

RADIO AGE

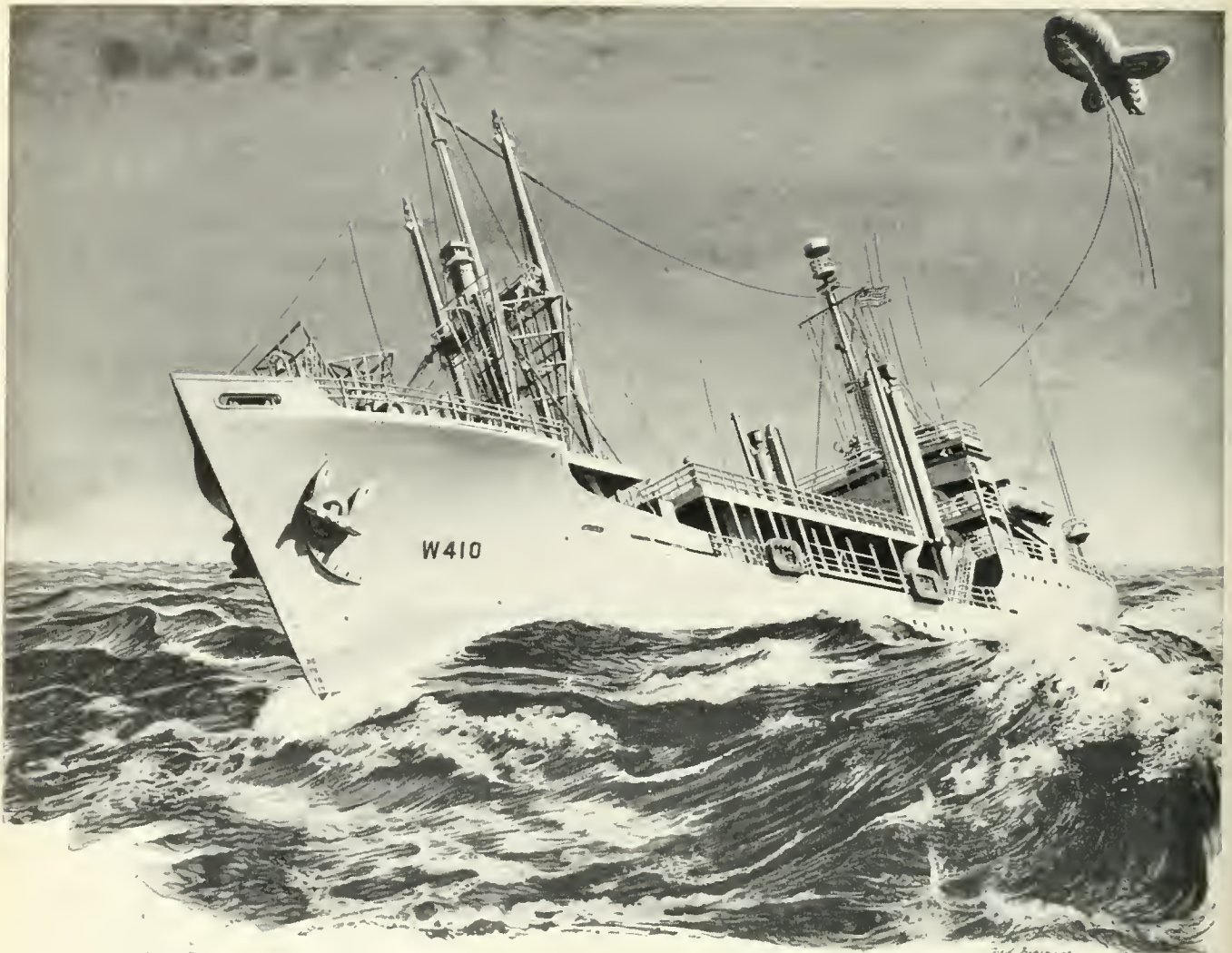
RESEARCH • MANUFACTURING • COMMUNICATIONS • BROADCASTING • TELEVISION



JULY
1952

"ALKIE-LOOKIE"
AT THE
CONVENTIONS





The U.S.C.G. Cutter *Courier*—armed with Truth, not guns—will use its RCA transmitter to beam messages of hope to Iron Curtain countries, and will also be a good-will ambassador to the free nations.

Freedom's clear voice goes to sea

When broadcasting Freedom's message to Iron Curtain countries, transmitters must contend with deliberate radio interference, created to "jam" the air. Aboard the Truth Ship *Courier*, a powerful RCA transmitter fills most of one cargo hold, while a second hold contains Diesel generators which produce 1,500,000 watts of electrical power. Amidship, a special deck is the launching platform for a barrage balloon which carries the antenna high aloft.

In operation, the *Courier's* radio voice will follow regular schedules, so that listeners—often tuning in at serious risk—will know when broadcasts are coming through.

These people are seeking to learn the Truth, and want to hear it despite the thousand jamming stations built in an effort to keep Freedom's messages from penetrating the Iron Curtain.

Development of broadcast equipment for use on land and sea is only one example of RCA pioneering in research and engineering. It is your assurance of finer performance in all products and services of RCA and RCA Victor.

* * *

See the latest in radio, television, and electronics in action at RCA Exhibition Hall, 36 West 49th Street, N.Y. Admission is free. Radio Corporation of America, RCA Building, Radio City, New York 20, N.Y.



RADIO CORPORATION OF AMERICA

World leader in radio—first in television

Radio Age

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BROADCASTING • TELEVISION

JULY 1952



COVER

NBC's Dave Garroway demonstrates one of the Walkie-Lookies developed by RCA and used for the first time at the political conventions in Chicago. (Kodachrome courtesy of Popular Science Monthly.)

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

RCA Building, New York 20, N. Y.

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NBC's "TV Newsroom on Wheels" goes into action against a background of Chicago's skyline.

NBC Covers the Conventions

Staff of 300 Technicians and Commentators, Aided by \$2,000,000 of Equipment, Set New Record of Coverage in Service to TV and Radio Set Owners from Coast to Coast

THE view and sound of a gavel wielded by the party's national Committee chairman signalized the opening of the 1952 Republican Convention in Chicago on July 7, and set in motion the most complete and complex array of television-radio facilities ever assembled at one time for any occasion. It brought to realization the extensive plans over which scores of NBC engineers and programming experts had pored for nearly a year.

For the first time in history the video facilities, ranging from TV cameras on the floor to long files of microwave relay towers and miles of coaxial cables made it possible for the colorful and sometimes frenzied scenes of a national political convention to be witnessed simultaneously in nearly a third of all homes from coast to coast.

Actually, NBC's convention coverage had started several days earlier. During pre-convention week the network presented eight hours of special TV programs. Included were sidelights of the tense battles for contested convention seats as well as the press conferences that were held by candidates for the presidential nomination.

Some idea of the extent of NBC's participation in the convention can be had from statistics compiled by the network.

To report and observe every move on and off the convention floor at the Chicago Amphitheatre, at the National Committee headquarters in the Conrad Hilton Hotel, at railroad stations and other focal points, NBC assembled a staff of 300. Some were "borrowed" from the network's owned and operated stations, including eleven technicians from Hollywood.

These staff members were supplied with the latest equipment including several units never before used in the coverage of national events.

One of the most interesting of these accessories was the walkie-lookie, a portable TV camera-transmitter originally developed through research at the David Sarnoff Research Center, Princeton, N. J. The hand sized TV camera, weighing 10 pounds, together with its 50-pound back-pack transmitter made it possible for commentators and observers to extend the scope of their

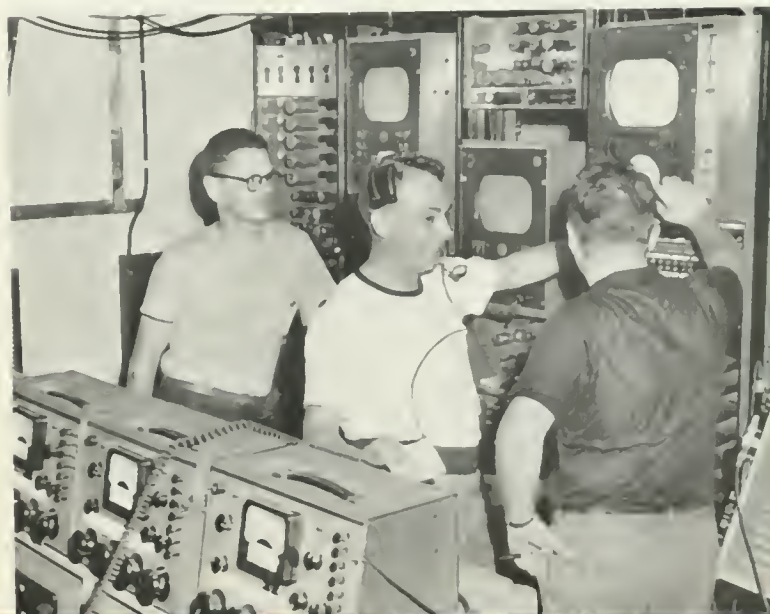
coverage into areas where standard cameras could not go. The walkie-lookie transmitted a regular TV picture-plus-sound from the scene of action to its associated base station thence through the network to home viewers tuned to NBC stations.

Another equipment newcomer, unveiled for the two conventions, was NBC's super mobile unit, rebuilt from a 14-passenger bus. Variousy called a "disaster unit", "crash truck" or "TV newsroom on wheels", the 35-foot truck with its complement of television cameras and controls, film cameras and fast-developing dark rooms, film projectors and microwave transmitter showed its ability at Chicago to speed to any point of interest and to record and transmit the action for immediate re-transmission over the network or delayed transmission from developed film reels.

The truck's film-developing unit is a radical departure in that field. The apparatus proved that it could turn out 300 feet of negative 16 mm. film in 15 minutes, six times faster than ordinary developing machines.

Few home viewers of the convention scenes could realize the full extent of preparations and materials involved in bringing these political highlights to the American people.

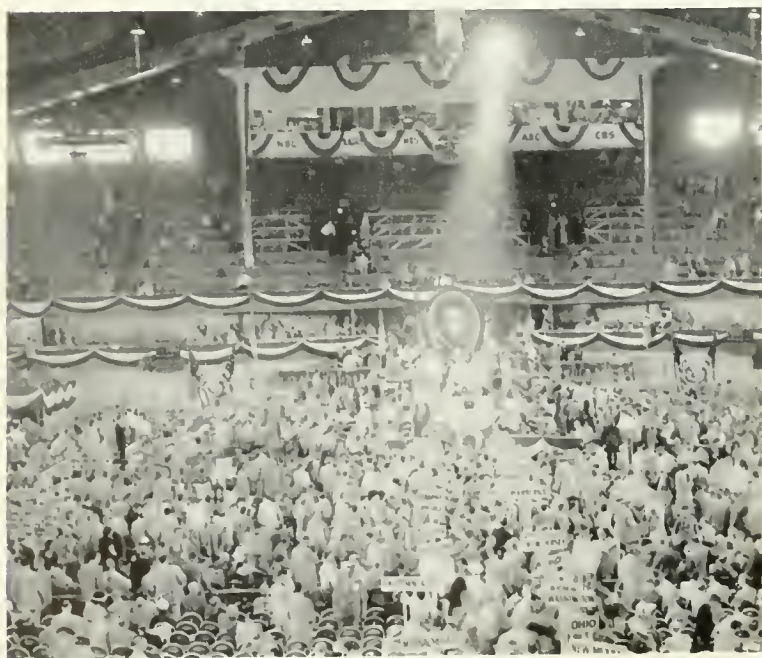
Part of the tons of radio-television instruments and equipment shipped to Chicago by NBC for use during the political conventions.





Portable walkie-lookie unit is dwarfed by a huge parabolic receiving unit used to pick up microwave signals from walkie-talkies on the auditorium floor.

Television and radio booths are located high above the speaker's platform enabling observers to watch action in all parts of the Amphitheatre.



Plans developed by NBC called for the installation, solely for this purpose, of \$2,000,000 of equipment. Included were one hundred miles of wiring and ten tons of audio or voice apparatus, augmented by 28 electronic cameras, 12 film cameras and numerous tape recorders.

Each Delegation has Microphone

Although all networks utilized the facilities, NBC engineers installed and operated the 55 microphones and loudspeaker system which connected the speakers platform and all state delegations seated on the floor of the Amphitheatre.

From a common control point directly beneath the rostrum, the microphone-speaker circuits could also be connected directly with newsreel headquarters and other loudspeaker outlets both inside and outside the auditorium.

To simplify communications with its extensive personnel stationed at widespread locations in the Convention city, NBC compiled its own telephone directory and in addition, arranged a special 24-hour teletype system connecting the Amphitheatre with all affiliated stations on radio and TV networks.

