

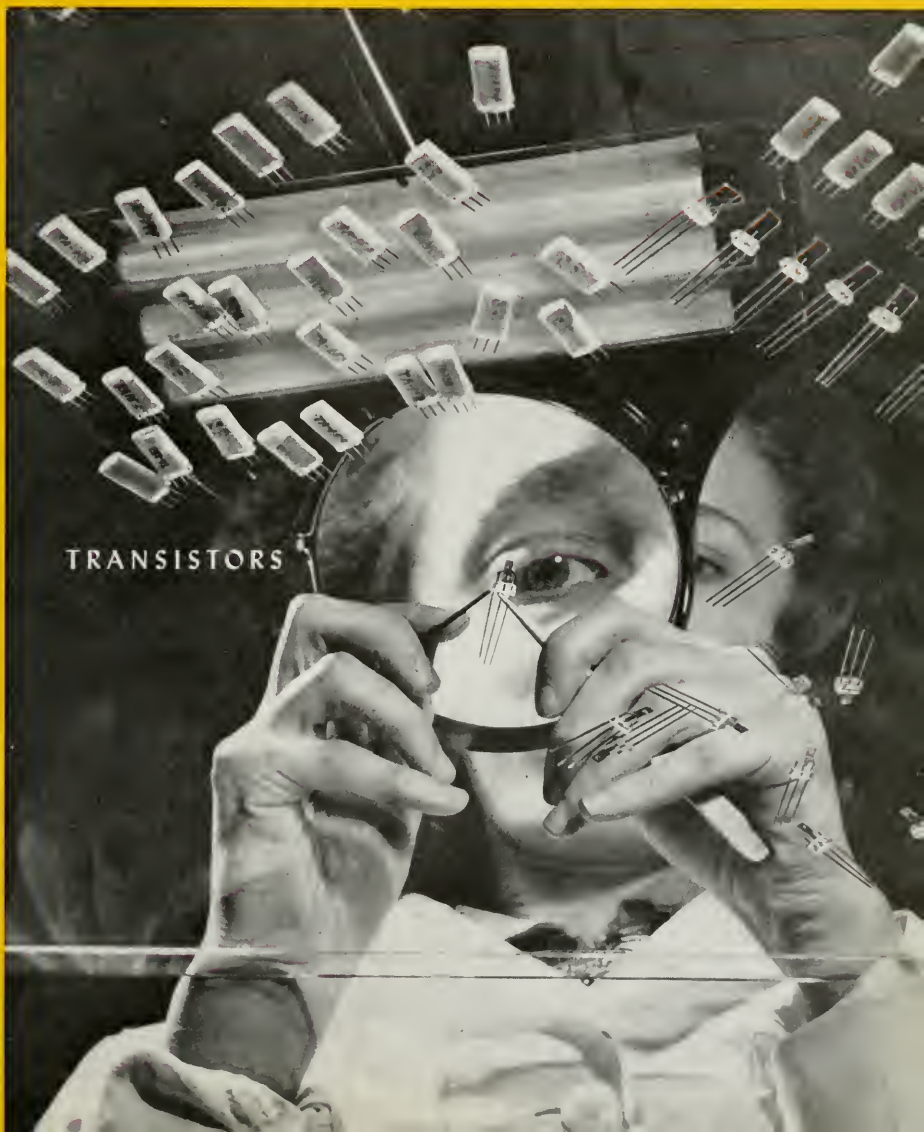
RADIO AGE

RESEARCH • MANUFACTURING • COMMUNICATIONS • BROADCASTING • TELEVISION

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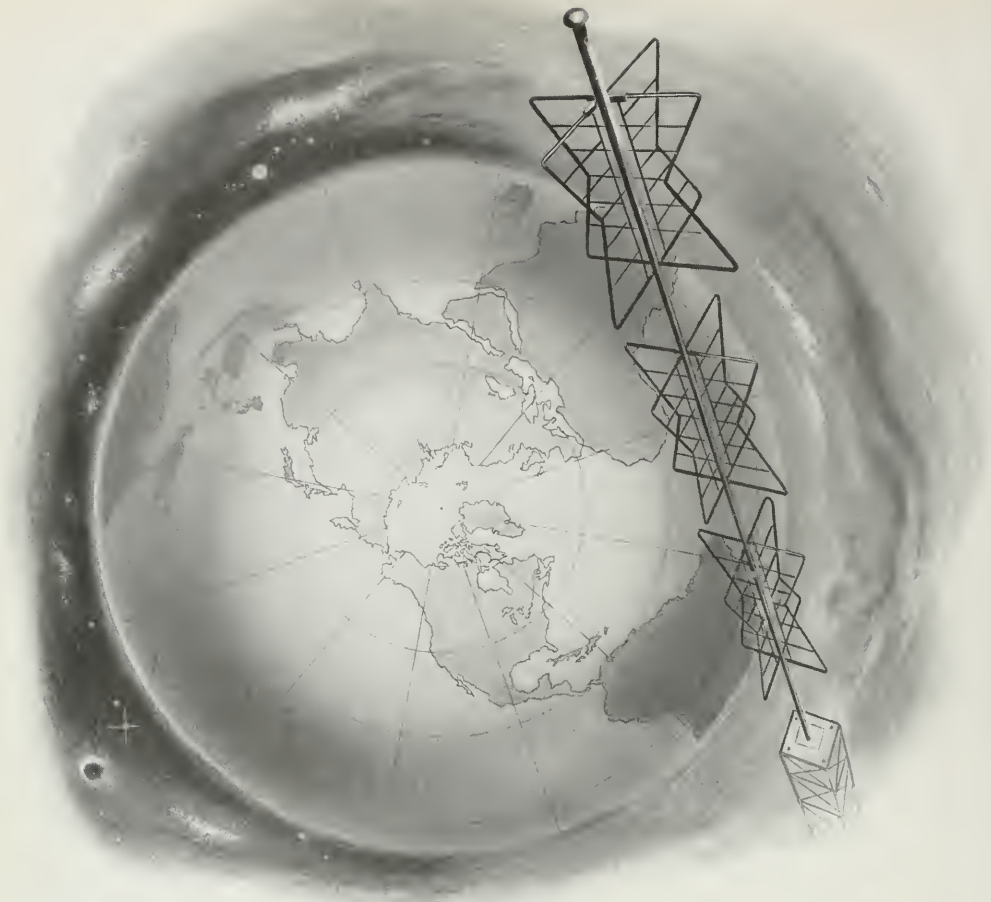


