real secret of our strength. When American industries of all sizes and from all regions work together as members of the same team, they give us a defensive power that no aggressor can ever crumble.

"I am indeed pleased that a small manufacturer from this State has made such an important contribution to the security of our task forces around the world and to the sailors who man them. I think you typify, Mr. Mossman, the American Small Businessman of 1952.

"My warmest congratulations to you."

Small Business Essential to Defense Effort

In ceremonies at the headquarters of the Illinois Manufacturers' Association, some of the state's leading industrialists gathered to present Mr. Mossman with an engraved citation for his "outstanding contribution" to the defense effort and for symbolizing the American small manufacturer of 1952. James L. Donnelly, executive vice president of the I.M.A., who made the presentation, told Mr. Mossman that his switch represented "dramatic proof of the importance of small business to the defense effort."

The citation said in part:

"The accomplishments of Don Mossman and his associates exemplify the teamwork typical of American industry — large, small or middle-sized — which has made America strong and presents an unanswerable challenge to those who would destroy the American system of free, competitive enterprise."

In all of his radio and television appearances, and in his responses to the awards given him, Mr. Mossman emphasized that his experience with RCA proved how big and little business could work together effectively under the traditional American system of free enterprise.

Expressing his gratitude to Governor Stevenson, Mossman said he accepted the citation on behalf of all the members of "our team" — the 121 companies that worked with RCA on the Navy contract.

"I really interpret your recognition, Governor, as a testimonial to the results that can be obtained," Mossman said, "from the teamwork of small, medium and large organizations operating all across the country within the framework of our free economy."

Donald Massmon (right) accepts citation for his "outstanding contributians to the defense effart" fram J. L. Dannelly af the Illinais Manufacturers Association.

Enlarging on this theme, Mr. Folsom pointed out, in the announcement that RCA was producing the Navy console, that 5,000 suppliers in every section of the country worked with RCA. Seventy per cent are classified as small businesses and about half employ less than 100 men and women.

Programs on NBC-TV Win Awards

Two NBC Television network series took first awards in the recent annual review of educational radio and TV programs at the 22nd Institute for Education by Radio at Ohio State University.

First prize for TV network programs devoted to systematic instruction went to "American Inventory," a weekly experimental adult education series produced by NBC in cooperation with the Alfred P. Sloan Foundation. It was honored "for effective visual development through mature dramatization of a wide variety of themes basic to understanding of American democracy."

First award for network cultural TV programs — which included drama, music, literature, science and art — went to "Zoo Parade," a weekly series presented by NBC from Chicago's Lincoln Park Zoo and featuring R. Marlin Perkins, the Zoo's director.

Transistors--*Modern Miracle of Electronics*

Development of Tiny Electronic Device Goes Forward Rapidly in Broad Program Initiated by RCA Scientists and Engineers.

NEW possibilities for extending the usefulness of the transistor — tiny electronic device which functions like certain types of vacuum tubes — have been disclosed by research scientists and engineers of the Radio Corporation of America.

Development of the RCA transistor, noted for its reliability and ruggedness, emerged from a broad program initiated at the David Sarnoff Research Center of RCA, Princeton, N. J., and carried forward into practical applications at the RCA plants in Harrison and Camden, N. J. In addition, these activities are providing valuable information on new electronic circuits that will be necessary before transistors can be utilized, according to Dr. E. W. Engstrom, Vice President in Charge of the RCA Laboratories Division.

"As the vacuum tube made possible the modern miracles of radio, television and radar," says Dr. Engstrom, "so will the transistor become a tool with which to open vast new horizons in the electronic art. However, RCA does not expect the transistor to supplant the electron tube any more than radio replaced the phonograph. In fact, the market for electron tubes is almost certain to increase under the full impact of commercial transistors.

"This is because the transistor permits development of electronic instruments and apparatus undreamed of at the present time. Many of these devices will still require electron tubes. Thus, as transistors begin to take the place of certain tubes, the displaced tubes will find new jobs in new electronic gear."

Operates at Low Temperatures

A paper on the improved RCA transistor in the December, 1951 issue of *RCA Review*, prepared by B. N. Slade, of the RCA Tube Department, describes it as shock resistant, unaffected by dampness and able to operate at temperatures as low as liquid air (minus 180 degrees Centigrade). These characteristics have been achieved by embedding the elements of the transistor in thermosetting resin to provide the finished product with an almost indestructible protective case.

In appearance and size, the RCA transistor resembles a small kernel of corn, with three needle-like terminals protruding from the end. Its principal embedded element is a quantity of single-crystal germanium about the size of a pinhead. Overall, the transistor measures 6 10″ by 3 10″ by 2 10″.

Although only the size of a kernel of corn, the transistor performs the functions of certain types of vacuum tubes.

One of the world's few setups for producing single-crystal germanium needed for transistors was on public view in New York during March 3-6 at the Institute of Radio Engineers exhibit in Grand Central Palace. Refinement of this rare element was accomplished with professional efficiency through the use of a small electric furnace operated by RCA engineers.

The germanium furnace, part of a display showing research into electronically active solids, transformed the germanium into the desired single-crystal form. To obtain the processed germanium crystals RCA engineers "draw" — instead of cast — a thin, pencil-like ingot

from a crucible of molten germanium. This action takes place inside of a quartz tube.

The main advantages of transistors are: long life, small size, resistance to shock, low power requirements, and no "warm-up" period. When properly made and not abused, a transistor should almost never wear out.

A transistor differs basically from an electron tube in that it has no heated filament operating in a vacuum. In an electron tube this filament, when heated by electric power, "boils off" the needed electrons in the vacuum. In the transistor, the electrons are harnessed in a piece of solid matter. They are controlled as they move about within this solid.

Germanium is a Semi-Conductor

The solid material currently used is germanium of the type described — an element which physicists call a semi-conductor. That is, it does not conduct electrical energy nearly as well as copper; but neither is it an insulator. A semi-conductor can be made to conduct current well in one direction, and poorly in the opposite, a phenomenon which does not occur in the metals normally used for conducting electricity.

The point-contact transistor developed by RCA consists simply of the tiny speck of germanium touched by two closely spaced, fine wires. These wires correspond to the terminals in a vacuum tube.

In their present stage of development, transistors have a few drawbacks. They are sensitive to temperature change, and have frequency limitations that further research and development are expected to eliminate or minimize.

Among the devices which RCA engineers predict will be possible with fully refined transistors are:

Compact, portable electronic computers. In the last ten years, specialized electronic devices have become more and more complex, Dr. Engstrom pointed out. In one electronic computer alone, such as "Typhoon" built for the U. S. Navy by RCA, more than 4,000 electron tubes are used. Engineers have made great strides in decreasing the bulkiness of equipment by using miniature and sub-miniature tubes. But the problem of heat has remained. By using transistors, excessive bulk and heat should virtually disappear.

Smaller personal type portable receivers, with more economical battery life will be developed around the transistor in the future.

In addition to simplicity and small size, elimination of delay in warming up may be regarded as a major feature. Electrons within the transistor are lying ready for action. Transistor equipment comes to full strength the instant it is switched on; long distance telephone amplifiers, marine radios, and other devices which must be ready to operate on demand will not need to be kept turned on continuously.

Transistors Have Long Life

Respecting the longevity of the transistor it is generally agreed that it may be in the vicinity of 100,000 hours, since there is no filament or heating element to burn out.

Perhaps the most striking advantage of the transistor is the modesty of its power requirements. In the vacuum tube, by far the greater part of the power goes to heat the filament; only a small part reappears as output signal. Since it needs no energy to set electrons free the transistor needs only the power necessary for the desired signal. A millionth of a watt is sufficient to operate it and it can then generate signals of the same order of power.

This fact coupled with the transistor's freedom from heat appears to make it ideal for use in many of the complicated electronic instruments such as calculators and control systems which at the present time employ

Liquid resin is dropped into a transistor shell to cement the components in place and protect them from moisture and other elements in the atmosphere.

thousands of electron tubes and which are ofttimes curtailed in effectiveness by the excessive heat generated.

While emphasizing that the art of the transistor is still in its infancy, Dr. Engstrom said that its development was made possible by a research program of the broadest dimensions in the field of electrons and solids. He revealed that some of RCA's top scientists have been working on this problem — which involves the basic fundamentals of matter — for many years.

One group of RCA scientists has been concentrating on photoconductive materials — materials which are sensitive to light. Out of this research came the small television pickup tube known as the "vidicon."

Still another group of RCA scientists has conducted pioneering research into luminescent materials — substances which glow when struck by electron beams in a vacuum. Some of these materials, called phosphors, coat the inside of every home television picture tube, he pointed out; others are used in fluorescent lights.

"The transistor, first developed and announced by Bell Telephone Laboratories in 1948, is a special form of device making use of the knowledge of electronically active solids," Dr. Engstrom said.

"Out of all this theoretical, fundamental, and applied research," Dr. Engstrom said, "we are assembling a fund of know-how which will permit us to develop electronic devices which were undreamed of fifty years ago."