As working space for its contingent at the Amphitheatre, NBC constructed three TV studios, five radio studios, and an assortment of rooms for offices and as storage space for the large stock of spare parts, test instruments and general supplies.

Telecasts originated by NBC at the Republican Convention were broadcast in 47 key market areas throughout the nation, surpassing all other network coverage by more than 35 per cent. Based on the 17,800,000 television sets presently in use, it is estimated that 70,000,000 viewers were in range of the convention scenes transmitted by WNBT and affiliated NBC stations. When television covered the 1948 conventions in Philadelphia, distribution of the featured programs was limited to 5,000,000 persons along the Eastern seaboard. At that time, stations beyond this area were forced to rely on kinescope recordings of the proceedings.

In addition to the thorough coverage of the scheduled sessions of the Republican Convention, NBC also originated numerous regular TV and radio programs from Chicago. Among them were "Camel News Caravan"; "Meet the Press"; "We the People"; "American Forum of the Air"; "Youth Wants To Know"; "News of the World"; "Three Star Extra" and "H. V. Kaltenborn and the News".

All facilities used during the G.O.P. assembly were duplicated for the Democratic conclave which opened July 21, in Chicago.



Iron Curtain Is Penetrated by Powerful RCA Transmitters

WITH a giant half-mile-long antenna pointing the way with pin-point accuracy and force, the four RCA 50-kw high frequency transmitters located at the new Radio Free Europe Station at Gloria, Portugal, are now hurling daily messages to vital target areas behind the Iron Curtain.

Features of the RCA 50-kw units which made them particularly acceptable for use in Portugal include an efficient method of cooling the tubes by circulating air; amplifiers that were stable; ability to shift from one frequency to the other with a minimum loss of time, and their compactness, a factor which reduced installation and building construction costs.

The station at Gloria creates no programs, but for sixteen hours daily it re-transmits Radio Free Europe broadcasts to Poland, Hungary, Rumania, Bulgaria, Czechoslovakia, Albania, and other areas. The station is operated by Sociedade Anonima de Radio Retransmissao (RARET), a joint Portuguese-RFE organization.

Gloria was selected as the site of the transmitters because of its proved excellence as a position from which messages can reach Eastern Europe.

The programs that are broadcast originate in Munich, Germany, where exiles prepare the scripts and read them into microphones for transmission by relay to the Gloria station. The relay is handled by two 10-kilowatt transmitters installed ten miles from Gloria.

With the Gloria station completed and in operation, Radio Free Europe's programs can be broadcast simul-



From this short wave station at Gloria, Portugal, four powerful RCA transmitters beam Radio Free Europe messages across Europe and into Iron Curtain countries.

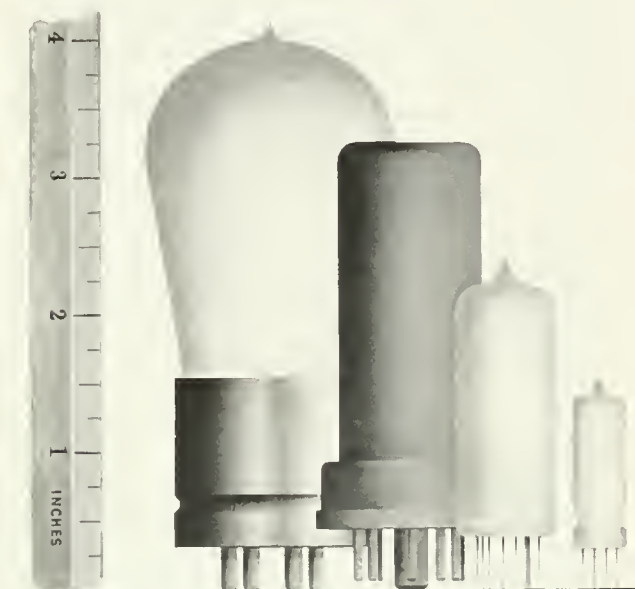
taneously, on different wave lengths, to Eastern Europe, using the facilities of six stations in Munich and Frankfurt in addition to those in Portugal. By transmitting over several frequencies, RFE is able to reach the maximum potential audience in the Soviet captive states and thereby counteract attempts of the communists to jam the programs.

"The expansion of Radio Free Europe, which started broadcasting on July 4, 1950, with a single low-powered transmitter, is a tremendous achievement," said General Lucius D. Clay, national chairman of the Crusade for Freedom.

"Much of the credit for this hard-hitting campaign against Communism goes", he added, "to the American people who have given so generously to the Crusade for Freedom."

General Clay also praised the government and the people of Portugal for their cooperation in making the Radio Free Europe installations possible and completing their construction in the record time of less than six months.

HOW SMALL CAN THEY GET?



Since the familiar type 201 of 1920, electron tubes, like many radio components, have become progressively smaller while improving in performance. Sub-miniature tube of 1952 on extreme right.

A QUIET revolution in design techniques is taking place in the electronics industry. Representing a dramatic expansion of a trend dating back to the late 1930s, it has begun to bear fruit in smaller, lighter, more compact, and more flexible devices and equipment—and some challenging possibilities appear on the horizon.

Probably the most notable disclosure of progress in this program to date came with RCA Victor's announcement of the half-size, half-weight walkie-talkie produced for the U. S. Army Signal Corps. Although some components were so reduced in size that the use of magnifying lenses was required for certain assembly and inspection procedures, the instrument offered twice the range of its larger predecessor, and greater selectivity.

This wedding of smaller size with better performance is typical of results being achieved in this program, known to electronics engineers today as "subminiaturization." An extension of the "miniaturization" which preceded it, this polysyllabic title means simply the reduction of electron tubes, parts, and circuits to the minimum size without lowering the standard of performance.

Subminiature tubes with a volume of only $\frac{3}{4}$ cubic inch, for instance, are being made to do the work formerly allotted to miniature tubes with a volume of $3\frac{1}{2}$ cubic inches. Tuning coils smaller than a dime in

By D. F. Schmit

*Vice President and Director of Engineering
RCA Victor Division*

diameter replace coils several times as large. Flat, two-dimensional printed circuits do away with wiring problems and replace bulky assemblies. A whole family of Lilliputian parts has replaced the familiar capacitors, resistors, transformers, switches, relays, and sockets of yesterday.

The trend to miniaturization began shortly before World War II, but it was the wartime military need for compact units, particularly in the field of airborne communications and navigation equipment, that sparked the miniaturization program. The engineer who has worked on Air Force contracts, knowing how much equipment of all kinds must go into an airplane, understands that, ideally, such electronic equipment should occupy no space and have zero weight. Weight and size are critical considerations. Miniaturization was the best answer to this problem.

The history of miniaturization dates from the late '30s, when RCA developed and produced miniature coils, a 2-by-3-inch speaker, and four miniature tubes for use in RCA Victor's BP-10 "personal" portable radio. These four small tubes, the first of their kind, were a major factor in reducing portable radios to the tiny "personal" size. They were also the forerunners of the whole field of miniature-tube types which have since found widespread commercial application.

Advantages of Smaller Tubes

While considerably smaller in size and lighter in weight than conventional types, these miniature tubes were found in many cases to be superior in performance, especially at the higher frequencies. They also have the advantage of being more flexible in application, and less costly, on the average, than larger types.

The new tubes fitted right into the needs of the military during World War II. As a result of military demands, many new types were developed. The coming of commercial television later gave miniatures another tremendous boost in commercial application. For many functions, miniatures work much better at television's higher frequencies than regular tubes, because they are more compact and have reduced radio-frequency losses. Today, miniature tubes account for between 50 and 60 per cent of RCA's receiving tube production.

RCA's new program of subminiaturization was signaled by the introduction of our battery-operated types of subminiature tubes in 1949. Although subminiatures have now been on the market for some time, their full advantages in size and weight can only be realized when there is a corresponding miniaturization of associated components.

The miniaturization of component parts—coils, transformers, relays, etc.—has been carried out in the Parts Section of the RCA Tube Department.

As new tubes and components have been developed, the market for miniaturized components has steadily increased. The broad possibilities for application of these developments were recognized by the military. This recognition has been a primary factor in the acceleration of both the miniaturization and subminiaturization programs.

How Miniaturization was Accomplished

Three factors helped to make the miniaturization of component parts feasible. One was the development of new materials, of which the best example is the ferrite-core materials, used in deflecting yokes for TV picture tubes, built-in antennas for small radios, etc. RCA was among the first to make use of ferrites in this kind of application. Another was the use of closed powdered-iron circuits which provide higher inductance in smaller spaces. The third was the development of improved methods of humidity protection, employing new types of plastic and casting resins, which make it possible to obtain equivalent performance from coils one-third the size of standard types.

RCA has been producing miniature transformers for about two years. Here, again, most of the orders have come from the government, and units have been manufactured to meet military specifications. In many cases, these orders have merely specified technical requirements

for a unit to fit an assigned space in some military equipment. It has been the problem of RCA Victor engineers to put together a transformer that will meet these requirements.

The availability and continued development of new materials is vital to the miniaturization of transformers. Typical materials are ferrites and new types of magnetic materials which are cheaper, smaller, lighter, and generally superior to the oriented silicon-steel materials which they have replaced. The material used is generally dictated by the technical requirements submitted by the customers.

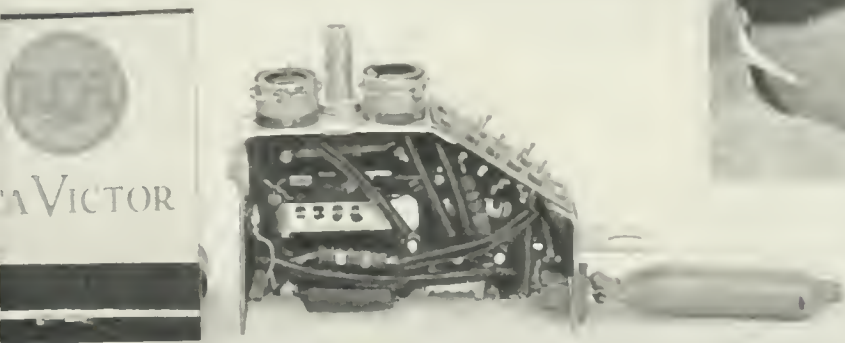
A unique achievement of RCA Victor in the miniaturization of transformers has been the development of a process for encapsulating (covering) certain types of miniature transformers with a special stypol resin—one of the thermosetting plastics. This material eliminates the conventional protective can, reduces the weight of the transformer, and protects it against both heat and moisture. The resin is applied to the transformer with a vacuum impregnation process.

Another RCA Victor achievement in the miniaturization



So tiny are many radio parts today that they must be assembled under magnifying lenses.

Miniature size of complete receiver output section of new walkie-talkie is compared to a match folder.



zation field has been the successful development of a very lightweight multi-circuit relay which is capable of simultaneously switching six different 2-ampere circuits, but weighs only about three ounces.

Although still in a developmental stage, the recently unveiled RCA point-contact transistor—a tiny germanium crystal amplifier which will perform the functions of vacuum tubes in some applications—promises astounding developments in electronic devices. Its long life, small size, resistance to shock, lower power requirements, and ability to function without a “warm-up” period make it one of the most challenging devices in any miniaturization program.

A comparison of sizes is revealing. A typical miniature tube averages $\frac{3}{4}$ inch in diameter and 2 inches in length. The subminiature tube is $\frac{3}{8}$ inch in diameter and $1\frac{3}{4}$ inches long. The point-contact transistor measures only $\frac{6}{10}$ by $\frac{3}{10}$ by $\frac{2}{10}$ of an inch. It consists essentially of a tiny speck of germanium in contact with two closely spaced, fine wires. The wires correspond to the terminals in a vacuum tube.

One of the major problems in any miniaturization program has been that of heat dissipation. Closely packed circuits and components give off large amounts of heat that must be carried off by efficient cooling. Usually, air cooling by means of fans has been relied upon. Since the transistor has no heated filament operating in a vacuum, it does not heat up. This makes it especially desirable for use in subminiature circuits.

Getting about as much attention as transistors in the

miniaturization program of RCA Victor is the use of “printed circuits.” Using such circuits, engineers eliminate bulky wires, coils, and other parts in electronic equipment by “printing” and etching their functional equivalents on conductive foil on an insulated base.