TRANSISTORS



APRIL

1953



RCA Television Systems now serve the world!

TELEVISION TOWERS are rising round the world. They are symbols of a new era in education and understanding. Increasing numbers of RCA equipped TV stations are on the air or planned for early operation in Brazil, Canada, Cuba, Dominican Republic, Italy, Japan, Mexico, The Philippines and Venezuela.

More and more countries plan for video, the great new teacher. A world

network of TV stations emerges, tapping the reservoirs of culture, improving markets, creating better understanding.

Abroad, as in the U.S.A., RCA has everything for television . . . from camera tube to antenna, from transmitter to receiver . . . and the service of distributors and companies long versed in the electronic needs of their countries.

Only RCA manufactures everything

. . . from TV cameras, through studio and remote facilities which send clear, steady pictures out over the air from RCA transmitters, to the bright, sharp pictures and sound in homes, schools and many other locations.

* * *
Your RCA Distributor or company will be glad to offer information on RCA Television; or write to RCA International Division for the booklet, "World Experience". . . a stimulating review of TV around the world today.

World Leader in Radio
First in Recorded Music
First in Television



RCA INTERNATIONAL DIVISION
RADIO CORPORATION of AMERICA
RCA BUILDING
30 ROCKEFELLER PLAZA, NEW YORK, N.Y., U.S.A.

Radio Age

RESEARCH • MANUFACTURING • COMMUNICATIONS
BROADCASTING • TELEVISION

APRIL 1953



COVER

Elements of a junction transistor are so minute that they must be assembled under a magnifying lens. Here are transistors in various stages of completion, as viewed through a glass table.

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.

DAVID SARNOFF, *Chairman of the Board*
JOHN Q. CANNON, *Secretary*

FRANK M. FOLSOM, *President*
ERNEST B. GORIN, *Treasurer*

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National Broadcasting Company, Inc. • Radiomarine Corporation of America
RCA Communications, Inc. • RCA Laboratories Division • RCA Institutes, Inc.
RCA Estate Appliance Corp. • RCA Victor Distributing Corp.



The phonograph record players span more than fifty years of progress. (Left): the latest RCA Victor 3-speed "Victrola" phonograph; (right) and early spring-wound record player.

Sarnoff Honored By Radio Engineers With First Founders Award

Chairman of RCA Tells Engineers that Radio-Electronics Offers Unlimited Fields for New Developments — He Points to Transistors, Electronic Home Appliances, Business Machines, Tape-Recording of TV Programs, a True Amplifier of Light, and Other New Devices — Industrial Television May Surpass Present Growth of Broadcast Television

BRIG. GENERAL DAVID SARNOFF, Chairman of the Board of the Radio Corporation of America, was honored as the first recipient of the Founders Award of the Institute of Radio Engineers at the annual banquet of the I. R. E. at the Waldorf-Astoria on March 25. He was cited for "outstanding contributions to the radio engineering profession through wise and courageous leadership in the planning and administration of technical developments which have greatly increased the impact of electronics on the public welfare."

Acknowledging the Award, General Sarnoff delivered the main address at the annual dinner of the I. R. E., which was attended by more than 1,000 engineers. He told them that their future in radio, electronics and television is fascinating and promising, and that even their wildest dreams cannot encompass all the possibilities open to them in the years ahead. The fields of conquest in radio-electronics, he declared, are unlimited.

General Sarnoff told the I.R.E. of RCA's development of a much simplified closed-circuit television system, which provides a vidicon camera attachment for a standard home television receiver. The simple attachment, he said, is connected as easily to a television receiver as a record-player and does not affect the normal use of the receiver in any way. With the addition of this camera unit everyone of the 23,000,000 television receivers now in use becomes a potential closed-circuit system for schools, the home and other places.