New TV Station in Cuba

One of the foremost newspapers of Latin America — *El Mundo* of Havana, Cuba — has completed plans for participation in the building and operation of a powerful television station in the Cuban capital, with microwave relays extending TV program service to three additional provinces on the island, according to an announcement by the RCA International Division. This is believed to be the first microwave system for television scheduled for operation ouside of the United States.

Studios and operation headquarters are situated in Havana's three-million-dollar Ambar Motors Building, near the fashionable Vedado residential section. Transmission will be on Channel 2.

Cuba's radio pioneer, Angel Cambo, co-founder of the CMQ radio network, is president of the new station. His re-entry into broadcasting followed two years of observing television operations in the United States.

Associated with Mr. Cambo are Julian Lastra and Miguel Humara, of the firm of Humara y Lastra, RCA distributors in Cuba for many years.

In addition to covering Havana, service of the new station will be expanded by microwave relays south to Pinar del Rio Province, and eastward to the provinces of Matanzas and Las Villas.

Shadowing Device Speeds Electron Microscope Analysis

Shadowing unit introduced by RCA, is used for the rapid preparation of specimens for the electron microscope shown in the rear.

A TV comera and commentotor go into the plant of Foote Mineral Company to explain factory operations to a meeting of the firm's stockholders.

From this monitor room, set up at the Foote Mineral factory, program directors control the TV camera pick-ups and the film sequences.

Stockholders "Tour" Their Plant Through Eyes of TV Cameras

SETTING up and running a 10-ring circus for a one-day stand in a busy industrial plant might seem to enjoy top rating as the neatest trick of the year. But those who watched the preparation and production of the first televised plant tour for a stockholders' meeting, staged February 21 at the Exton, Pa., plant of the Foote Mineral Co., would have the facts to argue any such contention.

Robert D. Drake, Foote's advertising manager, conceived the idea of the unusual telecast when he saw an RCA Victor TV demonstration last fall at the Exposition of the Chemical Industries in New York. He explored the idea with Richard H. Hooper, manager of the RCA Victor Shows and Exhibits Division, and detailed plans, charts, and script were then worked out. Arrangements were coordinated for Foote by Otto W. Renner, Jr., of Renner Advertisers, Philadelphia.

In undertaking the job, RCA Victor's globe-trotting TV production crew, despite a wide and varied experience, was stepping off on new ground. But the field was recognized as one of substantial promise, and that promise has certainly been expanded by the success of this debut performance.

The closed-circuit (wired) telecast enabled more than 250 stockholders to see new facilities and watch key operations at widely separated locations on the 81-acre Foote property without leaving their seats in the plant cafeteria, where the meeting was held. One sequence of the show, made possible by televised film, brought the stockholders a glimpse of activities at Foote's new Kings Mountain holdings, near Charlotte, N. C., where the company "bought a mountain" containing the nation's largest known source of spodumene, an ore from which lithium is extracted.

To stage this initial stockholders' TV tour, RCA Victor installed and operated the largest closed-circuit system yet employed for a service of this type. The equipment, valued at more than $80,000, included four image orthicon field cameras, 1800 feet of camera cable, 1200 feet of microphone line, a TV film camera chain, twelve 17-inch home TV receivers, and all the auxiliary equipment needed for a complete control and monitoring station.

Four Cameras Covered Seven Locations

The cameras were initially set up in four strategic locations, and some were swiftly moved when the script permitted, according to a time schedule carefully worked out in advance, to permit coverage of a total of seven

An RCA TV camera makes it possible for stockholders to witness the complex processing of rare elements at the Foote Chemical plant.

plant locations without breaking the program's continuity.

L. G. Bliss, vice president in charge of sales of the Foote company, furnished the commentary from a narrator's desk, covered by one of the field cameras, in a plant building near the cafeteria. Also located in this building were the control station and the TV film camera chain.

One objective at the outset was to eliminate the confusion and inconvenience which would be unavoidable if the stockholders were guided physically through the far-flung plant from one installation to another. Another was to give the stockholders a more concise and understandable view of the company's activities than they could hope to get by actually touring the area. Both aims were accomplished.

The equipment was installed and the show was staged by a crew of eight, including six RCA Service Company engineers and two members of the RCA Victor shows and exhibits group.

Half-mile of Cable Required

Although members of this group have demonstrated television and pioneered new applications of the medium throughout the United States and in many foreign countries, they were confronted by several unusual challenges to their ingenuity in carrying out the Exton program. One was the necessity for stringing a total of approximately 3000 feet of cable and "mike" line, most of it overhead. Another was split-second timing of camera movements, which meant shutting down a camera, moving it to a new location, and putting it back in operation without the usual time for warming up the tubes. Particularly difficult were the quick shifts from indoor to outdoor light levels, and vice versa.

To speed up camera movements, the crew used a special truck with a hydraulic lift on the rear end. When a camera completed one sequence and a camera in another location took over, the first camera would be rolled onto the lowered lift of the waiting truck, tripod and all, without dismantling. It would then be hoisted to the truck floor and hauled to the next location. There, the lift would be lowered and the camera rolled into position. The longest distance covered by such a shift was about 450 feet.

The equipment—five tons of it—hauled by truck from RCA Victor headquarters in Camden, N. J., was packed in 38 large wooden boxes. Uncrating and setting it up took only four hours, but stringing the half-mile of cable consumed eight hours.

To avoid blocking plant streets and drives and to eliminate the risk of damage to the cable by passing vehicles, most of the line had to be run overhead. This also obviated possible damage to insulation from puddles and wet ground, in many cases bearing lithium salts and other chemicals. At one point, the line crossed a spur of railroad track, and the railroad stipulated that it must be hung at least eight feet above the tops of freight cars.

But all these problems had been solved when the hour arrived for the show to go on.

On the receiver screens in the cafeteria, the stockholders saw first the processing of lepidolite ores from Africa to obtain lithium products used for many industrial purposes, including the preparation of special types of glass for TV picture tubes. Other important uses are found in the manufacture of lubricants, ceramics, and air-conditioning systems.

Many Chemical Processes Observed

Next, by means of the televised film, they were shown the quarrying and processing of spodumene, a source of lithium salts, at Kings Mountain. Returned to the Exton plant by the flip of a control switch, they saw more lithium processing operations and the activities in progress in a pilot plant where a new process is being evaluated.

This was followed by detailed close-up action views of complex operations and equipment used in processing zirconium, used for its high corrosion resistance and high strength-to-weight ratio in radar, television, and jet engines, for its low neutron-absorption characteristics in atomic reactors, and for its high gas-absorption factor as a means of increasing vacuum in vacuum tubes. The tour closed with a visit to the plant area where various minerals are processed to produce welding electrode coating materials.

Commenting on Foote's introduction of this new use

(Continued on page 21)

First Floating Broadcaster to Hurl "Voice" Over Iron Curtain

SS *Courier* Carries Powerful Transmitter Designed by RCA

WITHIN a short time, the *U. S. S. Courier*, a 5,800 ton Coast Guard cutter will have completed her shakedown runs somewhere in the Atlantic and will set out on her first assignment as a floating broadcaster especially equipped to carry the "Voice of America" to the people behind the Iron Curtain.

In his speech dedicating the ship on March 4, President Truman said:

"This ship is named the *Courier*. It is well named, for it will be carrying a message. It will be carrying a message of hope and friendship to all those who are oppressed by tyranny; it will be carrying a message of truth and light to those who are confused by the storm of falsehood that the Communists have loosed upon the world.

"The *Courier* is a small ship — it is not as big as a destroyer — but it is of tremendous significance. Its significance lies in the fact that it will carry on the fight for freedom in the field where the ultimate victory has to be won — that is in the minds of men."

RCA engineers and designers played an important role in supplying the equipment which fills the major part of the *Courier*'s cargo holds. Included are a 150,000 watt medium wave RCA transmitter, an assortment of antennas, tape recorders, receivers and a large quantity of helium that will be used to inflate dirigible balloons to support the antenna. With the latter lifted 1,000 feet, signals from the RCA transmitter are expected to reach out with a range of 1,000 miles or more. According to engineers of the "Voice of America" staff, this seaborne voice is more powerful than any operating in the United States.

Captain Oscar Wev, commanding officer of the S.S. Courier, and a technician inspect one of the power units aboard the floating broadcasting station.

The Courier, world's first sea-going radio-broadcast station during commissioning ceremonies.

The large RCA transmitter is mounted on an eight-inch platform of concrete which "floats" on slabs of cork three inches thick. This cushion protects apparatus from the ship's vibrations. Two other smaller transmitters for general communications purposes radiate their signals from fixed triangular antennas on the flight deck.