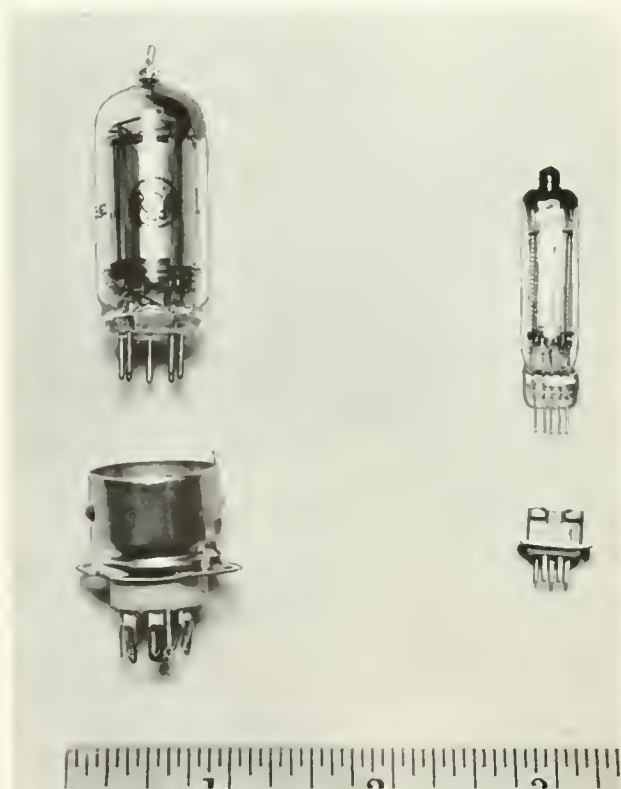
Printed circuits have been under study by the U. S. Bureau of Standards for some years, and they have been used in many of RCA's military equipments during the past decade. A recent survey indicates that important military devices now in production make extensive use of printed wiring, while numerous industrial applications are also listed. More than 112 printed wiring plates are required in the government assemblies scheduled for production.

The principal physical effect of printing circuits is the reduction of electronic circuit wiring essentially to two dimensions. The effect is enhanced where it is possible to employ subminiature tubes and compact associated components. It then affords a degree of miniaturization unobtainable by other means. Just how much saving may be realized depends on the application. Standard electronic components are now available in such small sizes that complete amplifiers may be built into volumes of less than 1 cubic inch, and RCA has designed complete plug-in I-F amplifier units employing standard components that resemble miniature vacuum tubes.

The printed circuit also serves as an aid to uniformity of production, by virtue of precise reproducibility of the wiring pattern, as well as reduction of assembly and inspection time and costs, and reduction of line rejects. These factors, together with “dip soldering,” make the process attractive, even in applications where size is not important. While not all components of an electronic circuit may be printed, the practice is adaptable to conductors, resistors, capacitors, inductors, shields, and antennas. The development of truly diminutive electronic devices now awaits only the availability of such items as smaller microphones, transformers, speakers, and batteries.

From the foregoing it will be apparent that miniaturization is still in its infancy. But its impact will shortly be felt in all phases of the electronics industry. Design engineers had scarcely designed miniature equipments before they were forced to turn their efforts to subminiaturization. The constant pressure of the military for smaller and smaller equipment, especially in the case of airborne equipment, is still receiving the attention of nearly every available design engineer. Commercial needs for lightweight electronic equipment, however, are beginning to be felt, and the coming year may see an ever-growing number of such developments making the headlines.

Tube-socket combinations from old (left) and new walkie-talkies emphasize the rapid progress in miniaturization of radio components.





Television is "the instrument of reality, putting people in touch with the real world."

Legal Profession Urged to Oppose Curbs on TV's Power to Present Truth

The following text is taken from a recent address by Joseph H. McConnell, NBC President, before the North Carolina Bar Association.

IN talking to you about television, I want to discuss its tremendous influence in strengthening the workings of our democratic society. I want particularly to emphasize the dangers of restricting such an influence. You are members of the profession of Jefferson and Madison and Adams and Marshall and Mordecai — the profession which did the most to establish our liberties in the early days of the Republic. And down to the present day, the legal profession and the courts have stood in the forefront of the battle for maintaining those liberties.

In this country, people have freedom to choose among competing forms of entertainment and information. They have voted heavily in favor of television. The American public is responsible for television's growth to a three billion dollar industry in the short space of five years.

The power of television will not be contained in

the United States alone. In our lifetimes, we will see intercontinental television bring events and personalities from overseas into our living rooms at home. And it will also bring into the homes abroad a picture of our democracy in action, and a better understanding of our attitudes and traditions.

Television serves many different publics that make up the diversity and strength of America. Each must recognize the varying interests of the others. A television service that did not provide for this variety would lose its vitality; and a development by members of the audience of tolerance for the tastes of others is no less important than adherence by broadcasters to sensible standards of taste for all.

Another problem which the industry has faced is that of making television economically available on the broadest possible base. That means that the cost of receivers must be brought within reach of all pocket-books, and this is being done.

There are other practical business problems in television — for example, the development of patterns to assure the complete advertising support which is necessary under the American system of broadcasting. This

system has been built on the principle of providing a source of entertainment and information without charge to the public. The provision of this service is costly and we have had to work out new and ingenious sales devices in order to take in the money to support it, and to insure to the public programs of high quality and wide variety. These efforts to protect the public's stake in our free system of broadcasting must not and will never cease.

Values of Television

All of these technical and economic problems can and will be solved. We have in television a medium whose impact on people and influence on our society will be unparalleled in the history of communications. The fundamental question we must face is how we can best direct this power so that it will reach its full potential as a social force for good in America.

I believe broadcasters have accepted this challenge and are learning step by step how to meet it. I do not mean to pretend that we have found complete answers to all of the questions presented by the growth of an industry so young, so strong, so alive, and so dynamic.

But one thing is certain: Television is not simply a living room toy which offers amusement to people when they do not want to go out. Television is a medium of complete and instantaneous communication for the whole population.

All of us who have been trained in the discipline of the law have had drilled into us, ever since we started to study, the importance of the facts. We have learned, by study and experience, the rule that the facts come first, and when the facts are established, the judgments and interpretations can follow.

"Television should be a free ticket of admission to all Americans, wherever a single spectator is permitted."



Television presents the facts. It presents them with complete accuracy, without exaggeration, without restriction, without prejudice, without personal views, and with complete impartiality. This is not done by words which reflect someone else's eyes, someone else's ears, someone else's opinion, someone else's impressions, perhaps someone else's background. In television, nothing stands between the event and the viewer. It is the instrument of reality, putting the people in touch with the real world.

Those of us who have regularly experienced television can see its effects in our own homes. My children are learning science from such programs as "Zoo Parade," "The Nature of Things," and "Mr. Wizard" — and they are enjoying the process.

They are seeing American history dramatized. They watched the signing of the Japanese peace treaty in San Francisco. They are becoming familiar with grand opera through television. They have seen Toscanini conduct the NBC Symphony Orchestra, and they have witnessed one of the great musical events of the year — "Amahl and the Night Visitors" — an opera about the Nativity, especially commissioned by NBC for television.

They have watched the World Series from their living room, and they have sat in on the North Carolina-Notre Dame football game. They have seen the political candidates and the leaders of our country.

They have heard great poetry and seen great dramas enacted. They have watched current issues and events unfold on the screen — from General MacArthur's return, to the explosion of an atomic bomb at Yucca Flats. They have seen Milton Berle and Bob Hope and Red Skelton and Sid Caesar and Jimmy Durante and Howdy Doody. Every week, they have at their fingertips entertainment which kings could not command even twenty years ago.

At times, they have also seen the pursuit of criminals, lady wrestlers, roller derbies, and other things that are as real a part of our life as the political conventions and the World Series.

Today, television is bringing to our children information and culture and the great entertainment our own country can offer. Tomorrow, they will have a window on the whole world. They will see the great cathedrals of Europe — in color — and the paintings in the museums overseas. They will become familiar with London, Paris, and Rome — and maybe some day with Moscow. They will know the statesmen, the people, and the customs of other countries — because they will have seen them.

We are all aware of the tremendous part television is already playing in the political life of our country and the tremendous influence it will exert as it grows in years to come. The power of television is so great that it has frightened some people. There are, for example, those who have suggested that its influence on politics is dangerous . . . that it can elect or defeat . . . that it can be used by a demagogue to fool the public. But the American public is not easily fooled once it has the facts. The dangers in our system lie in the opposite direction — in shutting off the people from the facts and in limiting their knowledge of the issues.

Television meets this danger. In bringing the candidates face to face with the people . . . in letting these candidates expound their views directly to the people . . . in showing how they behave in action and debate, television gives the citizens the truth and equips them to make their own judgments.

There has recently arisen a small minority who would seek to throttle television through Government censorship of its programs. Any such idea is repugnant to those who cherish liberty. Good taste cannot be legislated. No government authority can determine that a murder in Hamlet is good while a murder in modern drama is bad. The responsibility is on the individual broadcaster, who, in turn, must be sensitive to the taste and discrimination of the audience he serves.

Censorship Violates Principles of Freedom

Moreover, program censorship by the government would violate the great principles of freedom of speech and of the press. This principle is covered by Constitutional guarantees. It applies to broadcasting just as it applies to newspapers and magazines, and just as it has recently been applied by the Supreme Court to motion pictures. The values of that principle are paramount. Its impairment in any area weakens one of the basic foundations of our free society.

The freedom of television is also threatened by proposals for barring it from such places as the news conference, the Congressional hearing, and the floor of the House and the Senate.

I recognize that there are proceedings, involving the national security or personal privacy, where publicity of any sort should be avoided. These proceedings should be held in closed sessions to protect the national interest and private rights. But where the public is physically admitted, we must assume that public attendance is proper.

The freedom to see what goes on in America should not be restricted to those who can be accommodated in such places as the hearing room, the House gallery or



Maestro Arturo Toscanini

"Television is bringing to our children information and culture, and the great entertainment our own country can offer."

the Senate chamber. It should not be limited to those who happen to be in the city where the event is happening — be it Washington or Raleigh; or who have the time and money to travel to it; or who are lucky or influential enough to gain admission. Television should be a free ticket of admission to all Americans, wherever a single spectator is permitted.

I know that many of my respected and learned brethren among the legal profession look with concern at the idea of having the television camera brought into the Congressional hearing and into other public proceedings. I recognize the integrity and good intention of this attitude, but I question its long-range soundness.

The legislative chamber cannot hold all mankind — but the television camera opens the door to all of the people who are interested. Their rights to attend and to view are equal to those of the spectators who are physically present. Similarly, the rights of television to have direct access to the news are equal to those of other news gathering media.

In our system, where the state serves the people and the people determine their own destiny, an especial value is put on having the people know the truth, and all of the truth. Television can give them the truth, because television *is* truth.



NBC's East Coast transmitter building at Bound Brook, N. J., is surrounded by a forest of poles supporting the station's array of shortwave antennas.

"Voice of America" Carried to Europe, Africa and South America by NBC Shortwave Station

FAR better known to radio listeners in foreign countries than to radio fans in America, are the programs broadcast from the NBC-operated shortwave station WRCA at Bound Brook, New Jersey. Each day this station transmits 17 hours of information programs for the Voice of America to peoples in Europe, Africa, South America and to clandestine listeners behind the Iron Curtain.

Although today, the Bound Brook station is dedicated to the broadcasting of America's message of freedom in many languages, its history dates back to 1925. In that year, Station WJZ, then owned by RCA, transferred operations from Aeolian Hall in New York City to its present site. The move to a less populated area was made necessary when the station began transmissions on high power. The WJZ transmitter remained at Bound Brook as long as it served as the key station of the NBC Blue Network. After this network was sold to the American Broadcasting Company in 1943, the WJZ equipment was moved to another location.

In 1930, the importance of Bound Brook increased when it was chosen as the location for experimental shortwave broadcasting by NBC. Under the call letters

W3XL and W3XAL, regular programs of the Blue Network were sent abroad to many lands. As a result of the foreign audience which was immediately attracted to these broadcasts, NBC in the late 1930's established its International Division, a unit of the company devoted to special shortwave programming. The major sponsor was the United Fruit Company, for whose programs a so-called "banana" antenna was later erected to improve signals beamed at South America.

With the outbreak of World War II, NBC turned over its Bound Brook shortwave facilities to the Office of War Information, primarily for European broadcasts. At that time, NBC built a new 50,000-watt transmitter which was added to the two already in operation. Seven new directional antennas and three additional RCA 50,000-watt shortwave transmitters were then installed by the OWI, giving the station the present complement of six transmitters.

Because of the government's decision to provide international shortwave programming via the Voice of America, the NBC International Division was not re-established after the war. Today, while NBC continues as owner, the property and the services of NBC personnel at Bound Brook are leased to the Voice of

America. Programs originating in the New York studios of the Voice of America reach the station over telephone lines.

The exterior of Station WRCA resembles a well-kept residential home with its trees, gardens, and neatly trimmed lawns. In this setting, the transmitter building and the graceful double-spray cooling system are surrounded by towers and antennas of varying sizes, scattered over NBC's 100-acre tract of land.