"Until now," he added, "industrial television has been utilized mainly by larger business and industrial organizations, but the reduction in cost brings it within reach of thousands of small businesses."

General Sarnoff reported that uses are foreseen for closed-circuit TV in hotels, department stores and other business establishments. A visual intercommunication system between offices for checking papers and documents, between office, factory and warehouse, can now be realized economically, he stated, and declared:

"One of the largest fields ahead for the use of closed-circuit television is the home itself. Closed-circuit sound systems are familiar to Americans. We think nothing of voice communication between rooms in the same house, between offices in the same building, between upstairs and downstairs. We are destined, I believe, to become equally familiar with closed-circuit systems of sight transmission.

"When the cost of the camera attachments is sufficiently low to permit their use in the average home they may make the television receiver truly the control

Brig. General David Sarnoff (right) Board Chairman of the Radio Corporation of America, accepts the first Founders Award of the Institute of Radio Engineers from James W. McRae, president of the Institute. The presentation took place at the annual banquet of the I.R.E. on March 25.





Dr. V. K. Zworykin, (right) Vice President and Technical Consultant, RCA Laboratories Division, and staff members, demonstrate simplified closed-circuit television system for the home, using Vidicon camera attached to standard home receiver. Others, left to right, are G. W. Gray, W. S. Pike and L. E. Flory.

center of the home. The snap of a switch will turn the receiver from the broadcast program to view the children asleep in the nursery or at play in the yard, or the cooking on the kitchen range. The housewife will not only hear but see the caller at the door before she opens it."

Praising the engineers and their contributions to national defense, General Sarnoff called them "soldiers of science, defenders of the flag." They too, he said, are in the front line that bulwarks progress and prosperity.

"The future," he declared, "is in your hands and those of the engineers who will follow in your footsteps as we have followed the signposts erected by Marconi, DeForest, Fessenden, Armstrong, Zworykin, DuMont, Farnsworth — and others who have marched to fame in the I. R. E.'s great cavalcade of science and engineering.

"Between now and 1960 — and that is only seven years away — great changes in industry will take place as a result of developments in solid-state electronics. Indeed, the vacuum tube is approaching its 50th anniversary confronted by a mighty competitor — the transistor.

"Present day electronic devices, instruments and systems will be transistorized. This new tool of science will widen the usefulness of electronics. It will spread its applications into many fields which the electron tube has not been able to serve.

"Within these next few years we should not be

surprised to see electronic appliances find their way into the home, Air conditioners, using electronics, eliminating motors, blowers and compressors, and therefore noiseless in operation, may lead a mighty procession of household products to new markets."

Industrial electronics offer many opportunities for substantial development and expansion, continued General Sarnoff, saying:

"It will revolutionize many phases of business, especially within large organizations. For example, electronic computers can translate, process, compute, store and print pertinent facts and information. They simplify the task, greatly increase the efficiency and perform the functions of an accounting system with utmost speed and accuracy.

"Electronics will change clerical operations, relieve men of routine and drudgery and effect enormous savings in time, money and materials. The world of business machines is ripe for electronics.

"Electronics can also serve in other directions. It promises new aids to health, safety and better living. There are countless applications for the development of inspection methods to insure the highest purity in liquids, vaccines, drugs and all bottled beverages, including milk. Electronics becomes the foe of impurity and contamination in all bottled, packaged or canned products."

He asserted that thus far the phenomenal growth of broadcast television has overshadowed many other applications which operate over closed-circuit systems.

and constitute the growing field of industrial television. He continued:

"Wherever danger, remoteness or discomfort preclude the presence of a human observer, the industrial television camera can take his place. Handling of explosives, pouring of castings, watching the operations of furnaces and remote power sub-stations are examples of television's usefulness to industry.

"As yet only a negligible fraction of the potential of industrial television has been tapped. The major obstacle has been cost. That obstacle is being overcome by light-weight equipment using the vidicon camera tube. The dimensions of industrial television may surpass the growth in broadcast television we are now witnessing.

"Schools, in which television sets are becoming more and more a standard classroom fixture, may employ their TV sets to bring talks and demonstrations to the entire school or to selected classes, without the loss of time or the confusion attendant upon a call to assembly. On college campuses the linking of the lecture halls by television will permit exchange of instruction between departments, adding to the variety and interest of the courses. In biological research and technical education this form of television has proved a valuable tool.

"The availability of a simple closed-circuit system will put the television microscope as a new instrument for instruction within reach of every high school and college in the country."



Point-contact type transistors before and after embedment in plastic housing.

General Sarnoff recalled that in 1951, on the occasion of his 45 years in radio, when the RCA Laboratories at Princeton, N. J., were named "The David Sarnoff Research Center," he had asked for the "three presents" for his fiftieth anniversary in radio in 1956 — the tape recorder, an electronic air-conditioner and a true amplifier of light. Recently, he said that he was given a preview at the RCA Laboratories of some preliminary steps toward these 1956 anniversary presents.