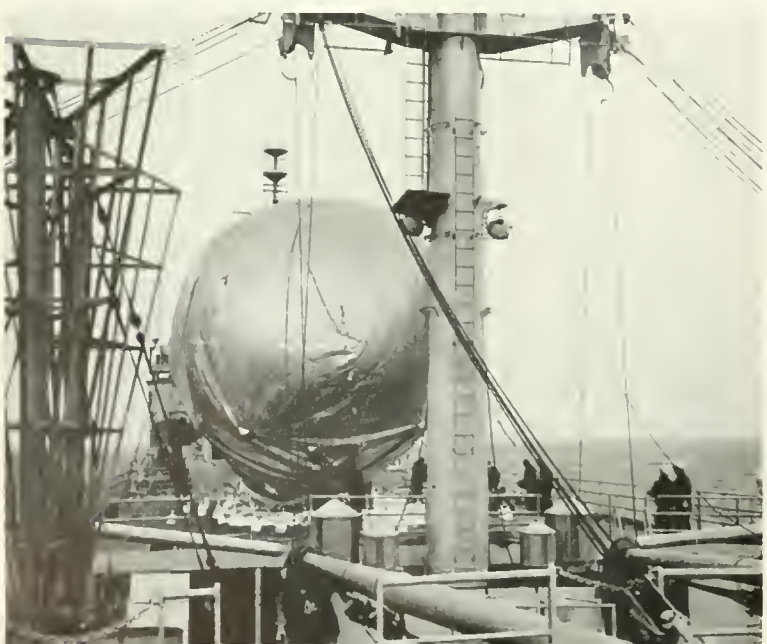
In another cargo hold are the Diesel engines which are capable of generating 1,500,000 watts of electric power for all the transmitters aboard the *Courier*.

The floating broadcaster will pick up programs from land-based transmitters of the "Voice of America" and retransmit them, either directly or by the intermediary means of tape recorders, into the desired areas.

The Coast Guard crew of 80, many of them highly trained radio technicians, is commanded by Captain Oscar Wev, a transport commander in the Pacific during World War II.

President Truman inspects some of the extensive radio equipment oboord the Courier.

One of the helium-filled bolloons is inflated on the flight deck of the Courier during a test of the vessel's 150 k.w. tronsmitter, supplied by RCA.



Color TV in Biology Research

A new use for color television which adds another dimension to biological research was described to the Institute of Radio Engineers on March 4, by Dr. V. K. Zworykin, L. E. Flory and R. E. Shrader, of the David Sarnoff Research Center at Princeton, N. J. In a paper prepared jointly by the three scientists, they said that the use of color television will enable the biologist to obtain more information about microscopic specimens than with present methods.

The development was made possible by hooking up an RCA tricolor picture tube to a sensitive new ultra-violet vidicon camera which is mounted over a microscope trained on the specimen. The absorption of ultraviolet light by the tissues of the specimen differs among them. By arbitrarily assigning different colors to the tissues, the biologist can make them emerge with individual clarity. This method supplants the old system of staining the tissues.

The new technique adds color artificially to cells or tissues by translating different wave lengths of invisible light into electronic energy. This energy is then translated into the three different primary colors on a color television picture tube.

A specimen or thin slice of tissue which, to the human eye, appears colorless and flat through a microscope can then be viewed on a television screen as a dynamic picture in color.

Some of the electron tubes which supply energy for the powerful broadcasting tronsmitters on the Courier.

America Moves Steadily Toward Equal Opportunity for All, Says Buck

RCA Victor Head Tells Cincinnati Audience This Nation Excels All Others in Progress

AMERICA has the only form of government in the world today that provides the opportunity for bringing the good things of life to everyone, down to the last man and woman, Walter A. Buck, vice president and general manager of the RCA Victor Division said in an address at the interracial dinner and annual meeting of the Urban League of Greater Cincinnati on March 26.

The fact that we still have "a considerable distance to go," he said, "is less important than the fact that we are moving more steadily toward that goal than any other nation.

"Under the American system," he said, "our only problem is to extend its benefits still further — and to extend with them the basic freedoms and good will to all men which spring from the same Constitutional source. If this seems like a big order, consider the infinitely greater problems inherent in a system which transfers the responsibility for man's welfare to the state, and in the process destroys the freedom of all individual action and enterprise."

Hailing the Urban League for its early recognition of the importance of equal opportunity to the great future of American industry and the nation as a whole, Mr. Buck said its vision and confidence in the destiny of America was "born of the same quality that has inspired the leaders of industry to push this nation to the forefront of the civilized world."

"Business prosperity has made our national prosperity," he said. "The principles of free enterprise are so closely identified with American political principles that it is virtually impossible to speak of one without the other. They were made for each other, and together have produced American civilization as we know it." He defined American civilization as "our particular blend of political, economic, and social ideals, all stemming from a central principle."

The great contributions of business to American civilization, he said, have been mass production, mass distribution, vision, research, and merchandising. These things, he pointed out, have made goods available to all of our people, brought prices down to levels at which most people can afford them, and created new products and services which mean better living for all people.

Walter A. Buck, addressing the Urban League of Greater Cincinnati.

Mr. Buck asserted that we live in "the one country where the full freedom and rights of the individual are written out for all to see," and predicted that research, supported by industry, will bring a future even brighter than the present, "if granted reasonable freedom from future restraints."

"American industry needs the best people, the best brains, the best skills available," he continued. "No manufacturer, in my opinion, can in the years to come afford the luxury of petty prejudices, of differentiating between competent people because of the color of their skins.

"I have faith that in a country built on the rock of individual freedom, progress in the brotherhood of man cannot help but continue until equal opportunities, equal acceptance, are enjoyed by all."

Rapid public acceptance of metal-shell kinescope picture tubes keeps production lines busy at RCA plant, Marion, Ind.

Metal-Shell Kinescopes Gain in Favor

Use of Steel Gives Larger Tubes Greater Strength and Lighter Weight

By Larry S. Thees
General Sales Manager
RCA Tube Department

METAL-SHELL television picture tubes, introduced commercially less than four years ago, have already won such rapid acceptance among the industry's receiver manufacturers that they currently account for nearly 30 per cent of total kinescope sales. In the 21-inch size, they are actually outselling comparable all-glass types by a wide margin.

The television industry's trend toward larger picture tubes of metal-shell construction developed and introduced commercially by the Radio Corporation of America in 1948, shows that time and usage have confirmed the metal tube's special advantages to electron tube producers, TV receiver manufacturers, and home set owners.

According to available statistics, the industry's major tube producers during 1950 sold approximately eight million kinescopes of all types, of which approximately two million were of the metal variety. During the first nine months of 1951, the same producers sold more than three-and-a-half million kinescopes, of which more than a million were metal types.

The RCA Tube Department, the industry's largest producer of kinescopes since 1938, currently uses metal-shell construction in approximately two-thirds of all the kinescopes it produces. It can be anticipated that the company will develop and produce more and larger metal types, when and if required by consumer demand.

Although all-glass tubes will remain an important item in the industry, there is every indication that for larger tubes, from the 21-inch size up, the metal-shell construction will be favored. This prediction is based primarily on the metal tube's established advantages for the set manufacturers—advantages which provide superior picture quality, permit streamlined receiver production, and resolve problems of handling, assembly, and breakage loss.

The metal tube's inherent characteristics emphasize the following features:

(1) The faceplate, unlike that of the all-glass envelope, is produced as an independent unit, facilitating

(Continued on page 29)

Plastic "Props" for Television Shows

A NEW concept of television staging through the use of plastics, the result of six months of experimentation in collaboration with the Studio Alliance, has been put into active use by the National Broadcasting Company in its New York studios.

The project, developed by Studio Alliance, was brought to NBC in its early stages and the company then joined forces with the studio in its development. Some of the qualities of the plastic which make it superior to other materials previously used for sets, props and even costume accessories are:

It is waterproof, fire-proof, shatter-proof and warp-proof.

It can be repainted repeatedly for use in different colors. The plastic, while tougher and lighter than wood, has wood's desirable qualities in that bolts and screws can be inserted easily and it can be cut, planed and sanded. Some of it is flexible.

Some items are translucent, with the appearance and texture of marble. Color can be impregnated into such forms as desired.

The newest thing is the perfection of a transparent plastic for use in making "crystal" chandeliers and the like.

Items with joints or seams, once a problem, now are being made in one piece, with a consequent increase in strength and durability.

Many units are made in sections so that any one segment or combination of segments or the entire unit may be used as needed.

Museum pieces, which sometimes can be rented at relatively fabulous rates and which carry heavy insurance for damage risks because of their extreme fragility, can be duplicated in plastic to become part of the permanent property stock. An antique pottery vase, for instance, which is delicate and heavy, can be made in sturdy plastic which will weigh one fourth of the original.

Another example in this category is an antique, carved wooden picture frame from Italy. A replica in wood and plaster would cost about $125 and would require careful handling because of its tendency to break apart. Reproduced in strong plastic, it would cost only half as much and would last indefinitely. It could be painted in any color, washed off and repainted as often as desired.

Window draperies can be made in three sections so that one, two or all three may be used, as required. They need no fire-proofing, dry-cleaning, mending or special handling. Like the other items, they can be repainted with ease and repeatedly.

Plastic stage "props" look like the originol orticles but weigh only one fourth os much.