The building is divided into several sections which accommodate the station engineer's office, transmitting rooms and master control. Around the corner from the office is a long room which houses the three government-owned transmitters. In the center is a transmitter control console, manned by an NBC engineer. By flipping a switch the engineer can connect a monitor speaker with programs in French, English or any of the other languages that might be on the air. The program may be a newscast, music or even an afternoon ball game. Sports events are sent overseas by the Armed Forces Radio Service, for the benefit of American troops assigned to foreign camps.

Technicians Watch Equipment Constantly

To assure continuous satisfactory performance of the transmitters, technicians devote considerable time to the equipment. This includes continuous routine maintenance, replacement of parts and constant precautions to prevent the tubes from overheating.

From the room which houses the government transmitters it is only a few steps to the compartment containing the three NBC-owned transmitters. The two original shortwave transmitters with their old fashioned dials, knobs and large manually-operated switches pro-

vide a striking contrast to the more modern equipment. Nevertheless, both the new and old transmitters work side by side with equal efficiency to carry broadcasts of truth, liberty and education to the peoples of many nations.

In the master control room, all programs received on the telephone lines from the Voice of America studios are monitored and switched to the assigned transmitters. At the end of each program segment, the engineer on duty gives the WRCA station identification. This "break" is considerably more difficult to make than at a standard broadcast station since a separate switch must be made for each transmitter.

The operating schedule on the desk of the master control console indicates the complexity of the daily transmissions from Bound Brook. Programs in English, French, Finnish, Polish and other languages constitute a typical day. These are sent to Europe from 10 A.M. to 6 P.M. and from 10 P.M. to 3:15 A.M. The 6 to 10 P.M. hours are devoted mainly to Spanish and Portuguese broadcasts for South America.

The basement of the Bound Brook station houses power transformers and associated equipment. From copper tanks located there, distilled water used to cool the transmitter tubes is fed to the outside pond and then back to the tubes. The basement also contains a maintenance shop for repairs and numerous bins and shelves filled with replacement parts and tubes.

The NBC staff at Bound Brook consists of 15 men who perform a wide variety of tasks necessary to keep the station operating at peak efficiency. From the chief engineer to the antenna rigger, skilled team-work prevails to give WRCA an important role in telling the American Story to freedom loving people everywhere.

Operator at the master control console of transmitters at Bound Brook.

Three RCA transmitters line the walls of the main floor of NBC's International station.



RCA Scholarship Plan Extended



Dr. F. H. Kirkpatrick, RCA Educational Counselor (right), reviewing academic progress with an RCA Fellow.

FOURTEEN post-graduate fellowships and 19 scholarships have been offered by the Radio Corporation of America for the 1952-1953 academic year under an expanded and revised scholarship program.

Total amount of the awards, according to Dr. C. B. Jolliffe, Vice President and Technical Director of RCA, will be \$53,000, a substantial increase over previous years. This amount reflects RCA's expanded program of helping young engineers and scientists by means of seven new scholarships and one fellowship. It was also pointed out that the annual stipends for RCA Scholarships have been increased from \$600 to \$800.

Decision to expand RCA's Scholarship Program, Dr. Jolliffe said, is the result of recommendations by the RCA Education Committee to make scholarships available in additional geographical areas of the United States, at a women's college and in university centers where RCA manufacturing plants are located.

The objective of RCA's program is to encourage the training of new scientific personnel who are critically needed to meet the rapidly growing requirements of the electronics industry. This is in keeping with industry's increasing recognition of an obligation to help develop young men and women of genuine ability and promise. In 1944, Brigadier General David Sarnoff, RCA Board Chairman, created the RCA Education Committee with

the late Dr. James Rowland Angell, President Emeritus of Yale University, as Chairman. Within the following year General Sarnoff recommended the RCA Scholarship Plan to the Board of Directors.

During 1945, first year of the awards, RCA Scholarships were offered to undergraduates in only eight colleges and universities. In 1947, post-graduate fellowships were offered for students working toward advanced degrees in scientific fields related to electronics. Since the awards were established, RCA has progressively increased the scope of the original Plan until today recipients of RCA scholarships and fellowships are carrying on their studies at more than 20 colleges and universities.

Significant points under the revised program are:

1. Award of the David Sarnoff Fellowship, established in honor of the Chairman of the Board of RCA, for predoctoral students of electrical engineering at New York University. Other RCA Fellowships are available for graduate students at California Institute of Technology, Columbia University, Cornell University, Princeton University and the University of Illinois. An annual grant of \$2,700 is made to each university.

2. Award of the Frank M. Folsom Scholarship, established in honor of the President of RCA, at the University of Notre Dame, and the Charles B. Jolliffe Scholarship at West Virginia University. Five additional new RCA Scholarships, each carrying grants of \$800, have been established at the University of Cincinnati, University of Florida, Franklin and Marshall College, Indiana University and Wellesley College.

Other RCA Scholarships are available at the California Institute of Technology, Columbia University, Harvard University, University of Minnesota, Princeton University, Purdue University, Rutgers University, University of Santa Clara, University of Washington, University of Wisconsin and Yale University.

3. A grant is made available to the National Research Council for the award of four additional fellowships to students working on scientific problems related to electronics. These are open to graduate students in any university.

4. Four fellowships for young scientists and engineers employed in the laboratories and operating units of RCA which each provide a maximum grant of \$2,700.

5. Award of an RCA Scholarship to an outstanding graduate of RCA Institutes who wishes to continue his

(Continued on Page 32)

Three-Speed Record Player Announced by RCA Victor

A NEW and improved type of "Victrola" three-speed record player, which makes it possible, with a single turntable to provide quality reproduction from records of all three established revolving speeds, has been placed on the market by the RCA Victor Division. Under development for more than a year, the new instrument, available in four models, marks the introduction of RCA's first three-speed record-playing system.

Heart of the new instrument is a novel slip-on 45-rpm spindle which houses the automatic record-changing mechanism of the 45-rpm system. The larger slip-on spindle fits over the permanent spindle and converts the new record player into an authentic 45-rpm instrument, with all the engineering advantages and performance features of the "45" system. With the slip-on spindle removed, the instrument, at the twist of a selector knob, will play either 78-rpm or 33 $\frac{1}{3}$ -rpm discs.

Completely automatic, the new record player: Plays up to 14 45-rpm records at one loading; plays up to ten 12-inch or twelve 10-inch standard or long-playing discs at one loading; plays up to ten intermixed sizes of 78-rpm, or the same number of 33 $\frac{1}{3}$ -rpm records of intermixed sizes; stops automatically after playing last record of any of the three speeds; provides two separate pick-up points in a single tone arm, one for playing 78-rpm discs and another for the 45-rpm and 33 $\frac{1}{3}$ -rpm records, and eliminates the need for record inserts.

The new all-speed "Victrola" instruments include a record-player attachment which can be connected to any radio, phonograph, or television set. Other models are a self-contained phonograph with a built-in speaker and amplifying system; a self-contained portable unit housed in a luggage-type carrying case, and a three-speed table model "Victrola" radio-phonograph.

"Engineering advances now make it possible to integrate '45' facilities in an all-speed changer that provides reproduction of equally high quality from all types of records and, at the same time, retains all the advantages found only in 45-rpm instruments," said H. G. Baker, vice president in charge of the company's Home Instrument Division.

Reflecting the simplicity of 45-rpm engineering, the new all-speed Victrola instrument features a single, lightweight tone arm for records of all speeds; a twin-point stylus which is quickly rotated for playing either 78-rpm or 45- and 33 $\frac{1}{3}$ -rpm records by turning a tiny



Three-speed record player installed in combination table-model radio-phonograph.

lever mounted on the tone arm; a "guard position" protects the stylus when not in use; a single speed-selection control knob, and a single knob for on-off-reject control.

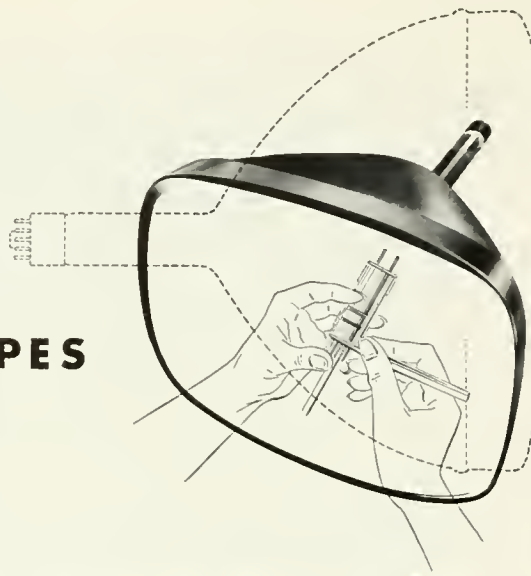
For 45-rpm, the operator need only turn the speed-selector knob to the proper speed. For either 78-rpm or 33 $\frac{1}{3}$ -rpm, the only additional step required is to lift the large spindle off the permanent spindle, and adjust speed-selector knob and stylus. Every RCA Victor 3-speed record player has a specially designed receptacle to conceal the 45-rpm spindle when not in use.

Toscanini to Lead NBC Symphony In 14 Concerts This Season

Maestro Arturo Toscanini is to conduct the NBC Symphony Orchestra in fourteen concerts during the 1952-1953 season, beginning November 1. In the new series, Toscanini's sixteenth successive season as conductor, he will direct two more concerts than in the last winter season. Guido Cantelli, who starts his fourth season as a guest conductor of the NBC Symphony, will direct the remaining eight concerts of the twenty-two week series.

Toscanini will conduct concerts on the following dates: November 1, 8, 15, 22 and 29; January 3, 10, 17, 24 and 31, and March 7, 14, 21 and 28. Mr. Cantelli's eight dates will be December 6, 13, 20 and 27 and February 7, 14, 21 and 28. Conductors of the current summer series of the NBC Symphony will include Laszlo Halasz, Samuel Antek, Wilfred Pelletier, Richard Korn and Massimo Freccia.

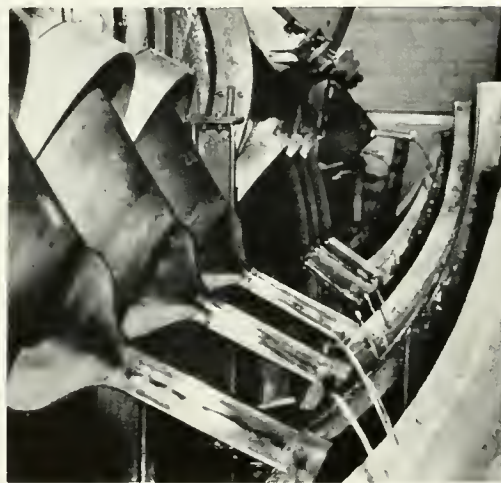
HOW
RCA
 KINESCOPIES
 are made



Manufacturing process begins with inspection of all parts comprising the tube, whether glass or metal-shell type.



Metal tubes are placed on a crawling conveyor belt to permit the phosphor to settle on the face-plate.



At the end of the settling belt, automatic machinery tips the tube and decants the remaining liquid.



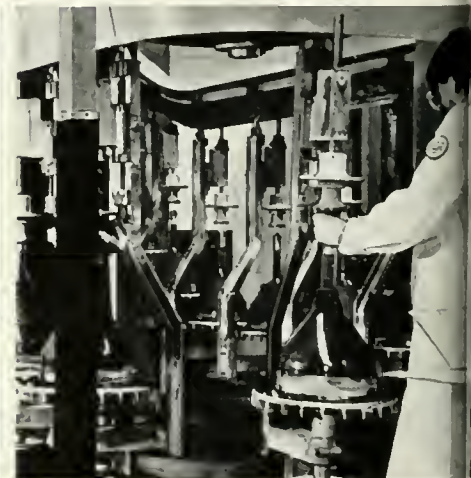
Kinescopes are baked in huge ovens to "bail" out impurities and to dry the inside graphite coating.



As a tube approaches completion it is tested for picture brightness under home lighting conditions.



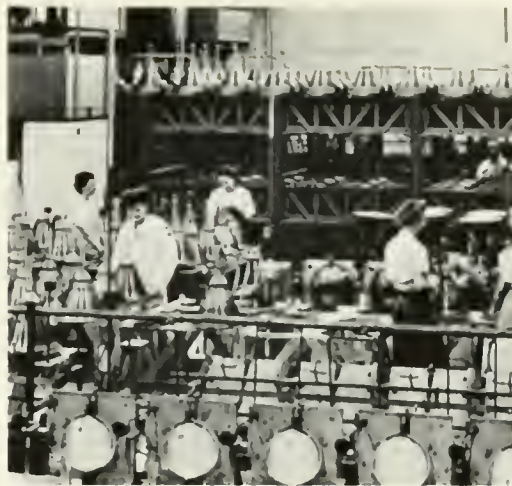
Final tests are made to insure that the tube will give a well-centered perfectly-focused picture.