"I was surprised at the demonstration I saw of a television program coming from New York and being simultaneously recorded on tape in the Princeton Laboratories 45 miles away. The recording was played back instantly. The quality of the recorded picture still needs improvement — but even its present performance convinced me that I will have the television tape recorder before the time I specified.

Tape Recordings Will Obsolete Films for TV

"Tape recordings will obsolete the use of film for television and reduce over-all costs. Small degradations which mark the various steps in the production of a film, creating a cumulative effect in the final print, will be eliminated. This new method will revolutionize the entire art. As a simpler and cheaper process, it will extend into color television. And it may extend into the motion picture industry as well.

"As you all know, the recording of sound on magnetic tape already has reached a high degree of perfection. When recorded sound has served its purpose it can be wiped off and the tape used over again. I believe that we now stand on the threshold of the same service for sight."

General Sarnoff said that the second "present" requested of RCA engineers two years ago — the all-electronic air-conditioner — is "still in the embryonic stage, but I saw signs of life!" He declared that the third "present" — the true amplifier of light — is the toughest problem to solve, but added:

"As you know, the present method is first to convert the light into electricity, next to amplify it, and finally to convert the electricity back into light. Most of today's limitations of television are due to this complicated and inefficient method of handling light. I still believe that one of these days we shall learn how to amplify light directly."

Viewing the future, General Sarnoff said:

"I hold to the conviction that if we intelligently accept the challenges that spring from our opportunities, the wonders we have witnessed in the past fifty years will be dwarfed. Indeed, the advances of the next half

(Continued on page 32)

Compatible Color TV Authorization Urged by RCA Before House Committee

Dr. Engstrom of RCA Laboratories Division Says RCA is Prepared to Expedite Production of Receivers for Sale to Public

THE Radio Corporation of America recommended on March 24 that the Federal Communications Commission immediately authorize commercial broadcasts of compatible color television signals and said that it is ready to commence such color broadcasts at once and to expedite the production of color sets for sale to the public.

Dr. Elmer W. Engstrom, Vice President in Charge, RCA Laboratories Division, appearing as the first witness in an investigation of the present status of color television by the House Committee on Interstate and Foreign Commerce, testified that RCA has spent more than \$20,000,000 in the development of color television, \$5,000,000 in the last year.

"We have the know-how to broadcast color programs, we have the know-how to build the equipment to do the job, and we have the know-how to build the sets that will receive these color programs," Dr. Engstrom said. "In addition, we have a nucleus of trained personnel ready and waiting to do the job."

Dr. Engstrom stated that RCA does not believe that the present FCC standards for incompatible color are satisfactory, because: "First, the more than 22 million black-and-white television receivers now in the hands of the American public, representing an investment by the public of billions of dollars, are 'blind' to incompatible color broadcasts. Second, the present incompatible color standards are, in our opinion, unsatisfactory

House Committee Views Color TV at Princeton and New York

On April 14, members of the House Committee on Interstate and Foreign Commerce visited the David Sarnoff Research Center of RCA at Princeton, N. J., to witness a demonstration of compatible color television. During the afternoon of the same day, the Committee members inspected the NBC color television studio at the Colonial Theatre in New York.



Dr. Elmer W. Engstrom, vice president in charge, RCA Laboratories Division, appears before the House Committee investigating status of color television.

from a technical engineering, and commercial standpoint for broadcast use.

"We knew from our own experience that the authorization of an incompatible system would be a mistake. Today, we are convinced more than ever that we were correct in our earlier conclusion that the only system which would succeed is a compatible all-electronic system."

In the interests of bringing color television to the American public at the earliest possible date, Dr. Engstrom said, RCA believes that the Commission legally can proceed without the time and expense of formal hearings in this matter. The Commission and its staff, he continued, have been kept advised of the extensive research and development work which has been done on compatible color television by RCA and other members of the National Television System Committee.

Dr. Engstrom said that RCA recommends:

"That the Federal Communications Commission immediately authorize commercial broadcasts of compatible color television signals in addition to the broadcasting of incompatible color television signals it has previously authorized.

"The broadcasting of compatible color television will not interfere in any way with the present service being

rendered to black-and-white television set owners. Nor will there be any interference with the broadcasting of incompatible color television should any television station wish to broadcast incompatible color signals."

Dr. Engstrom said that RCA is "today prepared to commence broadcasting compatible color programs which can be received in black-and-white on sets now in the hands of the public without changing these sets at all and without any present set owner being required to buy any new equipment to receive these broadcasts.

"We are also prepared to expedite the production of color sets so that those members of the public who want to receive our compatible color broadcasts in color can buy color receivers.

"Given this opportunity to judge for itself the advantages or disadvantages of the compatible and incompatible system of color television, the American public would make the final decision as to which system it prefers. In our opinion, this is the quickest way to bring color television service to the American public."

RCA Strongly in Favor of Color TV

RCA has been, and is today, strongly in favor of color television, Dr. Engstrom said, and is doing everything that it knows how to do to advance color television for the home. RCA has everything to gain, he pointed out, by bringing color television to the American public at the earliest possible date. Dr. Engstrom said that RCA has planned to file a petition with the FCC for the approval of standards for compatible color television within six months or possibly sooner.