Experimentation with flexible plastic has produced authentic reproductions of ornamental gold braid and similar items for uniforms and other costuming, which can be sewed and handled in the same manner as fabric but never tarnishes or requires repairs.

Through the use of plastics, a standard stage wing has been reduced in thickness by one third, thus making it easier to handle and less bulky for storage. A 100-pound wing can be prepared in plastic at 57 pounds.

TV and Radio Expand In Dominican Republic

The first phase of extensive plans of the Dominican Republic to modernize and expand its communications services has been completed with the opening of a country-wide radio broadcasting network. In making the announcement, Meade Brunet, a Vice President of the Radio Corporation of America and Managing Director of the RCA International Division, said that the new radio network, equipped throughout by RCA with the latest types of broadcasting apparatus, links Ciudad Trujillo, the capital, with Santiago, the nation's second city, by means of automatic repeater stations at La Cumbre and Santo Cerro, operating at very high frequencies.

Complete Chain of Television Equipment Ready for Opening of UHF Band

FORGING of the final link in the electronic chain that makes ultra-high frequency television a practicable, commercial possibility, was disclosed by RCA last February at a seminar in Washington, D.C. At that time, the company revealed a complete line of UHF selectors, antennas, transmitters, and associated equipment — everything needed for transmission and home reception of UHF television — would be available as soon as broadcasting is begun in the upper reaches of the radio spectrum.

The chain had taken 20 years to forge. Earlier links were labelled research, development, experimental broadcasts, and field testing. It had been a vast and difficult undertaking — charting the ultra-high-frequencies for television was comparable to the geographical exploration of a continent. But with RCA's announcement in the nation's capital, the development phase of UHF-TV ended, and the commercial about to begin.

Two hundred of the country's leading television engineers, consultants, and attorneys, plus representatives of the Federal Communications Commission, attended the RCA seminar and applauded the company's report.

They heard representatives of the RCA Victor Division describe a multi-channel selector designed to receive programs on all channels in the UHF band, housed in its own attractive cabinet and equipped with its own on-off and tuning knobs.

Also announced were simple, inexpensive one-channel and two-channel selectors, for use with present VHF receivers in areas where only one or two UHF stations go on the air.

All three selectors, it was noted, are easy to install and will function with any make of television set.

In addition, participants in the seminar learned, RCA Victor will produce a complete line of combination receivers, providing reception in a single instrument for both UHF and VHF.

The RCA Service Company reported that new UHF receiving antennas are available in various styles to meet specified reception needs. They differ radically in design from the now-familiar VHF antennas. The new antennas, designed to meet special requirements of UHF transmission, have been evaluated and classified by RCA Service Company engineers on the basis of extensive field tests.

At other sessions, engineers of the RCA Victor Division unfolded the company's plans to meet anticipated broadcast needs during the next few years, and gave a preview of new products and developments.

Left: Compact all-channel UHF selector, designed by RCA for use with existing television receivers to bring in all UHF programs in any area. Below: Same of the types of development UHF antennas designed by RCA engineers.

Improved model RCA Image Orthicon camera which provides brighter, sharper TV picture receptian in the home.

A UHF antenna which helps in eliminating reflections in cities and improves picture quality in fringe areas.

Among the more important disclosures were new 1-kw and 10-kw UHF transmitters, high-grain antennas, and associated equipment capable of providing up to 200-kw of effective radiated power in the 470-890 megacycle frequencies. Engineers of the RCA Engineering Products Department described design features of the equipment, including new developmental UHF tubes of several type, special low-loss UHF long-shoulder transmission line with inner conductor bullets, in several diameters, and constructional details of the company's new slotted UHF antennas.

The conference was the latest in a series of meetings and demonstrations undertaken by the Radio Corporation of America to aid broadcasters in laying plans for UHF television operation.

At the annual convention of the Institute of Radio Engineers in New York, two weeks after the Washington seminar, initial models of the new selectors and receiving antennas were given their first public showing. The solid proof of accomplishment was there for all to see.

Final Equipment Details Added

Early this month, RCA filled in the final details of the TV equipment picture. During the annual exposition of the National Association of Radio and Television Broadcasters, in Chicago, the company unveiled initial models of its complete line of UHF transmitters, studio equipment, antennas, and home selectors, as well as new VHF equipment and a dramatically advanced new image orthicon TV camera.

The new transmitters, which are capable of putting stronger signals on the air, will result in pictures of greatly increased brightness and contrast.

The UHF equipment developed by RCA is the result of more than two decades of studies, field tests, and experimentation, climaxed by work at the company's experimental UHF station at Stratford, near Bridgeport, Connecticut. Built by RCA and operated by NBC, this is the first and only such station to transmit daily programs.

Other television manufacturers have brought their equipment to Stratford and, in cooperation with RCA, tested and perfected products for the new service. Representatives of the FCC have journeyed there to study the latest developments. This quiet corner of New England has grown into the engineering capital of UHF television.

The location where RCA built the station is known in the community as Success Hill. The work accomplished there will eventually enrich the lives of millions.

Tests at Stratford and elsewhere have proved that, contrary to earlier expectations of some elements of the industry, UHF television brings clear, sharp, dependable pictures, comparable in quality to VHF reception.

Television's conquest of the ultra-high frequencies means the medium can now extend its service to virtually every corner of the land. More than 1,000 new stations are expected to share the UHF channels, and they will bring pictorial reports of world affairs and some of the finest entertainment available to towns and villages throughout America.

Industrial Television Expands

Video Equipment Used in Factories, Banks, and Libraries and in Numerous Government Projects

INDUSTRIAL television, another precocious offspring of the video art, has been available to industry for less than ten years, yet in that relatively short time, it has created an increasingly important role for itself in many unrelated fields. New uses for ITV, as it is labelled for brevity, are being developed constantly by RCA engineers and its adherents are convinced that there are no reasonable limits to its applications.

In 1950, RCA Victor marketed its pilot-model. Today, two years later, RCA is assembly-line producing a new two-unit chain with only 21 tubes, half the number required in the first model. Cost of the basic chain is approximately $5500.

In February of this year, the RCA Service Company installed its most advanced ITV chain at Farrand Optical Company, New York, for government work. Jack Greene, coordinator of industrial television service, was told no more about the job than the necessary light sensitivity and the field to be picked up. The U. S. A. is RCA's biggest ITV customer to date.

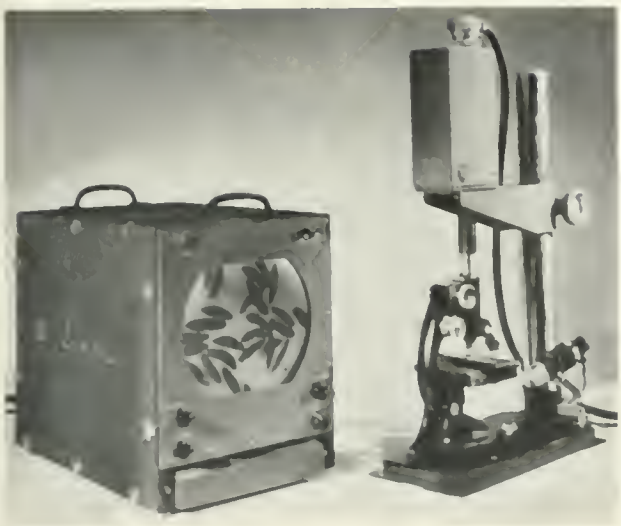
An industrial TV system at Picatinny Aresenal, Dover, N. J., was the next installation. Others are scheduled at Bausch & Lomb, Rochester, N. Y.; and the Library of Congress, Washington. At the latter location, the unit will be used to check documents in distant parts of the library, thereby saving much foot-travel from one part of the building to another.

The Atomic Energy Commission, Signal Corps, Navy, General Motors, among many others, are putting ITV to work. At GM, a man is hired to look at television all day long. From his observation post he operates controls which drop bales of scrap into a gondola on a siding outside the plant, a considerable distance away.

Electric utilities, leaders among civilian users of the system rely on ITV units for the viewing of water level, furnace flame, stack smoke, even to scan visitors applying for entrance at gates.

In arsenals, the physical handling of explosives can be reduced to a minimum since ITV makes it possible to study their action close up. Guided missile perform-

Bank employees use an RCA Industrial Television System to compare signatures on checks and other documents.



Monitor screen (left) shows magnified images of living organisms picked up by combination of light microscope and sensitive Vidicon tube at right.

ance also is known to be observed by this means. Classroom teaching is frequently made more effective via TV.

Other fields for which the system is suitable and either in operation or considered for the near future are:

Commerce and Banking — meetings (sales, stockholder); shows, exhibits and demonstrations; office intercom; transmission of signatures, balances, records.

Industrial Control and Testing — wind tunnel tests, time study, oven and furnace operation, smoke control, life tests, remote telemetering, inspection (processes, machines, gauges, etc.); plant intercom, transmission of prints, photos, drawings; foundry and rolling mill operations, training, materials handling.