After the tube has passed all tests it is given its final washing before paint is applied to the outside.



s between glass and metal parts checked by polarized light, and by air under high pressure.



The phosphor solution is poured into the envelope where it settles to form the tube's luminous screen.



Purity of the phosphor solution is rigidly inspected to prevent the entrance of injurious foreign material.



Electron guns are assembled here and microscopically tested to watch-makers' rigid specifications.



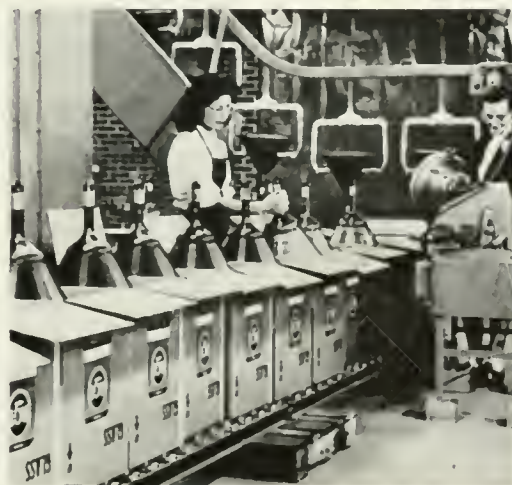
In this rotary machine the stem supporting the electron gun is sealed into the neck of the envelope.



The tubes are now ready for the pumping system which removes all air and gases.



The kinescope is now branded with the RCA trademark, which is a warranty of top-quality picture tubes.



Having received the stamp of approval, the tube is given a final polish and placed in its shipping carton.



The RCA kinescope is now ready to provide the customer with the best picture his set can produce.

Small Businesses Essential to Progress of American Industry

RCA Executive Reveals that Approximately Half of Annual Sales Dollar Has Gone to Outside Manufacturers of Materials and Components

The following text is taken from a statement by Vincent deP. Goubeau, Vice President in Charge of Materials, RCA Victor Division, before the U. S. Senate Small Business Committee on May 3, 1952.

WE are proud of the relationships we, at RCA, have built up with our suppliers. We like to think of them as friends as well as business associates. Over the many years that we have been in business, we have learned that there is a very strong inter-dependence between our company and the many organizations with which we work in carrying out our responsibilities to our customers, our employees, and our stockholders. This experience embraces a working relationship with companies of all sizes, from the smallest to the largest.

Over the years, approximately half of our annual sales dollar has been spent for materials and components purchased from outside organizations. The proportion purchased is fractionally less in regard to equipment for the Armed Services because of the large amount of engineering development involved. And yet, in reviewing our records, it is remarkable to note how closely this over-all figure has held to 50 per cent — in peace, in war, or — as at present — in time of semi-mobilization.

For the year ended December 31, 1951, RCA spent 50.3 cents out of every sales dollar for materials and services bought from others.

In all, there are roughly 5,000 suppliers with whom we are working day in and day out producing for both the Armed Forces and for the nation's consumers.

Our suppliers are located in 42 states.

Out of this total of 5,000 suppliers, approximately three-fourths — or 75 per cent — are small business organizations by the accepted definition of "500 employees or less." In round figures, that makes 3,750 small concerns with whom we do business.

Many of these suppliers are very small companies. I know of one in particular that is making for us a vital part of an electronic system being manufactured under Air Force contract. This company has a total employ-

ment of six, including the president.

But while this is somewhat unusual, a more significant fact is that of all 3,750 small businesses contributing to our production, about *half* employ less than one hundred people.

It is pertinent to inquire at this point how we determine the amount of our business to be subcontracted, or indeed why we subcontract at all. Why, for example, does a large company like RCA not manufacture all its needs?

The answer begins with our policy that, on items with large volume for which we have manufacturing facilities and know-how, we normally divide our procurement between our plants and our suppliers. We do this in order to have more than one source of supply and to insure our getting the best price for the items that go into our product.

Considering the variety and volume of parts entering into our product, we cannot profitably make all the parts we require because of the capital outlay required to pur-

Walkie-Talkies for the Armed Forces get final tests at end of production line at RCA Victor plant in Camden, New Jersey.



chase the equipment and the lack of volume to liquidate the cost of the facilities in a reasonable time.

Many small businesses serve large businesses by being specialists in one or more fields of manufacture. Small business functions effectively when it is able to serve several other businesses, either large or small, because it has facilities which can be operated economically due to the combined volume of its customers. Furthermore, their business is flexible and can be readily adapted to the changing requirements of their many customers.

In addition to cost, the utilization of subcontractors frequently speeds delivery of completed items. By working closely with his subcontractor, a prime manufacturer can so arrange schedules that the many components produced by outside firms will arrive at production lines in time to permit final assembly not only in the most efficient and least costly manner but also in time to meet specified deadlines. Prompt delivery, particularly on military contracts, can be vital. The prime contractor who assumes the responsibility for such delivery to the military relieves the Government of the hundreds of details involved when many companies, both big and little, are teamed together to produce weapons and related devices under military contract. More often than not, this responsibility involves far more than mere engineering assistance, expediting of required raw materials, and sometimes financing of needed materials.

The prime contractor also supplements the work of Government inspectors and frequently sees to it that contracted components meet Government specifications. The testing and inspection facilities required for many military items often are intricate and many small business firms could neither equip, staff, nor finance them.

Thus it is true, at least insofar as our company is concerned, that a prime contractor contributes far more than the engineering of a new device and its assembly and production.

Walkie-Talkie Cited as Typical

I would like to mention a few examples to illustrate our work with subcontractors on defense orders generally. They are more or less typical.

One of a great many devices we are working on today is the walkie-talkie for the Signal Corps. The walkie-talkie is a portable radio station containing its own transmitter, its own microphone and earphone circuits, and its own power supply. It is designed to be carried on a soldier's back like a knapsack. The walkie-talkie being used right now in Korea performs the same general function as the walkie-talkie that was first introduced and used in World War II. But there are several major differences.

As you can appreciate, weight is of major impor-

tance — particularly since the walkie-talkie is intended for use by troops in battle where maneuverability can frequently mean the difference between life and death. The old walkie-talkie weighed 50 pounds. Our new walkie-talkie weighs 24 pounds — a reduction in weight of over 50%.

In addition, the new walkie-talkie has a range that is almost double that of the earlier model. In many other ways too — such as its ability to withstand prolonged immersion in water — the new walkie-talkie is a much more effective instrument.

After our design work was completed and accepted by the Signal Corps, we established our production schedules. To help with this important task, we called on 185 suppliers of precision parts. Some of these suppliers are classified by the Government as large business firms. But most of them are small. In fact 131 (or 71%) of the 185 companies collaborating with us on the new walkie-talkie are small business firms.

61% of Dollar Volume to Small Business

In dollar volume the amount of subcontracted business to large business is 39% and 61% to small business.

We recently completed an analysis of another of our military contracts — this one covers a classified electronics system being made for the Air Force.

Parts and supplies for this contract are coming to us from many scattered sections of the country — from Lake City, Minn.; Aurora, Ill.; Muskegon, Mich.; Wyncote, Pa.; Waltham, Mass.; Davenport, Iowa; Dayton, Ohio; and even Hollywood, Calif.

The 307 subcontractors teamed with RCA on this contract are located in 18 states. We sent out a questionnaire to these subcontractors to find out where they, in turn, were purchasing their raw materials and components. Sixty of them replied. These sixty are buying from 365 different suppliers located in 25 states. Of the 365 sub-subcontractors, 55 per cent are large concerns and 45 per cent are "small business." It is natural that the percentage here is slightly in favor of large business because our sub-subcontractors include copper and brass manufacturers, steel concerns and chemical producers.

I am well aware of the fact that the small business man today is faced with unusual difficulties, just as we are. I realize, too, that the necessary procedures for getting into defense production are foreign to his normal way of doing business. The point to emphasize, however, is that they are necessary. If the small business man will accept these conditions and adjust his way of doing business to the economic conditions which prevail, I sincerely feel he will find the means to keep his business going.

Transistors that Operate on 225 Megacycles Result from RCA Research

A SIGNIFICANT advance in transistor research which for the first time points the way to very-high-frequency applications in television, FM radio and point-to-point radio communications has been made by the Radio Corporation of America.

Several developmental point-contact transistors have been made to oscillate at frequencies well up in the 100-to-200 megacycle band and one reached a record high frequency of 225 megacycles per second, according to Dr. Charles B. Jolliffe, Vice President and Technical Director of RCA. Such frequencies include the range in which FM radio and television signals are broadcast. The highest frequency value previously achieved by transistors, according to published reports, has been 50 megacycles per second.

The transistor, still in the developmental stage, consists of a speck of germanium crystal and fine contact wires and is no greater in size than a kernel of corn. It can perform many of the functions of electron tubes.

Prior to recent RCA experiments, transistors have been regarded as limited to relatively low-frequency applications, Dr. Jolliffe said. The new development promises to extend the use of the tiny transistors in high-frequency devices and to new applications in television, FM radio, point-to-point radio communication and other electronic equipment for military and civilian use.

The successful development of transistors which oscillate in the very-high-frequency region was accomplished by B. N. Slade, transistor engineer of the RCA Tube Department, RCA Victor Division, Harrison, N. J. This experimental work was conducted as a phase of RCA's transistor research program which is coordinated at the David Sarnoff Research Center of RCA, Princeton, N. J.

Mr. Slade pointed out that the research theory which led to the development of VHF transistors now makes possible the design of transistors which incorporate particular operating characteristics for a given application.

Tests conducted at the RCA Tube Department's Harrison, N. J., transistor laboratories confirmed a definite correlation between the spacing of a transistor's contact points and its frequency response. Generally speaking, Mr. Slade said, the closer the spacing, the higher the frequency.

Further tests established that a transistor's frequency



Point-contact transistors developed by RCA scientists.

response and stability are also determined to a large degree by the resistivity of its germanium crystal.

RCA transistor engineers, he explained, developed different combinations of spacing and resistivity values which enable them to design experimental transistors having a range of operational characteristics. One such combination of values also resulted in a transistor which oscillated with good stability at a frequency of 225 megacycles per second.

Andean City Installs Radio Police Department

Modernization of the State Police of Táchira, Venezuela, with a Radio Police Department has been begun by Dr. Antonio Pérez Vivas, governor of the Andean state. According to Meade Brunet, Vice President of RCA and Managing Director of the RCA International Division, Dr. Pérez Vivas selected RCA equipment after seeing the efficient performance of the system as used in Washington, D.C., where over 100 RCA mobile and fixed very-high-frequency units are in operation.

The layout at the beginning will comprise a 250-watt transmitter and associated equipment for Táchira and several 60-watt units to be installed at strategic locations. Mobile Fleetfone units will complement the system in the city and surrounding area.



General Sarnoff addressing stockholders at 33rd Annual Meeting in New York.

New Electronic Developments Revealed At Annual Meeting of Stockholders

Chairman of RCA Board Foresees International Television Within
Five Years — New Projects that Aid Business, Industry and
Communications Include Electronic Process to Speed
Production of Color Plates for Printing

NEW radio-electronic developments holding "great promise for new business in the future" were revealed by Brig. General David Sarnoff, Chairman of the Board of the Radio Corporation of America, at the 33rd annual meeting of RCA stockholders which was held in a studio of the National Broadcasting Company in Radio City, New York, on May 6.

General Sarnoff listed nine new projects which RCA scientists and engineers are presently developing for business, industry and communications:

(1) Automatic electronic equipment — known as a Color Corrector — which reduces by at least 50% the time required to make color plates for printing, in addition to improving materially the fidelity of the plates and lowering production costs.

(2) An electronic inventory control system to facilitate the maintenance of military supplies. This system, developed under a contract with the military, completes in a matter of days an operation generally requiring

several weeks. Widespread commercial applications are foreseen for business and industry.

(3) Electronic inspection apparatus for use by the pharmaceutical industry for safeguarding the purity of drug products such as medical ampules containing vaccines and other liquids.

(4) A portable one-man television station called the "Walkie-Lookie" for use by reporters and broadcasters covering news and special events in the field. This visual counterpart of the wartime "Walkie-Talkie" weighs only 46 pounds.

(5) A simple magnetic sound-recorder projector for use by home-movie enthusiasts, schools and advertising agencies to record individual commentary or musical backgrounds on 16 mm. films.

(6) Two-way microwave radio systems for communication along highways, railroads, pipelines and other routes, as well as for military purposes. Among orders



RCA's two-way radio equipment is the modern means of communication between fixed locations and vehicles.

received is one from the North Atlantic Treaty Organization (NATO) for use in Europe.