He continued:

"RCA engineers are now working with the National

Television System Committee to complete field tests of technical signal standards for compatible color television. Rulings of the Federal Communications Commission require that field tests be completed before any petition for new color television standards will be granted by the Commission.

"RCA is already manufacturing prototype compatible color receivers, tri-color tubes and studio equipment. When the Commission approves technical standards for compatible color television, RCA will manufacture and sell this apparatus to the public, to broadcasters and to other manufacturers.

"At the same time, the National Broadcasting Company, Inc., an RCA subsidiary, will commence commercial broadcasts of compatible color television programs and will offer these programs to sponsors and to NBC affiliated stations throughout the United States."

Reporting on RCA's color television preparations in research, engineering, manufacturing, and broadcasting, Dr. Engstrom announced these major achievements:

1. *Tri-Color Camera Tube:* RCA has completed the basic work on a tri-color electron tube for use in a color television camera. This will make it possible at a future time to eliminate the present three-tube camera for compatible color television and to substitute a simple and efficient single-tube color television camera. This relates to the "pick-up" of television programs at the transmitting end and does not involve any question of standards.
 2. *Pilot Production:* RCA has invested substantial sums in the establishment of a pilot operation for tri-color tube production in its Lancaster, Pennsylvania, tube factory. This manufacturing unit, which will have a production capacity of 2,000 color tubes per month, can serve as the prototype for other units in the establishment of factory facilities for large-scale, high-speed production.
 3. *Color Studios:* NBC has a color studio in Radio City, New York, and has now completed equipping a second television studio for compatible color television. This second color studio occupies the whole of the Colonial Theatre at 62nd Street and Broadway in New York. It is equipped with all new color studio equipment built by the RCA Victor Division.
 4. *Trained Personnel:* A special group recruited from the regular NBC staff has devoted its efforts to the development of color television broadcasting. In addition, other NBC personnel have been assigned
- (Continued on page 16)*

Tricolor kinescope tubes in pilot production at the RCA plant in Lancaster, Penna.



They Keep Communications Moving . . .

On ship and shore, in tropics and in the arctic, hundreds of trouble shooters, trained by RCA, keep the vital wire-and-radio systems of our armed forces in top working condition.

It's a small world today because of communications. Korea, 8,500 miles away, is our neighbor, Hawaii can be called on the phone, Greenland is easily available—all of these places and many more are "just around the corner" as long as there are enough engineers to keep our highly complex electronics systems operating.

To see that these circuits are not interrupted is the job of the Government Service Division of the RCA Service Company in carrying out its program of assistance to the U. S. Armed Forces and our Allies the world over. Engineers of the Division, under contract to the Army, Navy and Air Force, are working on more than 400 different types of military electronics equipment.

Although the Government Service Division is only a little over two years old, its nucleus goes back to the time before World War II, when the U. S. Government suddenly discovered that it lacked sufficient numbers of well-qualified technicians to cope with the mass of complex electronic equipments being rushed to our field forces.

When the shooting in Korea began, 50 people were assigned by RCA to Government work. This included office force and field engineers. Today, the Government Service Division employs hundreds of persons.

The objective of the Division, as outlined by Pinckney B. Reed, vice-president in charge, "is to provide the best possible electronics-assistance program to the Armed Forces, to make available trained field engineers backed up by the resources of RCA."

As a result of this long-range planning, RCA is prepared to assist in the five basic electronics needs of the Armed Forces: 1) supplying field engineers; 2) preparing technical publications designed and written by specialists; 3) developing training devices to give effective and rapid instruction in electronics fundamen-



tals and military electronics circuitry; 4) working out training programs for military personnel, streamlined through the experience of fieldmen who work with military leaders and RCA experts; and 5) setting up special projects, which include repair and modification facilities, and unusual and specialized engineering operations.

Since three out of ten field engineers eventually turn up overseas, a man, before he is assigned to this Division, must agree to spend at least one year abroad. After signing up, he is put through a six-week indoctrination course at the home office in Gloucester, N. J.



P. B. Reed (right), vice president in charge of the RCA Government Service Division, and engineer Harold Dick stand beside a roadside sign in Tokyo.

Basically, the men are assigned to install, maintain and repair electronic equipment of all types and to instruct military people in its operation, installation and service. Actually, their contributions are limited only by the vision and initiative of the individual. In combat areas, these engineers share the life of soldiers and sailors. In the world's capitals, they learn the language and become a part of the lives of nationals. The ability to get along with strangers, to become integrated quickly into the life around them is of utmost importance to the personal success of field engineers.

Technicians' Deeds Cited by Military

Home office files are loaded with letters from commanding officers of commendation for "special service" by our field engineers. In these reports are the names of men who have helped to accomplish actual combat missions, a number whose standard equipment includes a carbine.

Captain John Taylor, USN, commander of Destroyer Squadron Six, commended the performance of David Rennie, in these words:

"I have noticed that the usefulness of civilian technicians on independent duty of this sort depends greatly on the initiative of the individual concerned . . . Mr. Rennie has displayed such initiative."