Medical — surgery, X-ray transmission, training.

Military — handling of explosives, rocket and guided missile performance, view of range finding, training.

Security and Law Enforcement — patrolling, guarding, fingerprint transmission.

Specialized Application — under-water work, TV rehearsals, fire control, forestry conservation, rescue work, radiation and nuclear research.

Traffic Control — streets, railway yards, bus and truck terminals, ships and docks.

In other words, wherever it is desirable to view at a distance a clear, exact, instantaneous picture under conditions where direct observation is too dangerous, or the arena of action too inaccessible, too inconvenient or too expensive, industrial TV is the solution.

Design of RCA's ITV system centers around a new camera tube, the Vidicon. It is two-thirds as sensitive as the studio-type image orthicon, costs only one-third as much.

The chain consists of a miniature camera, about the size of a 16 mm. movie camera, and a compact control monitor connected by 500 feet of 18-conductor camera cable, .625 inches in diameter.

The connecting cable transmits the picture picked up by the camera to the control monitor's 10-inch viewing screen. The complete chain operates from ordinary 115-volt, 60-cycle power (50-cycle equipment is also available), and is entirely self-contained. Power consumption is only 230 watts.

The RCA industrial television camera is as easy to handle as the average 16 mm. movie camera. It contains only three tubes, one of which is the Vidicon. The small size explains why the camera can be placed in spots inaccessible to humans.

The monitor, together with its own power supply and control panel, is housed in a metal case smaller than the average table-model TV set (20" deep, 15" high, 13" across). The optical-focus control operates a small reversible motor, which changes lens focus.

Interlocking safety switches and a complete shielding unit permit people to work on the equipment in absolute safety. Though a standard set is supplied with 50 feet of camera cable, the monitor may be located at any point within 500 feet of the camera by the addition of extra cable, supplied on special order.

For applications requiring more than one viewer, or where the distance from the camera must be greater than 500 feet, the control monitor has been equipped with provisions for plugging in additional receivers.

Where distances between monitor and auxiliary viewers are extreme, the RCA system is so designed that it can be operated with microwave transmission or by means of coaxial cable.

Stockholders "Tour" Plant

(Continued from page 12)

of television, Bliss predicted that TV will become a valued tool of business and industry for such purposes.

"It provides a unique means of showing stockholders what is being done with their money and how their investments are being protected and enhanced," he said, "without wasting their valuable time and energies and those of company officials in traveling from point to point.

"Further, it makes it possible to present a dramatic vignette of highlights in a company's operations that is more impressive and understandable than a physical tour of the plant. It presents the company's story with more realism and conviction than film can achieve, since it is recognized that there is no window dressing in a TV presentation—no opportunity for cutting and editing."

Home-Built Yacht Carries RCA Radio Equipment

A LIFETIME ambition to own a self-built yacht completely equipped with the finest radio and navigational instruments has finally been realized by Walter F. Carey of Detroit, Michigan. While he was constructing his 63-foot, 70-ton yacht in the back yard of his farm at Birmingham, Michigan, Mr. Carey was giving serious thought to the radar and radio units that he would need. After an extensive study of the field he concentrated on RCA equipment, on the basis of its efficiency, accuracy and economy. Included in his final selection were Radiomarine's Model CR-103 small-craft radar, Model ET-8012-HF radiotelephone and Model AR-8709B radio direction finder.

The 75-watt radiotelephone is installed in a special compartment underneath the enclosed flying bridge of the *Seaquester* with a remote control unit located on the bridge itself. This set provides 7 channels in the 2000-3000 kilocycle band and 3 channels in the 4, 6 and 8 megacycle band for Inland Waterways and Great Lakes use.

The CR-103 radar weighs only 400 pounds installed and features compact design to comply with space limitations on small vessels. It has the power (30 kw) and sensitivity to pick up objects as close as 75 yards and as distant as 20 miles.

The radio direction finder is especially designed for ceiling suspension on boats where space is at a premium.

The *Seaquester* has put more than 7,500 miles under her keel during the past year, her most recent voyage being a trip to the Caribbean. Leaving her anchorage at the Grosse Pointe Yacht Club in Michigan, she traveled to Chicago via Georgian Bay, thence south to New Orleans, Miami, the Bahamas and Haiti.

Radiomarine direction finder installed in the wheel-house of the yacht *Seaquester*.

Discussing the recent trip, Mr. Carey said that his radar nearly became the most important piece of equipment on his boat. "Once, southeast of Nassau," he recalled, "some of the amateur navigators in the family got us effectively lost during the night. It was only the radar picture, showing us the outline of the different islands that enabled us to ascertain definitely our correct position."

"Several days later," he continued, "we were approaching Haiti in the middle of the night. I think one of the biggest thrills in my boating experience was to make landfall via radar, using the 20-mile range, just when I estimated we should. This was particularly important because of the low power and short visual range of the beacon light on the northwest end of the island."

Graduates of RCA Institutes meet in New York to form an Alumni Association to "further common interests in education and technical recognition."

Air Conditioners and Dehumidifiers Marketed by RCA

New Products Introduced for Home Use will be Serviced by Company Technicians

HOME air conditioners and electric dehumidifiers, the first ever marketed by the Radio Corporation of America are being placed on display in retail stores all over the country. Judging by initial reports from distributors and dealers, the new products are being well received by the public.

RCA's decision to enter the home air-conditioner industry was reached only after considerable study and analysis. The company made exhaustive surveys on market conditions, and on the actual contributions these appliances can make toward a pleasanter, healthier family life.

Approximately 80 per cent of the room air conditioners that were manufactured prior to 1952 were commercial installations in small shops, private offices, hospitals, and similar places.

Only 20 per cent had been sold for home installation. In other words, of the 39,000,000 electrified homes in this country, less than one-half of one per cent had room air conditioners—which meant the appliances had an immense sales potential.

Further investigation convinced us that room air conditioners can add so much to the comfort and pleasure of life that they are destined to become as integral a part of the American domestic scene as central heating.

Contrary to the common belief, an air conditioner does much more than supply cool air to counteract summer heat. A quality appliance will also dehumidify the air, wringing out excess moisture up to 30 quarts in 24 hours. Humidity accounts for as much summer discomfort as high temperatures. Furthermore, a true air conditioner will exhaust stale air, kitchen odors, and tobacco smoke, removing up to 80 cubic feet per minute of unpalatable air.

And, of particular interest to hay fever sufferers, these appliances filter the air by drawing it through layer after layer of specially treated spun glass, which catches the dirt, lint, and pollen.

In addition to weighing the sales potential of air conditioners and their ability to better American home life, we considered our company's accumulated experience in marketing and advertising, and our ready-made, nation-wide dealer-distributor organization which would welcome the opportunity to merchandise RCA air conditioners.

To this we added the plus factor available in the RCA Service Company with its trained technicians and its service centers located in most major cities, ready to install and service RCA room air conditioners anywhere. We foresaw that through the cooperation of the RCA Service Company, RCA dealers could write off the installation and maintenance problem which has plagued dealers in the past.

We also took note of the fact that air conditioners enjoy their greatest sales during the summer when television sales tend to slacken off.

When all the facts were in, the company's decision was clear and inevitable. And last October, President Frank M. Folsom issued the announcement that the Radio Corporation of America, through the RCA Victor Division, was entering the home air conditioner field.

New RCA air conditioner especially adapted for small to moderate-sized rooms.

During the six months since Mr. Folsom's announcement, RCA has built the nucleus of an organization to merchandise our new products. As sales manager for air conditioners, the company has appointed William F. Carolan, who has a wide and diversified background in marketing home appliances. S. D. Conley, a veteran of more than 25 years' experience in RCA Victor sales and engineering activities, is merchandise manager. E. Burt Close is in charge of air conditioner advertising, and Thomas Ford is engineering manager.

Three Conditioner Models Available

In addition, the air conditioner department has six field representatives, and 63 distributors. Dealers in all parts of the country will sell our new products.

RCA is offering three models, the "Thirty-three," the "Fifty," and the "Seventy-five," of one-third, one-half, and three-quarter horsepower, respectively. In performance, they equal the best in the field; in appearance, we feel our products surpass all others.

RCA air conditioners are made to the company's own designs by the Fedders-Quigan Corporation of Buffalo, one of the outstanding companies in the industry.

A diversified advertising and promotion campaign will support our new products, leading off with a 2-page color spread in *Life* magazine on May 26, followed by single pages in *Life* and many full-page newspaper ads.

"Tune in perfect weather with an RCA room air conditioner" is to be the theme of the campaign. The copy will be partly educational, highlighting the whole range of services performed by the appliances.