(7) A closed-circuit type of industrial television for use as a "remote eye" for industry through hundreds of applications including observation of dangerous processes, the transmission of pictorial information, and mass training in industry and the military services.

(8) Transistors — tiny electronic devices which function like certain types of electron tubes — are being developed by RCA for mass production as a new key that opens vast possibilities for new designs of radio, television and electronic instruments for civilian and military use.

(9) International television as a regular service to be realized within the next five years.

First Quarter Results

General Sarnoff announced that net earnings of RCA for the first quarter of this year amounted to \$7,076,520, as compared with \$11,901,542 for the first quarter of 1951.

After providing for preferred dividends, earnings per common share for the first quarter of 1952 were 45 cents, compared with 80 cents per share for the first quarter last year.

Consolidated gross income of RCA during the first quarter of 1952 amounted to \$163,871,331. Profits, before Federal income taxes, amounted to \$14,841,520.

A dividend of 50 cents per share on the common stock of RCA was declared by the Board of Directors

on April 4, 1952. It is payable on May 29, 1952, to holders of record of such stock at the close of business on April 18, 1952.

"Like the rest of the industry, RCA was affected by a decline in TV set sales during the first quarter of 1952 compared with the first quarter of last year," said General Sarnoff. "At that time scare buying created abnormally high demand which was followed by a slump in TV set sales and increased inventories throughout the trade.

"In the first quarter of 1952, however, RCA Victor manufactured all the television receivers permitted under government allocation of materials. We sold what we produced and our inventory is normal at this time. The prospects for increased sales during the balance of this year appear to be promising."

In 1951, RCA paid \$62,389,000 in taxes to Federal, State, and local governments. This was more than double the net profits earned for the year. Taxes amounted to \$4.49 on each share of common stock.

"This means that for every 8½ minutes throughout 1951, RCA paid \$1,000 in taxes," General Sarnoff reported. He added:

"In the past ten years, RCA's tax payments amounted to 352 million dollars. For the same period, profits — after taxes — totaled 197 million dollars.

"The ten year ratio of tax payments to dividends paid on the common stock, is approximately 6 to 1. That is, six dollars in taxes for every dollar in dividends.

"And even this does not tell the whole story. For in addition to the taxes paid by the Corporation, there are indirect taxes included in the cost of materials and services we bought from others."

Government Orders

General Sarnoff said defense contracts received by the RCA Victor Division have increased rapidly since the outbreak of the Korean conflict, and reported that the backlog of military orders continues to be substantial.

He disclosed that in April, 1952, the RCA Victor Division began construction of an engineering and development center on 430 acres near Moorestown, N. J., as a new "proving ground" for electronics connected with defense contracts in radar and related projects.

Television Service Extended

General Sarnoff reported to stockholders that television broadcasting continued to operate at profitable levels, as it did for the first time in 1951. He cited the fact that television had accounted for a sales increase of 48% over the preceding year in the National Broadcasting Company, and added:

"Since we met a year ago, television service has been extended by use of radio relay stations and coaxial cables. Television networks now extend from the Atlantic to the Pacific, and from the Gulf to the Canadian border.

"Today there are about 17 million television sets in the United States and by Election Day in November it is estimated that the total will be more than 18 million. In addition, there are 105 million radios in this country, including 25 million sets in automobiles.

"Elaborate plans for radio and television broadcasting have been made for the coming political conventions in Chicago. Never in the history of the United States have political conventions been within the visual range of as many people as they will be this year.

"When Marconi sent the first wireless signals in 1896 the total population of the United States was 70,000,000. We estimate that the potential TV audience for the convention telecasts from Chicago in July, 1952, will be 70,000,000 persons. By the time another presidential campaign year arrives, four years hence, practically all the voters in the country will be within TV range."

Declaring that the recent lifting of the television station "freeze" will give tremendous impetus to the expansion of television throughout the country, he said that, socially, economically and educationally, television can now attain its full stature as an industry in broadcasting service.

Respecting international television, he reported that its possibilities present a stimulating challenge, and continued:

"But there are technical, economic and political problems that must be solved before international television can be established as a regular service. The pioneering work of RCA that led to the establishment of international radiotelegraphy as well as international radiotelephony, radiophotos and radio broadcasting on a world-wide scale, has enabled our experts in the field of global communications to bring the day of international television nearer to realization.

"Despite the formidable problems which still remain to be solved in this field, it is my present belief that international television as a regular service will be realized within the next five years.

"International television can become a powerful aid socially, educationally and politically. It will cultivate better understanding among nations, and help to reduce tensions born of misunderstanding. 'The Voice and Vision of America' can contribute substantially toward achieving the goal of universal peace."

General Sarnoff said that the dramatic role of theatre television in 1951 brought it to the status of a mass-

audience entertainment medium. Public response to a series of special sports telecasts in principal cities, he reported, resulted in a strong trade demand, with the result that approximately 60 of the Nation's key theatres are now equipped with RCA theatre television installations. He revealed that RCA has underway an experimental program to provide for conversion of this equipment in the theatres to color television.

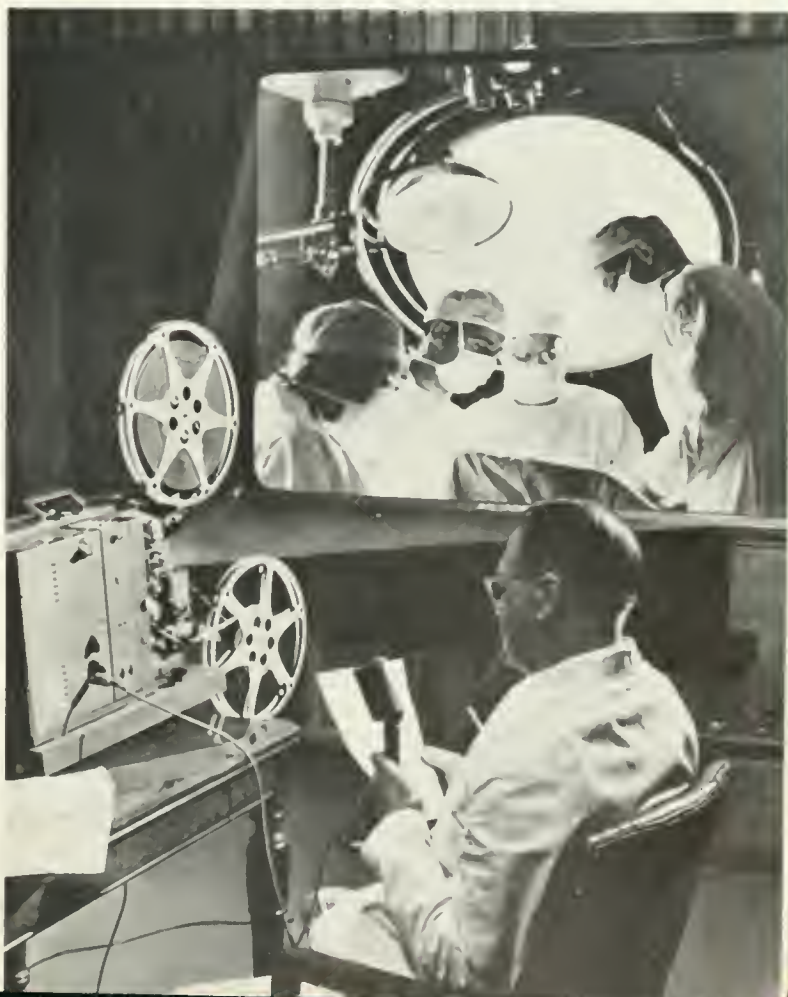
He disclosed further that RCA scientists and engineers have continued to make improvements in the RCA compatible, all-electronic color television system, including the RCA tricolor picture tube. He declared: "We are convinced more than ever that the compatible, all-electronic system is scientifically correct and practical and that it will best serve the public interest."

Recorded Music

Reviewing business in the phonograph record field, he revealed that during the first quarter of 1952 sales of RCA Victor 45 and 33 1/3-rpm records substantially surpassed the sales of records using the older speed of 78-rpm.

"We believe that the 45-rpm system, introduced by RCA in 1949, will continue to lead in record sales," he affirmed. "Its popularity is attested to by the large
(Continued on Page 30)

A commentator using RCA's new sound projector records voice to accompany a film on surgical training.



Sarnoff Receives First Honor Medal Award from Radio Television Manufacturers

BRIG. GENERAL David Sarnoff, Chairman of the Board of RCA, has received the "Medal of Honor," awarded by the Radio Television Manufacturers Association for his outstanding contributions to the advancement of the radio, television and electronics industry.

The citation accompanying the award read: "The First Annual Industry Award is made to David Sarnoff in recognition of his courage, vision, judgment and outstanding contributions to the progress and development of the radio-television industry."

General Sarnoff was presented the medal by Robert C. Sprague, Chairman of the RTMA Board, at a dinner climaxing the 28th Annual Convention of the Association at Chicago, on June 26.

"Throughout his career General Sarnoff has received many awards, both domestic and foreign," said Mr. Sprague, "and has found time in his busy schedule to serve his country and his fellows in many fields in war and peace. For this he has had the thanks of Presidents of the United States and commendations of many organizations and men of distinction.

"We present the Medal of Honor as a tribute from his colleagues, a commendation from the men who have worked with him to make our country great.

"In literary circles, the writers' writer is the one from whom many learn new techniques in writing. General Sarnoff is the industrialists' industrialist in the radio-television industry."

Chairman Sprague told General Sarnoff that the award was presented to him as a "small token of the esteem in which you are held by your fellows and in recognition of your many notable achievements toward the development and progress of the radio-television industry. To your colleagues in the industry you are best known for the vision and courage with which you pioneered in the industrial development of radio and television over more than a quarter of a century. It suffices to say that the industry would not be so big and so far advanced as it is today had it not been for David Sarnoff."

The "Honor Medal," authorized by the RTMA Board in February, is to be awarded annually to the person, company or organization which the RTMA Directors believe has performed a distinctive service for the industry.



Brig. General David Sarnoff (left) receives RTMA "Medal of Honor" from Robert C. Sprague, Board Chairman of the Radio-Television Manufacturers' Association.

Two Honorary Degrees Presented to General Sarnoff

Two honorary degrees have been presented to General Sarnoff from educational institutions in Pennsylvania. On June 18, the honorary degree of Doctor of Science was conferred upon him by the University of Pennsylvania. Another Doctor of Science degree was awarded to him on June 10 by Pennsylvania Military College at Chester, Pa.

Speaking at the commencement exercises of the 131-year-old military college, General Sarnoff warned that no nation will remain strong if it relinquishes its interest in science. He urged the graduating class to be alert to everything science has to offer, no matter how fantastic an idea may appear in its initial stages.

"Be prepared, for when war comes, time is of the essence," General Sarnoff said. "It becomes a race of science against time, and America must be strong and 'at the ready.' Our lead in science and technology must not be allowed to pass into the hands of a potential enemy who is striving mightily to catch up and then to overtake us."

Electronic Device Simplifies Studies of Blood Clotting

Vibrating Plate Viscometer was Developed by RCA Scientist



Dr. J. G. Woodward of RCA Laboratories Division demonstrates vibrating plate viscometer.

A NEW electronic instrument which simplifies many previously difficult or impossible measurements of the viscosity of liquids was exhibited by research investigators of Creedmoor State Hospital, Queens Village, N.Y., in an exhibit at the annual convention of the Medical Society of the State of New York, held at the Hotel Statler during the week of May 1-4.

Called a vibrating-plate viscometer, the device, developed by an RCA scientist, has been used in studies of human blood clotting rates by Drs. Arthur M. Sackler, Mortimer D. Sackler, Raymond R. Sackler, Co Tui, and Harry A. La Burt, of the Creedmoor Institute for Psychobiologic Studies, who have found that instruments such as this can open new fields of medical and biological study. Their tests have indicated so far, they report, that such measurement of changes in certain physical characteristics of blood as it clots may serve to differentiate between psychotic and non-psychotic individuals.

Viscosity — the degree to which a liquid resists change in shape — has been in many scientific and industrial fields a troublesome thing to measure. In general, accurate measurements are long and tedious; whereas quick measurements are usually very rough and depend largely on human sight and touch. This has made difficult a continuous and significantly accurate measurement of a liquid in the process of thickening.

The new RCA viscometer, a developmental model, can record at any range from low viscosity alcohol to high viscosity cold molasses. Its measurements are virtually instantaneous and they can be recorded over an indefinite period of time on a moving paper chart. The instrument can take measurements of a liquid whether it is in a huge vat or in a tiny container holding a quarter of a thimble full.

Designed by Dr. J. G. Woodward, of the RCA Laboratories Division, Princeton, New Jersey, the vibrating-plate viscometer consists of a thin metal disc, .2 inches in diameter, at the end of a metal reed less than an inch long. An electromagnetic motor causes the disc to cut back and forth through the liquid at approximately 800 cycles per second.