A new method of handling low-frequency transmission in the North Atlantic, suggested originally by John Heffernan, an RCA field engineer, was under intensive examination in 1952. If the initial success continues, Heffernan will have made a really significant contribution to the reliability of military communications in this critical area. The problem is of utmost importance, because of the position this installation holds in the global communications network. Heffernan's idea involved the use of pulse detection, coupled with a particular form of loop antenna. The combination shows



An RCA expert in maintaining radio teletype machines and circuits imparts his knowledge to U. S. airmen at an unnamed base.

promise of overcoming such obstacles as magnetic storms and the type of static caused by ice and snow on antennas.

The first wave of Government Service Division engineers arrived in Korea, in September, 1950. Morris Patneade, one of the first volunteers for front-line duty, landed at a soggy airstrip almost at the same time as the enemy, then thrusting downward from the north. Technical service was a life-or-death matter. With carbine at hand, he followed the fighting front up and down the peninsula, helping to keep communications open through the terrible Korean winter. For his devotion to duty, RCA gave him the Award of Merit, the Company's highest honor which is presented annually to only 15 out of more than 20,000 employees.

When Patneade was brought home, he was replaced by Chuck Lane who maintained tradition. When rotation turned up his number, Lane refused to come home because "the job is still going on over here."

George Ross, who came back to the States last fall for a visit, after two years in the Far East, is now back at his Yokohama post. He is group leader, inspector and technical advisor in the radar shop, U. S. Signal Corps Depot. One of his special contributions, commended by Brig. General Hammond, was his research on the SCR-548 radar set, during which he tested the effects of high humidity on the accuracy of information fed to warplane gun directors.



Field engineer Earl Cowden drew an assignment that took him to the Behring Sea.

Bill Bjorman, also in the Far East, found his second year "more interesting than the first." According to a letter of commendation, "he went into combat areas . . . In one instance, his work was responsible for establishing a very critically-required communications link in time to fulfill a classified mission."

John Longenecker covered 50,000 miles of the Pacific on his solo job, flying from one island to another as RCA's representative with the 1808th AACSS Wing. He spent a year changing continuous wave (air-to-ground) communications to voice. He did the field work, drew up plans, scrounged hard-to-get equipment, and assisted on-the-spot installation.

Reliability is Essential

Because the field engineer is on his own with an important mission to carry out, reliability is essential. The Company carefully screens each applicant for character as well as technical knowledge and skill. Because they must work at all times with a minimum of supervision, one of the big problems is to keep them from feeling cut off from the Company as a whole.

Refresher courses are held periodically for field men. Once a year, managers and supervisors are recalled to the home office for a conference. They meet with vice-president Reed and his staff, consisting of Col. Mike Fried, assistant; Tom Whitney, operations manager; Paul Melroy, contact negotiations manager; Andy Con-

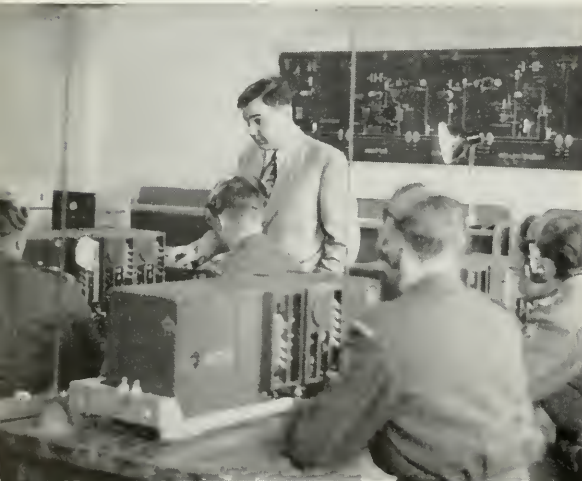
rad, chief engineer; Lloyd Yoh, contract administrator; Dick Propst, Air Force contract manager; Louis J. Depass, Army and Navy contract manager, and Jim Jackson, technical publications head.

The biggest user of RCA's services is the Air Force. Under contract with the Air Defense Command alone there are more than 150 engineers assigned to bases and radar sites throughout continental U. S. A. Many more are with the Airways and Air Communications Service. The majority are overseas in Alaska, Canal Zone, Korea, Europe, etc., where they are supervising the installation and servicing of radio and teletype communications gear, and navigational aids.

In Europe and North Africa and in this country, the Tactical Air Command is employing RCA field men on navigational aids, air and ground radar equipment. Many are employed by the Strategic Air Command in this country, Puerto Rico and Okinawa.

The Bureau of Ships has more than 100 men at work with the Atlantic and Pacific Fleets, and at bases overseas in the Atlantic area (Mediterranean, Cuba), Japanese areas and Pearl Harbor. These engineers are installing, maintaining and training naval people in shipborne radar, shipborne and ground station communications, loran and sonar.

In this country, men under contract to the Navy are doing project engineering, producing shipyard guidance plans for installation of electronic equipment on board fighting ships.