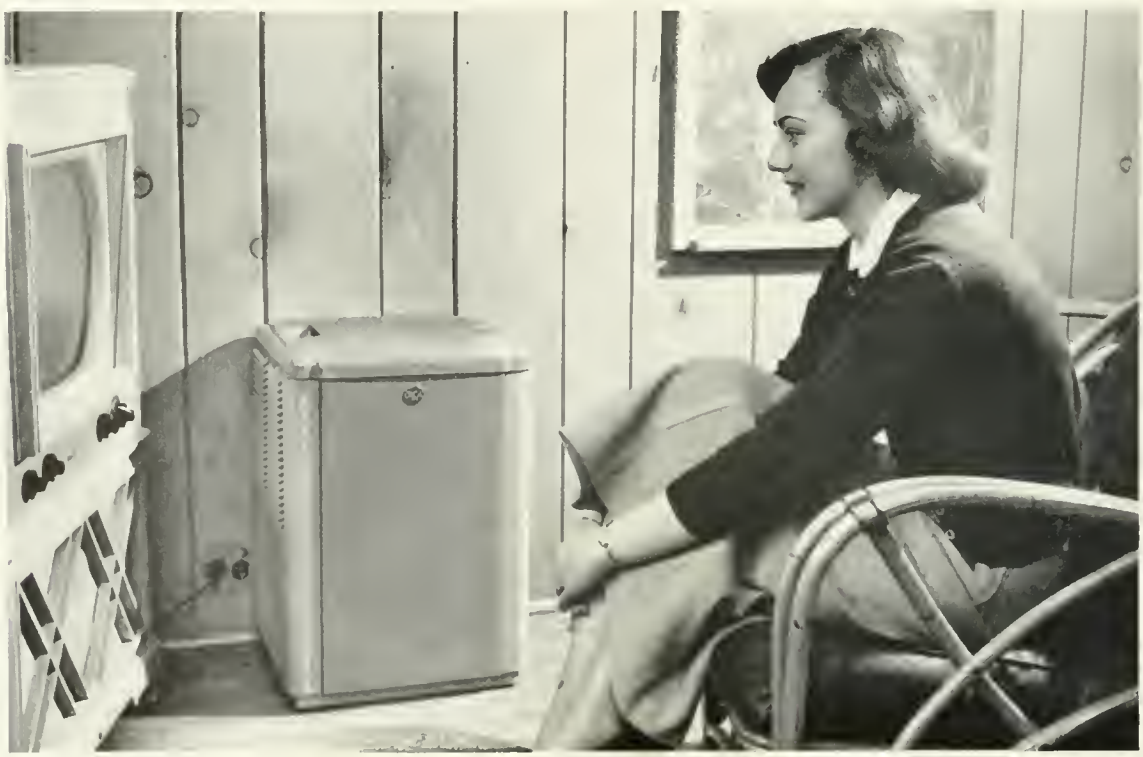
On television, the air conditioners will share the commercial time on the "RCA Victor Show," a Friday evening feature on the NBC-TV network, and on the popular "Kukla, Fran and Ollie" program. RCA Victor radio programs, including the Sunday evening favorite, "Phil Harris-Alice Faye Show," will also carry air conditioner commercials.

The RCA dehumidifier will come under the jurisdiction of the same personnel who handle the company's room air conditioners. The colors of the dehumidifier, a combination of arctic tan and polar beige, are the same as the RCA room air conditioners.

Designed principally for home use, but suitable for many commercial establishments, the RCA dehumidifier will remove up to 12 quarts of moisture from the air in a 24-hour period, and is capable of controlling humidity in closed areas up to 8,000 cubic feet. It is operated by a $\frac{1}{8}$-horse power compressor, which is hermetically sealed, permanently lubricated, and quiet in operation.

Experiments have proved that the dehumidifier will help stop mold and mildew damage to fabrics and leather goods, protect furniture and woodwork from rot and warp, and speed up clothes drying by 400 per cent.

RCA's electric dehumidifier removes up to 12 quarts of moisture from the air in a 24-hour period.



Selecting Mood Music for TV Programs

A TELEVISION drama without background music, someone has said, is like a stage setting without scenery; it's bare, empty and lacks the third dimension required to round out the mood of the play. How pertinent this observation is to the operations of NBC television programming is evident in the scope of activities behind the scenes in the network's music department.

Music for NBC's television dramas is carefully selected by a staff of five music programmers, all of whom have had a formal musical education and all of whom have remarkable memories. The latter attribute is essential, because the catalogues of recorded incidental music —no matter how descriptive—are not adequate guides to the approximately 10,000 selections in the special library and to the 100,000 records in NBC's regular record library.

Margaret Snider, who heads this particular operation, started the special section in 1945 with only a desk and a turn-table. When Miss Snider first began working on background music for television, she had access only to the standard classical record library. Today, with physical facilities commensurate to her staff of assistants (an office and four "roomettes" in which music programmers and directors can listen to the music), Miss Snider has amassed, in addition to two libraries of specially recorded music on 16-inch vinylite discs, seven English libraries of special background music, composed originally for film use and now used extensively in television and radio, here and in England.

Catalogues for each special library provide the programmer with clues to the general mood of each record. Under the heading of "Dramatic Atmosphere," for instance, there are records titled "Aftermath," "Deserted City," "Haunted House," "Snow Scene," "Motif for Murder," and "Stop Press." Under "Fanfares," you'd find such titles as "Big Moment" and "Majestic." Under the heading of "Light Atmosphere" the gamut runs from "All Strings and Fancy Free" to "Exhilaration" and "Shopping Center." Other general headings include "Marches," "Melodic," "National," "Oriental," "Sea," and "Storm, Machines, War" (containing "Engine Room," "S.O.S." and "Shipwreck," in that pessimistic order).

Other catalogues may be a bit more helpful. "Encounter at Dawn," for instance, is described as "very heavy and dramatic, but quick moving, then becoming more subdued, but still with a dramatic and sinister atmosphere."

"The individual compositions," Miss Snider said, "can be broken down into several moods and can be used in whole or in part. But the fact that the library is so much larger and so much more varied than a written catalogue would indicate that the music programmer must rely very heavily on his memory. Besides, he should keep an open mind, since one piece may be applied to many different situations—one week tragedy, another mystery, another comedy, and so forth. Since catalogues don't really indicate the full use to which records can be put, one must interpret the mood of the script and paint in the background from knowledge tucked away in one's own mental file."

With stop-watch and script, NBC's Margaret Snider selects music in the proper mood for the background of a television drama.

Miss Snider and her staff—Marilynn Kilgore, Phebe Haas, Lea Karina and Harold Venho—select music for about 20 television shows a week. Within the last two years a number of radio shows have also found it expedient to use recorded background music. A half-dozen such radio shows are on the air now, with the number rising to twelve or fifteen in the Summer season.

An hour-long TV drama, such as "Television Playhouse" or "Robert Montgomery Presents," demands a varying amount of time for music selection, depending on the individual director and the amount of music to be used. Ten to sixteen hours for a single script is average. A period piece takes longer, because the selector tries first

(Continued on page 30)

Phonograph Records Make Strong Comeback in 1951

By L. W. Kanaga

Manager, Commercial Sales and Merchandise Division, RCA Victor Record Department

THE phonograph record business—which soared to all-time heights in 1947 only to meet a declining market the following year—has made a strong comeback.

There was a confusing fog for a while created by the introduction of the new-speed records, but it has cleared away, leaving the industry healthier than ever before in its history. According to a consensus of the best available industry estimates, dollar sales, which were $233 million in 1948 and fell to $202 million in 1949, rose to $284 million in 1951.

It is true that record unit sales have declined, but the amount of actual music sold has increased—the difference being that more music is contained on the new-speed records. A symphony which, on the old 78-rpm speed, would occupy an album of four or five records today comes complete on a single 33⅓-rpm record—usually at lower cost, too. So the rise in dollar volume means that people definitely are buying more music.

It must be explained that the lack of a central data-gathering organization or a standard method of reporting makes it difficult to determine trends in the record industry. Most figures now available (from musicians' union fees, excise taxes, etc.) have to be adjusted and coordinated and often must be projected before they begin to make sense.

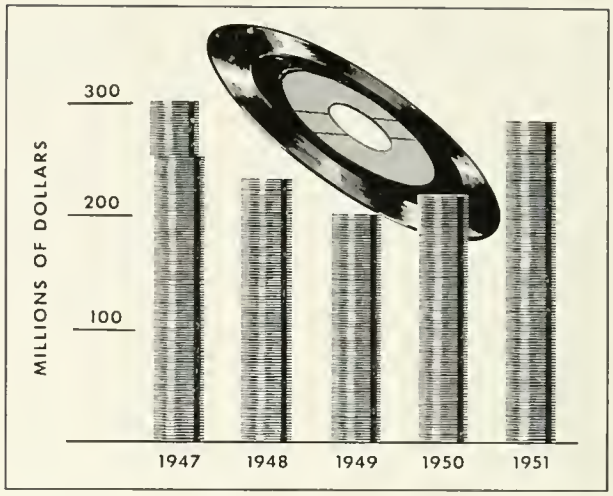
Industry Selling More Music

But one fact is plain: the industry is selling more and more music and is bringing in more and more dollars.