The plate makes its widest swing when oscillating in air but when dipped in a liquid the swing is restricted by the viscosity. Mounted on each side of the reed are piezoelectric blocks, which generate a voltage when stress is applied to them through the bending of the reed. An alternating voltage is thus generated which is proportional to the swing, or amplitude, of the plate. The more viscous the fluid, the more restricted the plate's vibrations are. The resulting voltages are readily determined on a vacuum tube voltmeter and simply converted to viscosity values.

Besides its use in blood clotting studies, the device has been used experimentally by technicians of the United Clay Mines Corporation of Trenton, New Jersey, in charting the rates at which clay preparations harden in their molds, a new and valuable type of measurement in the ceramics industry. Many other possible applications can be anticipated for such apparatus in the petroleum, plastics, paint, textiles, printing, dye and other industries where precise knowledge of viscosity and viscosity changes is desirable.

Bottling Machine Speeds Handling of Milk Containers

A BOTTLING plant machine that speeds the uncasing and washing of milk bottles was demonstrated recently by RCA at The Borden Company's Hamilton Park plant, in Chicago.

Leaders in the bottling industry saw the new device automatically remove milk bottles from the cases and feed them to a large washer under modern dairy conditions. It is capable of feeding at rates of up to 576 bottles a minute. The machine — known as the RCA Full-Depth Uncaser and Washer-Loader — eliminates one of the last steps in the bottling cycle now performed by laborious manual methods.

The machine is expected to revolutionize container handling, not only in dairies, but also in beer, beverage, and other industrial bottling plants, according to M. S. Klinedinst, manager of industrial products of the RCA Victor Division.

"The new equipment is simple in principle and construction," he said, "and is easy to operate. Adjustments make it possible to assure a continuous flow of cases and bottles of various sizes and shapes to the washing equipment — and at substantial savings."

W. W. Waterstreet, President of the Chicago Milk Division of The Borden Company, said his company expects that the new machine will speed up its operations, be more efficient, and result in a reduction of total costs.

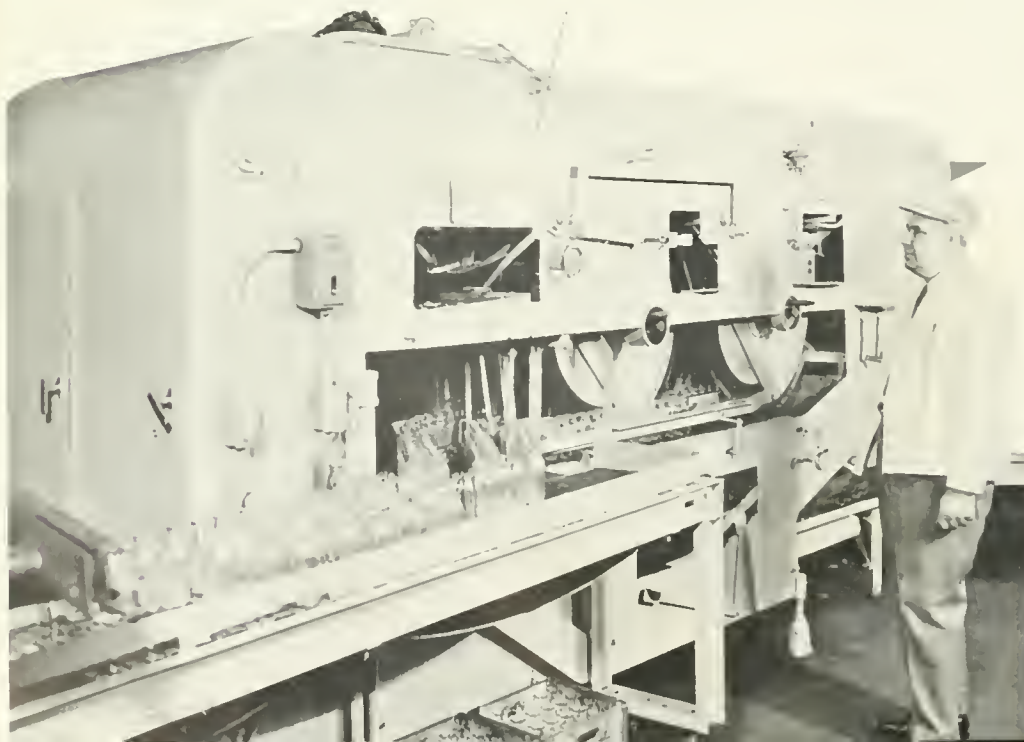
"We are proud to be the first dairy to install the RCA uncaser and washer-loader," he said. "In these days of

rapidly climbing prices, it is more important than ever to find more efficient ways of conducting our business."

The machine can be made to handle wooden, metal, or cardboard cases, or cartons and a wide range of types and sizes of bottles. The cases are fed from the plant case-conveyor directly into the uncaser. Entering the lower portion of the machine, they are carried upward and inverted, with the bottles held in place.

As the cases continue through the machine, they reach points at which first the inner rows of bottles and then the outer rows are gently lowered into large revolving transfer wheels with pliable rubber gripping surfaces. The surfaces of the first wheels firmly grip the bottles in the center rows as they are released, and those in the second set of wheels grip bottles in the outer rows. As they revolve, the two wheels deposit the bottles on conveyor belts which deliver them to the washer-loader. Meanwhile, the cases are set right-side-up and delivered to a conveyor or to the right or left or to the rear of the machine. In the washer-loader machine, the bottles are spread to the full width of the automatic washing equipment, and then are guided into as many channels as required by the washer.

During the demonstrations, it was shown that the new machine will automatically stop and ring a signal bell if faulty cases or improperly positioned bottles are fed in. The machine incorporates a bottle-supply control which automatically keeps an adequate supply of bottles ready to enter the washer.



In this machine, bottles are removed automatically from their cases and placed on conveyors leading to the washer-loader unit at the left.

Greater Efforts in "Pure" Research Urged by Dr. Jolliffe

RCA Scientist Says European Nations Excel in this Field

MANKIND is on the verge of an era in which new scientific knowledge can provide the basis for substantial advances in human health and happiness, Dr. Charles B. Jolliffe, Vice President and Technical Director of the Radio Corporation of America, declared in an address before the National Conference on Airborne Electronics in Dayton, Ohio, on May 13. In his speech, Dr. Jolliffe emphasized the urgency of replenishing science's storehouse of fundamental information and decried the secrecy imposed on researchers because of the unsettled international situation.

"In recent years our scientific emphasis has been heavily concentrated in applied research and engineering," he said. "I do not believe that enough attention has been given to pure, or fundamental, research. As a consequence, we are, in a number of important areas, short of the basic knowledge that is the raw material for engineering developments.

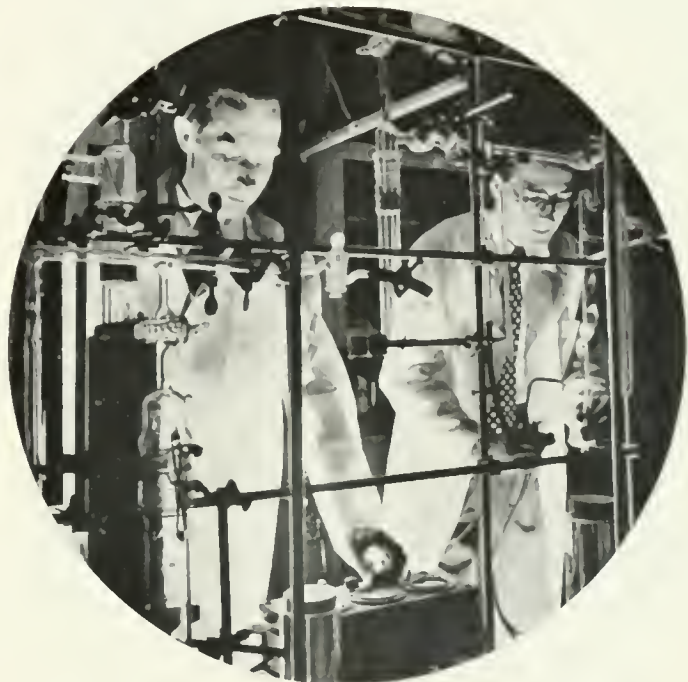
"Historically, Europeans — especially the Germans and the British — have done the most in advancing pure science. In the United States, our greatest accomplishments have been in engineering. Now, the United States must take the leadership in developing fundamental knowledge — Americans should be the 'Pioneers of Science' of the future. Our continuing safety and progress depend upon it.

"Russia, we may be sure, is not neglecting this all-important field; in fact, reports from behind the Iron Curtain indicate that Soviet scientists are given every incentive to move ahead as rapidly as they can in pure research."

Describing the difficulties involved in obtaining appropriate backing and public acknowledgment for explorations in "pure" science that must of necessity lack definite goals, Dr. Jolliffe urged the cultivation in America of "science appreciation" on a par with "music appreciation."

He said the task of advancing the cause of pure science is made more difficult by world conditions, and added:

"The barriers of secrecy at home and abroad are serious deterrents to scientific progress. Unquestionably, the world of science has suffered much because of the



Scientists at David Sornoff Research Center use high vacuum system in preparing samples of semi-conductors.

ideological conflict between Russia and her communist-dominated satellites on the one hand and the free nations of the world on the other.

"Basic to the advance of science is a free and unlimited exchange of information. In the growth of fundamental knowledge over the centuries, it often has been true that the report of a scientific discovery made in one part of the world stimulated important advances along the same line in other sections of the world. There has been no such chain reaction in numerous vital areas of science for many years."

Dr. Jolliffe said that because of the danger of unwarranted secrecy damaging the advance of science it behooved government as well as scientific leaders to subject research controls to careful review and reevaluation with increasing frequency.

"Discoveries of supreme importance to such sciences as physics, chemistry, and biology will come from studies of the atom," he asserted. "In fact, mankind is on the

(Continued on Page 32)

Long-Life Batteries Add to Performance of Improved "Personal" Receiver

NEW "A" and "B" radio batteries of advanced construction, so outstanding in their performance as to be termed revolutionary, and a new attractively styled "Personal" receiver designed to utilize to the full the impressive operating characteristics of the batteries, have been introduced by the RCA Victor Division.

The new "B" battery, designated the VS216, is of the alkaline dry-cell type, with a voltage rating of $67\frac{1}{2}$. It is the first radio battery to employ the type of alkaline cells formerly restricted to wet-type, non-portable batteries. It is 22 per cent smaller than present comparable batteries, and has an increased playing time capacity of 100 per cent, when used in "Personal" portable receivers. The new "A" is a redesigned version of the "sealed-in-steel" type, and gives four times the playing hours of the latter.

The alkaline dry-cells utilize zinc, manganese dioxide, and an alkaline electrolyte. The original alkaline cell, conceived years ago, was a wet-cell which was non-portable and had to be kept in an upright position. After years of research, the undesirable features of the original wet-cells have been eliminated with the development of the new alkaline "crown"-type construction.

The "crown"-type cell is a self-contained unit which delivers more useful energy per unit of volume than do

conventional types of cells and can be used in any position. Each battery is actually composed of two compact stacks of these exclusive "crown"-type cells combined to give the correct voltage output.

After manufacture, the individual cells are stored for two weeks before being tested. This storage period allows the cells to stabilize and, at the same time, permits the detection of potentially weak cells. After acceptable cells have been stacked and assembled into batteries, the latter are tested and again placed in storage, this time for one week. Following the second storage period, the completed batteries are re-tested. This double-aging, triple-testing procedure, assures batteries of high quality.

Both "A" and "B" batteries are encased in steel to prevent swelling and wedging in the radio.

Two of the "A" batteries connected in parallel in a "personal" radio will have a life equal to one of the new "B" batteries, thereby giving owners a playing time that compares favorably with that of most medium-size portables. In accomplishing these advantages, total battery space requirement is increased by only 30 per cent.

The "B" battery was developed through continuous research over a three-year period at a cost of over a

(Continued on Page 30)



RCA's new "Personal" receiver is available in various colors. Left: Improved "B" battery is 22 per cent smaller than older types and has 100 per cent longer life.

New Radar has 200-Mile Range in Mapping Terrain

SUCCESSFUL field operation of a new lightweight radar set that "maps" detail of terrain and weather obstacles up to 200 miles in front of an aircraft was announced jointly by the U. S. Navy and Radio Corporation of America on May 11.

This advance radar unit is now in production for the Air Force and Navy and already has been installed on President Truman's plane, the *Independence*, and on various military air transports. According to W. W. Watts, vice president of the RCA Victor Division, the instrument is also suitable for commercial aircraft.

At the present time, the equipment is being produced under Navy contract for military use only, and is scheduled for production under an Air Force contract.