Technicians of the RCA Government Service Division explain the circuitry and maintenance procedures of radio equipment to Netherlands' soldiers (left) and to members of the Air Defense Network (right).

Thirty-Four Million TV Viewers Watch Award of "Oscars"

FOR the first time in history, television audiences throughout America and radio listeners in many parts of the world shared the suspense and excitement of the annual "Oscar" awards ceremony of the Academy of Motion Picture Arts and Sciences. On Thursday, March 19, the National Broadcasting Company telecast and broadcast the proceedings which originated alternately in Hollywood and New York. An estimated audience of 34,000,000 televiewers witnessed the two-hour program which was sponsored by the RCA Victor Division.

Sixty-one stations of the NBC television network and 195 NBC radio stations carried the ceremony. NBC fed the Armed Forces Radio Service which beamed the program through 69 foreign stations to American troops stationed throughout the world. The AFRS station at Bremerhaven and stations of its Blue Danube network broadcast the "Oscar" ceremonies behind the Iron Curtain. Other AFRS stations as far north as Point Barrow, Alaska, and as far south as Pago Pago, Samoa, carried NBC's broadcast of the presentations to movieland winners.

Bob Hope, noted comedian, served as master-of-ceremonies for the Hollywood ceremonies. Conrad Nagel, a former president of the Motion Picture Academy, was emcee in New York.

Top honors went to Cecil B. DeMille's "Greatest Show on Earth" which won the "Oscar" for the best picture of 1952. Shirley Booth was named best actress of the year for her first starring screen performance in "Come Back Little Sheba." Gary Cooper was named best actor for his leading role in Stanley Kramer's "High Noon." Actor John Wayne accepted the award for Cooper.

Television added glamour to this year's Academy award presentations. NBC-TV cameras, manned by cameramen dressed formally in dinner jackets, captured scenes of the arrival of limousines at the RKO Pantages Theatre in Hollywood, and the capacity audience there and in the International Theatre in New York. Other NBC-TV cameras caught the faces of the winners as they walked from their seats to the stage to accept their "Oscars." NBC provided glimpses of the backstage rooms at the Pantages where members of the press interviewed the winners.

Robert Welch, an NBC-TV producer, was in charge of network coverage of the 25th Annual Awards ceremony. Richard Clemmer produced the first telecast of the New York "Oscar" ceremonies in history. William Bennington was TV director in Hollywood, Warren Jacober in New York.

All but two of this year's "Oscar" winners were in Hollywood. In New York, Shirley Booth hurried from the Empire Theatre where she is starring in a Broadway play entitled "The Time of the Cuckoo" in time to receive her "Oscar" from Fredric March. Miss Booth's brief word of thanks to "old friends for faith, new friends for hope and everyone for their charity" brought more than a few tears to TV audiences and to the audiences seated in the theatre. Boris Vermont won the other New York bestowed award for producing the year's best one-reel short subject, "Light In The Window."

John Ford, who was in England, won his sixth award for best director, this year for Argosy-Republic's "The Quiet Man." Gloria Grahame earned the "Oscar" as best supporting actress for her part in "The Bad and The Beautiful." Anthony Quinn won the award as best supporting actor for his part in "Viva Zapata!"

"Forbidden Games," a French picture released in the U. S. by Times Film Corporation, won the award as best foreign language film of the year.

Film star Shirley Booth receives "Oscar" from Fredric March as "best actress of the year," in ceremonies telecast and broadcast coast to coast by NBC under the sponsorship of RCA Victor Division.



Electronics' Next Era

1 一
2 二
3 三
4 四
5 五
6 六
7 七
8 八
9 九
10 十



KEY TO ILLUSTRATIONS

Top row: Chinese Abacus, Grecian Wax Tablet and Napier's Banes. Lower row: Quill and Parchment, Slide Rule, Adding Machine, "Memory" Tube and Typhoon Analogue Computer.

By Dr. Irving Wolff,
Director of Research,
RCA Laboratories Division,

THE transistor and some of its companions in non-vacuum devices appear to have arrived at the right time to make practical some dreams which have been developing and gathering headway since shortly before World War II. I am referring to what might popularly be called a super-electronic brain.

The predecessor of today's electronic computer was first the abacus and later the office mechanical calculating machine which performed some simple arithmetic processes such as addition and multiplication. This was followed in succession by Vannevar Bush's mechanical calculator at the Massachusetts Institute of Technology

which could solve some simple problems in calculus and, later, the early electronic computers using vacuum tubes which could solve the same type of problems more rapidly. Meanwhile, the number of vacuum tubes in each of these devices grew from one or two to a total of thousands. Special buildings were required to house these computers and air-conditioning systems were needed to take away the waste heat power of their tubes.