Chief factors entering into the firm position of the phonograph record business are:

1. The "speed" war and its attendant confusion—which kept many from buying records—is now a dead issue, most companies agree. The major record makers now produce in all three speeds. The 78-rpm records are dying out and the new speeds are contributing the largest share of the total volume. Both of the new speeds have their champions among consumers. While it is true that 45-rpm records have the edge in popular and light classical works, and 33⅓'s sell better in the heavier selections, the record buyer's choice depends mostly upon which system he owns.

2. Revivals are beginning to play an important part in both the classical and popular market. Among these, RCA Victor's "Treasury of Immortal Performances" series is notable. Caruso's records alone sold more than a half-million last year. This may be the strongest indication that the industry has come of age—for with its earlier products having a permanent demand from the older generation, there is a constant self-renewing market in collectors' items.



Phonograph record sales made strong come-back in 1951.

3. A basic sales factor is the number of phonograph players in homes. In 1941 there were only 3.3 million players in home use. During the following decade this sky-rocketed to 21.97 million—a solid market foundation.

TV has increased Record Sales

4. Television has not cut into record sales as was widely feared. In fact, TV has increased sales, according to recent RCA Victor surveys and sales figures. They indicate sales are best in television areas and that TV set owners themselves buy more records than non-owners.

There are several theories as to why this is so. One is that a TV set in the house keeps people home more often, and while they're home their chance of playing records is increased. Another reason might be the fact that, like live musical performances, television "sells" people on music and makes the recording artists more familiar to them.

5. The present state of low inventories (compared to 1948 and 1949) is another market booster. It allows greater facility in meeting fast-changing market demands.

6. The growing popularity of classical music is having its effect, too. Before the war the ratio between pop and classical record sales was about 80 to 20. Now it is estimated at approximately 70 to 30. This is gen-

(Continued on page 30)

Fading of Radio Signals Minimized by New Transmitter System

By Grant E. Hansell

RCA Laboratories Division
Riverhead, N. Y.

Fading of radio signals has been a problem for the communications engineer since he first attempted to transmit radio messages over distances of 100 miles or more. It required only a short time for research to reveal the Cause; the Remedy — even a partial one — is taking a great deal longer. While a complete mastery has not yet been reached, one of the most recent developments, a system called Transmitter Diversity, already has demonstrated its value in minimizing the effects of fading in certain types of communications.

In the early Twenties, when transoceanic radiotelegraphy was coming into its own as the fastest means of intercontinental communications, fading had to be taken in stride. In the knowledge of its cause lay a paradox. Strangely enough, the same phenomenon which made long-distance radio possible was also the basic cause of fading signals, namely the so-called Kennelly-Heaviside Layer. This layer, a mass of ionized particles high in the atmosphere, is created by the action of the sun's rays upon molecules of gas in the air. The particles act like a huge mirror reflecting back to the earth the radio signals which have passed beyond the horizon and outward into space.

Without this "ethereal blanket" long-distance telegraphy, radiotelephony, broadcasting, and radiophoto would be undependable, if not impossible. With it there is almost no limit to the travelling span of a radio signal, provided enough power is available at the transmitter.

Early research on fading disclosed that a transmitter signal which faded at one location was, at the same instant, at its maximum strength at another receiving point some distance away. Further experiments revealed that it was possible to connect the outputs of two receivers, connected to spaced antennas, so that the stronger signal, or a combination of the two signals, could be selected at all times. This method, called Receiver Diversity, has been in use for many years at the large radio centers operated by RCA Communications, Inc., at Riverhead, N. Y., Point Reyes, California, and many other locations.

From the foregoing description it is obvious that Receiver Diversity requires considerable space for the location of the two receiving antennas, thus limiting its use principally to fixed land stations. Reception by this method on planes, ships at sea, or at receiving points in congested areas, such as large cities, is impractical.

With this knowledge RCA engineers began work on Transmitter Diversity. They reasoned that duplicate transmitters connected to spaced antennas in the same manner as the receivers in the earlier method would provide a single distant receiving point with a continuously usable signal, since it was extremely unlikely that both incoming signals would fade simultaneously.

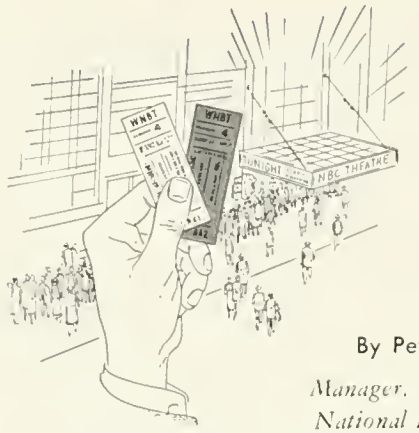
To determine the soundness of this theory, RCA conducted tests from Bolinas, Calif., to Riverhead, N. Y., and later from Bolinas to receiving points in lower and midtown Manhattan. In each instance, results demonstrated the effectiveness of Transmitter Diversity, particularly in urban areas where man-made radio noise is at a high level.

Transmitter Diversity, however, is not expected to replace the established Receiver Diversity for most point-to-point circuits but it does offer a practical solution for certain types of important message services, including shore-to-ship, ground-to-plane, and fixed base to mobile vehicles.

From an economic standpoint, also, Transmitter Diversity has an advantage. It is less costly, for instance, to improve the reception of a signal at a single receiver by adding a second transmitter than to increase the power of the single transmitter to get the same results. The power of the single transmitter would have to be increased from 16 to 1,000 times that needed by each of the dual transmitters to give the same results at the receiver.

New Power Tube for UHF

A new power tube, expected to be of special interest to designers of UHF transmitting equipment has been announced by the RCA Tube Department. Intended for UHF service in television and continuous wave applications, the new tube, a triode, is very compact, having a diameter of $1\frac{3}{4}$ inches and a length of $3\frac{1}{4}$ inches. It can be operated at maximum ratings at frequencies up to 900 megacycles per second.



NBC Operates One of World's Biggest Box-Offices

More than Three Million Tickets for Free Programs Issued Yearly

By Peter M. Tintle

Manager, Guest Relations, National Broadcasting Co.

THE National Broadcasting Company operates one of the biggest and busiest box-offices in the world. The Broadcast Ticket Division, a function of the Guest Relations Department, prints and distributes the fantastic number of more than 3,000,000 tickets a year. On any normal day, the Division handles tickets which involve an average of 450 different shows.

The unique feature of NBC's box-office is that all of its tickets are free, even though many admit their holders to productions, symphonies, etc. that may have cost up to $75,000 to produce. Naturally, with the leading entertainers in the world appearing on these free shows, a greater demand is created for tickets than could be ordinarily expected of paid performances. As a result, more requests for tickets to a popular program are received in one week than could possibly be filled in an entire year. And since demand for "hit" shows is constant, it is, unfortunately, impossible to fill most of the requests.

How Tickets are Distributed

The public generally has little idea of the method and scope of ticket distribution. The broadcaster's first obligation is to the advertiser who has paid for the show and the cost of air-time. Consequently the advertiser obtains a goodly supply of tickets. In most cases these tickets are used for dealer promotion or for other purposes that will help to sell the product advertised. In some instances, many of these tickets will eventually reach the public. Depending upon the popularity of the program, it is customary for the sponsor or his advertising agency to take over 70 to 100 per cent of a studio's seating capacity.

With the first obligation to the advertiser, the broadcaster must then accept the responsibility of handling the remaining tickets with the utmost care and tact.

For example, the Press Department needs tickets for its magazine and newspaper contacts, all of whom are in a position to help NBC with favorable comments on programs. The Sales Department faces a demand for tickets from clients and prospective clients. The Station Relations Department must have its supply for distribution to affiliated station owners and managers, who in turn are obligated to local sponsors and advertisers.

The Broadcast Ticket Division has another important activity. It receives and acknowledges all mail received directly from the general public concerning broadcast tickets. These letters total about 1,200 daily the year around. Because he is an "out-of-towner" and expects to be in New York for only a brief visit, the average letter-writer finds it difficult to understand, for instance, why he cannot get tickets for the Sid Caesar program or one of the other more popular shows. The one thing he does not realize is that New York City is well-populated with out-of-towners at all times.

Listeners Express their Preferences

The correspondence section of the Broadcast Ticket Division does have its lighter moments. Many of the letters, although written in complete sincerity, are sources of amusement to the staff. Recently a letter from a self-styled music lover expressed a wish to attend a Toscanini Concert, but insisted that NBC make sure that the program include only melodic music. He added that, in his opinion, it was a great waste for a tremendous orchestra to play music for a solid hour "going diddle-de-dee — starting nowhere and ending nowhere". In 1947, an elderly lady from Georgia, wrote in asking for two tickets to attend a program which since has gone off the air. This particular program, besides featuring honeymooners, also presented couples who were celebrating wedding anniversaries. To support her request, the woman enclosed a self-portrait in water color, and explained that since she would be celebrating her 50th wedding anniversary in 1953 she wanted to be placed on our list to receive tickets on that anniversary date, six years hence.