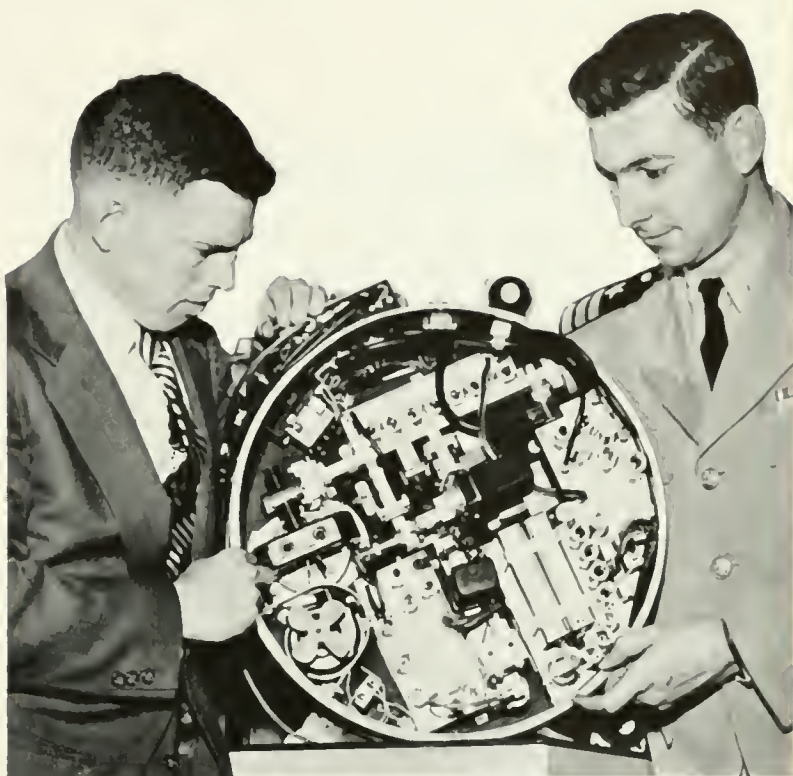
Specifications for the new transport radar were prepared by the Navy Bureau of Aeronautics and coordinated with the Air Force to include recommendations reflecting its experience with radar.

According to Watts, the new unit permits the pilot to see a close-up of a selected area as if he were using a powerful telescope that could penetrate through darkness and clouds, and can be used for these four general types of operation:

1. As a means of collision warning. It will show mountains or other aircraft in the vicinity.
2. As an accurate indicator of weather conditions. It will show the position of thunderheads and other cloud formations, and will enable the pilot to avoid turbulent weather or select the safest course through it.
3. As a means of position location when standard landmarks are not visible. It can pick up the signal of ground based radar range units.
4. As a means of mapping terrain. Through a special discrimination circuit, it shows the pilot the salient characteristics of the land over which he is flying.

Pilot Can Select Range

The range of the system can be selected by the pilot for distances up to 200 miles from the plane. A selector switch permits the pilot to bring into view all obstacles and terrain within 5, 10, 30, 100 and 200 nautical miles of his airplane. On a recent flight from Westover Air Force Base, Mass., to Frankfurt, Germany, in a military C-97 equipped with the new radar, the



W. B. Kirkpatrick, manager of RCA Victor's Government Radar Unit, and Commander M. A. Mason, head of the Navy Bureau of Aeronautics Radar Section, examine transmitter-receiver unit of new radar.

first islands of the Azores were observed at a distance of 195 miles from an altitude of 17,000 feet, Watts said. An RCA technician aboard the flight stated that "the entire chain of islands was mapped with excellent definition, and navigation to Lages by radar was easily accomplished.

"On the same flight the landing approach at Frankfurt was made by means of the radar, with the runway clearly defined."

Watts revealed that reports from military officials have been very enthusiastic about the new equipment. Rear Admiral Thomas S. Combs, USN, Chief of the Navy Bureau of Aeronautics, Watts said, labels its performance as "exceptional" and reports the Navy is very pleased that size and weight were kept to a minimum, as per the Navy's specifications, without sacrificing the effectiveness of the radar.

The device, designed solely for navigation and obstacle and weather detection, weighs a total of 175

(Continued on Page 32)

JOHN Q. CANNON ELECTED SECRETARY OF RCA

John Q. Cannon was elected Secretary of the Radio Corporation of America at a meeting of the Board of Directors on May 9.

Mr. Cannon joined RCA in 1945 as an attorney with the RCA Victor Division and has served as Assistant Secretary of the Corporation since May 4, 1951.

A native of Salt Lake City, Utah, he attended the University of Utah and was graduated from George Washington University in Washington, D. C., in 1928, with a Bachelor of Law Degree.

Following his graduation, he was associated with several government agencies including the Public Buildings Commission as Assistant Secretary; the U. S. Bureau of Standards as Business Specialist; with the Civil Service Commission successively as Legal Examiner, Legal Adviser and Chief Law Officer; Administrative Assistant to the U. S. Attorney General; and with the Securities and Exchange Commission as Director of Personnel.

Mr. Cannon succeeds Lewis MacConnach who retired after 29 years as Secretary of the Radio Corpora-



John Q. Cannon

tion of America. He joined the American Marconi Company, predecessor of RCA, in 1915.

New Electronic Developments

(Continued from Page 23)

number of companies now producing 45-rpm records. Conversion of coin boxes and radio stations to 45-rpm facilities further indicates its popular acceptance."

A new and simple automatic three-speed record player, designed for 45, 33 $\frac{1}{3}$ and 78-rpm records, has been introduced by RCA Victor and will be on the market this month, he said.

General Sarnoff told the RCA stockholders that "today our foremost responsibility is to serve the Nation by providing the Armed Forces with radio, television and electronic apparatus vital to the success of their operations."

"Production of civilian and other commercial products is determined not only by demand," he continued, "but by government control of materials and by the availability of engineering personnel.

"While uncertain factors in the current world situation obscure the general outlook, there are certain factors within our own field of operations that are clearer. For example, productive capacity is the greatest in our history. Television is expanding its services. New markets for television transmitters and receivers are being opened, and the outlook for sales is brightening. We expect that our business for the last half of 1952 will show an improvement over the first half."

New Long-Life Radio Batteries

(Continued from Page 28)

million dollars, it was disclosed by L. S. Thees, general sales manager, RCA Tube Department. When it is used with two of the newly designed "A" batteries, Mr. Thees explained, the balanced power supply makes possible up to 10 times longer performance without change of batteries. He added that with the previous conventional "personal" portable batteries, two "B" and 10 to 12 "A" batteries were required in order to run a set for approximately 100 hours.

About the size of the average book, RCA's new "personal" receiver weighs only 3 $\frac{3}{4}$ pounds with batteries. It is 6 inches in height; 9 inches in width, and 2 $\frac{1}{4}$ inches deep.

Features embodied in the new instrument are 1) an automatic volume control to eliminate alternate fading and blasting; 2) easily removable back-cover for ready access to batteries and tubes; 3) instant play — no warm-up necessary; 4) new easy-to-read, combined "on-off" and volume control switch; 5) completely built-in antenna — no lids to open or flaps to lift; and 6) a "battery life-saver switch" which helps to increase the life of the batteries up to 30 per cent. The "life-saver" switch, for use in strong reception areas, enables part of the batteries to "loaf," delivering the minimum amount of power needed at the time.

Awarded Patent on Improvements in RCA Tricolor TV Tube

THE basic improvements in tricolor television picture tubes, which made possible the RCA tricolor tube, so important in the all-electronic color television system, have been made by Alfred C. Schroeder, 37-year-old electrical engineer of the RCA Laboratories Division.

A patent, No. 2,595,548, covering Mr. Schroeder's improvements was issued by the U. S. Patent Office on May 6, 1952.

One of the disadvantages in earlier color tubes, prior to the RCA tricolor tube, it was pointed out, has been the fact that sources of electron beams usually have been located at fairly widely divergent positions within the tube's structure making necessary a number of beam-deflection systems. Such an arrangement of electron guns requires a tube with three necks.

Through Mr. Schroeder's invention, the guns are placed close together in a single neck tube, an arrangement permitting a single beam deflection system. This permits the use of a tube envelope and deflection system similar to those used in black-and-white television.

Since Mr. Schroeder's invention, teams of RCA scientists and engineers have integrated the improved tube into RCA's all-electronic system of color television.

A resident of Huntingdon Valley, Pa., Mr. Schroeder is on the research staff of the David Sarnoff Research Center of RCA, Princeton, N. J. He received his Master of Science Degree in electrical engineering at the Massa-



Alfred C. Schroeder and one of the RCA tricolor TV tubes which utilize his invention.

chusetts Institute of Technology in 1937 and joined RCA the same year. Since then, he has devoted a large part of his work to the development of color television.

27-inch Metal-Shell TV Picture Tube Developed by RCA

DEVELOPMENT of a high quality 27-inch metal shell television picture tube which is already being sampled to the television industry set manufacturers was disclosed early in June by L. S. Thees, general sales manager of the Tube Department of RCA Victor Division.

The new tube will be a high quality product designed for top priced, deluxe models, and will be made available to TV manufacturers in time for them to incorporate it into their plans for 1953 designs.

The tube incorporates a "scaloped" glass-to-metal seal which makes possible a spherical faceplate with superior deflection linearity. The new RCA 27-inch

kinescope is slightly shorter than the 21-inch metal shell kinescope. It has a frosted filterglass faceplate with aluminized backing, which insures pictures having excellent brilliance and contrast completely free of annoying reflection.

According to RCA engineers, the metal shell construction contributes to the tube's inherent mechanical strength, practically eliminates the possibility of implosion, and results in a much lighter kinescope, weighing only about 29 pounds, as compared to a reported 41 pounds in an equivalent glass tube. Specially designed deflection components have been developed for proper operation of the tube.

Facilities for the manufacture of the new 27-inch kinescope are being provided at the RCA plant in Lancaster, Pa.

Urges Greater Efforts In "Pure" Research

(Continued from Page 27)

verge of an era in which new scientific knowledge can provide the basis for substantial advances in human health and happiness."

Based on progress being made in what he termed electronics of solids as contrasted to electrons in a vacuum, Dr. Jolliffe said that this new science already has produced the transistor, a tiny germanium device capable of performing many functions of an electron tube.

Dr. Jolliffe said that one of the intriguing aspects about the development of the transistor is the little-realized fact that this new wonder device will, of itself, help materially in the advance of fundamental knowledge.

He pointed out that, so far, the design of electronic computers has required rather large and bulky equip-

ment, some employing thousands of electron tubes which need to be frequently and carefully checked to guard against error. Space and heat are also serious considerations, he noted, adding:

"It is easy to see, then, the really magnificent contribution the transistor is destined to make in the future simplification and refinement of electronic computers."

Dr. Jolliffe stated that, in creating wider horizons for the electronics art, the transistor does not necessarily supplant the electron vacuum tube. On the contrary, he said, the new applications made possible by transistors may actually increase the use of electron tubes.

"With greater development of transistors, smaller, lighter, more rugged, and more efficient electronic controls will be developed for airplanes and missiles. It may even make new weapons possible. New, better, and smaller control equipment may well result in new types of planes.

"Here, indeed, is an outstanding example of how an advance in the fundamental knowledge of one field can be of inestimable value in another."

Radar Has 200-Mile Range

(Continued from Page 29)

pounds before installation, and is pressurized to operate at altitudes up to 50,000 feet. It is the first system of its kind to go into production that has both military and commercial application.

Operation testing of the set has been done in both Navy and Air Force planes. It already has prevented one serious Navy crash. A passenger packed transport had just taken off in foggy weather when the control tower erroneously instructed the pilot to make a right turn which would have taken him into the side of a hill. Fortunately, the pilot noticed the obstacle on his radar scope and made the correct turn.

Scholarship Plan Extended

(Continued from Page 14)

education at an engineering school. This scholarship and stipend of \$800 is continued for four years or until the student receives the baccalaureate degree.

More than 100 young men, who have completed their education with the aid of RCA Scholarships and Fellowships, are today at work as scientists and engineers in industrial organizations, research laboratories and scientific institutions. In addition, 32 students in 25 colleges and universities throughout the United States are studying under RCA Scholarships and Fellowships.



Frank M. Folsom (left), President, Radio Corporation of America and Henry D. Mercer (center), President, States Marine Corporation, listen as Admiral Thomas P. Wynkoop, President, Radiomarine Corporation of America, explains the operation of Radiomarine's 2,000th Radar installed recently aboard the *Lone Star State*.



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If you desire to consider any of the positions listed, write us for a personal interview—include a complete résumé of your education and experience. Send résumé to:

MR. ROBERT E. McQUISTON, Manager
Specialized Employment Division, Dept. 95
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