R. E. Lofferty (left) and J. L. Hothawoy, NBC engineers, demonstrate the electronic "gun-shat reinforcer" which they developed for radio and TV dramos.

Electronic Device Makes Gun-Shots Sound Real on Dramatic Programs

An electronic device that produces the authentic sound of a revolver shot has been added to NBC's storehouse of Special Effects. The "gun shot reinforcer," as it is called, was developed by the network's Engineering Development Group.

The device, which operates automatically, is housed in a rectangular unit the size of a typewriter case. It is plugged into the system or line carrying the sound portion of the TV program. When the script calls for the firing of a shot, a blank pistol is discharged in the studio and the sound of the shot triggers a circuit in the "reinforcer" which instantaneously produces its own gun shot.

The sound, as heard on radio or television at home, is a combination of the actual pistol shot in the studio and the electronic gun shot. The accumulative effect is a "pooowww," or a perfect sound reproduction of a gun shot.

Only the sharp crack of a pistol shot can set off the "gun shot reinforcer." It is not energized by studio dialogue, music, cries, yells, or any such noises.

NBC engineer Raymond E. Lafferty constructed the device based on an electronic principle suggested by J. L. Hathaway, assistant manager of the Development Group.

Metal-Shell Kinescopes

(Continued from page 16)

the meeting of critical specifications. This feature permits the use of a high-grade, drawn, sheet glass which is optically superior to and considerably more uniform in thickness than the faceplate molded as an integral part of all-glass kinescopes. Further, this independent production of the faceplate insures freedom from mold marks, blisters, and other imperfections which may develop during the molding of glass bulbs.

(2) The metal tube has a weight advantage over comparable all-glass types. In larger sizes, metal tubes are as much as 13 pounds lighter, a factor which makes such tubes easier to handle in receiver production and assembly, permits the use of lighter and less-expensive supporting structures in the chassis and receiver cabinet, and reduces shipping costs.

(3) The metal kinescope's inherent mechanical strength reduces breakage and permits a more rapid and flexible handling of the tube during its assembly and test operations.

(4) Exclusive characteristics of the metal tube represent sales appeals to the set manufacturer's customers. The relatively flat, thin, faceplate of uniform thickness permits wide-angle viewing and less picture distortion than the all-glass tube. Further, the metal tube's faceplate is specially treated to eliminate reflections from any angle or source. These features add up to a larger, clearer, superior picture for the manufacturer's customers.

At the present time, RCA produces metal-shell kinescopes at its tube production plants in Lancaster, Pa., and Marion, Indiana.

Metal-shell kinescopes were introduced by RCA in 1948, after more than 13 years of research and development. Recognizing that picture sizes would become larger, and that production problems encountered with all-glass envelopes would be magnified in the larger sizes, RCA tube engineers in 1935 initiated a research program to develop more practical and suitable production materials.

After exhaustive tests, a high-chromium steel alloy was selected for the shell section, giving the tube its unusual combination of strength and light weight.

In December, 1948, the company made commercially available the 16AP4 kinescope, the television industry's first metal-shell picture tube. This first metal tube, pointed the way to low-cost, mass-production of still larger kinescope sizes such as RCA's 21AP4, introduced last year, which continues in heavy demand by set manufacturers.

Phonograph Records Make Comeback

(Continued from page 26)

erally considered to mean a growth in serious tastes and not a reduction of the popular market.

7. Pop sales are also rising. Earlier, a record which sold a million copies was unusual. Now it's unusual if there aren't many of these million-sellers each year.

These high-sale releases are absolutely necessary to the larger companies. Classical, children's, country and western records are the solid base of the industry, but the real earnings are made on the big, low-cost-per-unit "hits." The importance of huge-sale records lies also in the fact that they get more people into the record stores —people who buy other records at the same time. Also, the sales level of standard pop tunes is up.

8. A widening of the sales outlet base has played an important part. Chain variety and department stores that never handled records before now find them money-makers. People who might not bother to make a special trip to a record store will pick up a record or two when they are shopping for something else in a five and dime.

9. Children's records, like revivals, are increasing their share of the market. Large-scale production planning has a great deal to do with their increased popularity. RCA Victor, for example, spent about $15,000 recording the "Alice in Wonderland" album. This is contrasted with the early days when one man on a banjo made a "kidisc" as they are called. The increase goes into better storybook material, better performers and a more thorough production.

10. The most important factor in the revival of the record market is the all-around higher quality of the product. Slower speeds and non-breakable records have reduced two of the manufacturers' toughest problems—the reluctance of dealers to buy large amounts of space-taking, fragile records. The higher fidelity of the new records gives them wider acceptance at all "ear" levels.

One sign of the phonograph industry's present state of optimism is the current number of re-recordings of older works such as operas which require tremendous investments. Not long ago, record companies would not consider such an expenditure, but in the last 18 months RCA Victor alone has recorded three full-length operas with the best artists available. These were "Carmen," "La Traviata" and "Rigoletto." "Il Trovatore" is now being recorded at a cost of about $50,000.

There is no reason to believe that the record industry will not continue its present healthy growth. There is a large market to fill and new and better products are available to offer the people of the world.

Selecting Mood Music

(Continued from page 25)

for authenticity, at the same time maintaining the mood and keeping the music unobtrusive and in good taste.

"We get the script about a week in advance," Miss Snider said. "The music programmer, who is assigned a specific group of shows permanently, reads the script, gets an idea of the type of music needed. Sometimes the director marks the places where he wants music in the script. Then the programmer selects music—sometimes pulling out ten times the amount of music finally needed. Helped by the music programmer, the director makes the final choices."

After the director approves the selections, the music programmer types a synopsis of the visual or dialogue cues for the turn-table engineer, and indicates the record numbers, starting positions (which are also marked on the records in red crayon) and other details; stacks the records in the proper order and arranges to have them delivered to the studio in time for rehearsal.

The selection of music is not a programmer's only concern, however. She is responsible for seeing that the music on each program is cleared for copyright, kinescope rights, tape-recording and other rights. She is constantly searching for new material and replenishing her stock.

"We've just ordered our third dozen of King Palmer's 'The Film Opens,'" Miss Snider said. "This is the popular theme of WNBT's 'Eleventh Hour Theater,' and it's played four or five times a day—for station-break announcements—besides being played on the program.

"Generally we can make better use of unfamiliar music for backgrounds. Many well-known classics are specifically identified with a composer or a drama. Of course there are exceptions. We made wonderful use of Stravinsky's 'Rites of Spring' in an Indian battle scene on the Gabby Hayes Show. And the works of Howard Hanson, Aaron Copland and Prokofier are excellent standbys for various kinds of backgrounds."

11 RCA Scholarships Granted

Eleven university students from eight different states have been awarded RCA scholarships for the current academic year. These undergraduate students, majoring in various fields of pure science or in branches of engineering, have received scholarship grants of $600 each. Since 1945, when the awards were inaugurated, more than a hundred RCA scholarship and Fellowship grants have been made.

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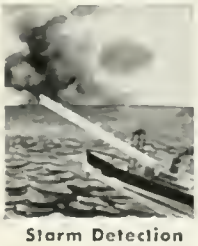

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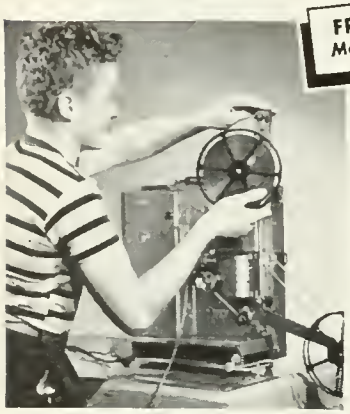

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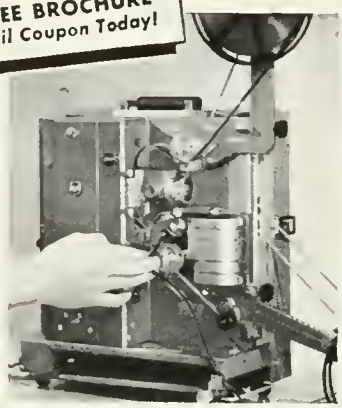
No more lost time setting up. With the RCA "400," you can put picture and sound on the screen in *only 2 minutes.* Or let a youngster do it. *It's that easy!*



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It's ultra-dependable, too. Built for the hard knocks of school and commercial use. You can easily replace projection lamp in 45 seconds, exciter lamp in 20 seconds. Rewind 10-minute film in 66 seconds, without changing belts, pulleys, or reels. It's the only projector powered by a big *A-C* motor, *500% oversize* for better sound stability. Big motor takes it easy, stays cool, *lives longer.* And it's *quiet.* Operating noise only 58.5 decibels. *Quieter than recommended by *SMPTE . . . quieter than other projectors by actual tests.*

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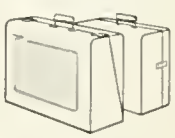

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*SMPTE: "Society of Motion Picture and Television Engineers," leading authority on projector standards. SMPTE recommends "unsteadiness of projected picture less than 3/10 of 1% of picture width."

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