Our general concepts of the functions performed and the method of operation of these machines was becoming much better organized. We began to realize that the ability to store information (memory) was an important function of the electronic computer. We realized the analogy between the operation of the electronic machines and our thought processes. Some ma-

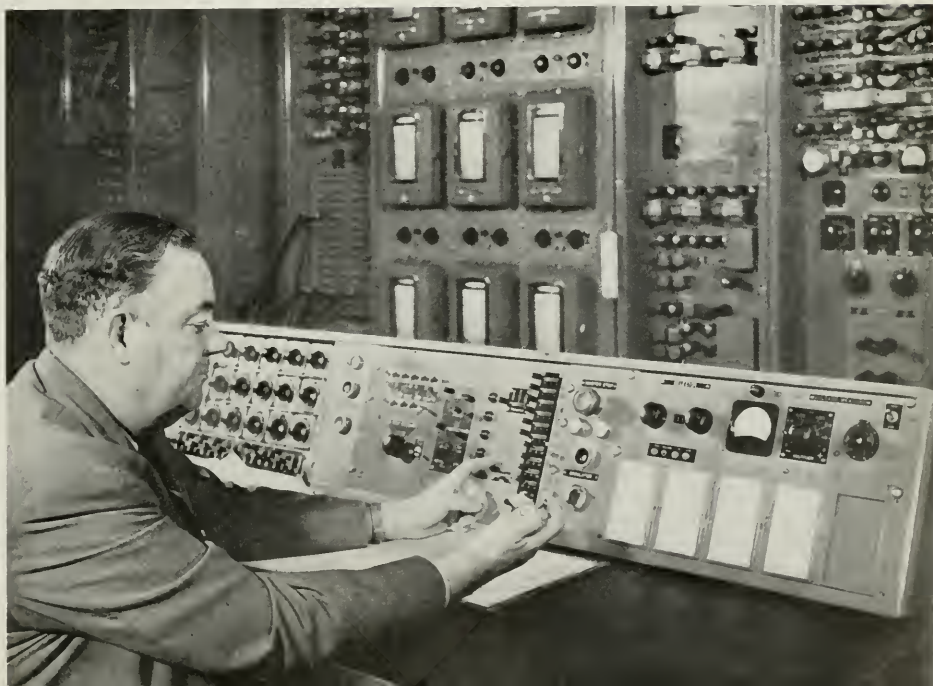
chines have been built which can start in ignorance and can learn by trial and error, a method of learning which is used by many animals. We could see how to make the electronic machines many-fold more useful but the thought of putting in and maintaining the thousands of vacuum tubes required seemed fantastic. The advent of the magnetic and ferro-electric switches and memories and the development of the transistor have now changed our concepts of what is practical. We can foresee the time when we will not be staggered by the thought of a million or more electronic amplifiers or switches in a single machine. A recent test showed that the power consumption taken by the so-called counters in one machine could be reduced by a factor of 30—from 18,000 watts to 600 watts—by the substitution of early experimental transistors for tubes. This is only a start compared to what we will be able to accomplish within a few years.

What does this all mean in terms of the services that can be rendered by electronic computer equipment? At this time we probably see only a little of what is ahead. One thing is, however, apparent. We will be able to design equipment of enormously greater complexity than any that, up to now, has been considered practical.

I don't believe that the full impact of what the electronic brain will mean to our civilization is generally realized. On the one hand it will act as a labor-saving machine in many business activities which use relatively unskilled clerical labor; on the other it will provide the individual with enormously greater mental power. Just as a large scoop shovel gives the individual power to move tons of earth with the touch of a few controls—something which would have taken days to do by hand—so the electronic computer will permit the solution of problems in a few days which the individual would not have been able to solve during his lifetime.

For one hundred years or more we have been going through what has been called the industrial revolution. This has involved mainly the substitution of machines for manual labor in the production area. We have just scratched the surface in the substitution of machines for people in the mental and clerical areas of industry. We can foresee that the new electronic computers will cause just as great a change in locations where large numbers of clerical workers are used, as the development of machines caused in the manual labor field. They can, for example, be used for automatic inventory control, cost accounting and billing. Presently, a system is actually under construction for the Ordinance De-

(Continued on page 31)



RCA Executives Promoted to New Positions



L. W. Teegarden

Election of L. W. Teegarden as Executive Vice President of the Radio Corporation of America, was announced on February 19 by Frank M. Folsom, President.

Mr. Teegarden, a pioneer merchandiser, has been active in the electrical and electronics industries for many years. Prior to assuming his new post, Mr. Teegarden was Vice President in Charge of Technical Products of the RCA Victor Division.

Since joining RCA in 1930, as a District Sales Manager, Mr. Teegarden has held increasingly responsible positions on behalf of RCA Victor activities.

Six years later Mr. Teegarden was named Assistant General Sales Manager of all RCA Victor product activities. He was appointed General Manager of the Tube Department in 1944, and a year later was named Vice President in charge of this Department.

Mr. Teegarden's responsibilities were increased in 1949 to include, in addition to his other activities, supervision of RCA Victor Engineering Products Department, which has since established new sales records under his direction.

Mr. Teegarden is a native of Salem, Ohio, and now resides with his wife and two children in Berwyn, Pa., a suburb of Philadelphia.

Edward M. Tuft was elected Vice President in Charge of Personnel (including labor relations) of the Radio Corporation of America on March 5. In his new position, Mr. Tuft will be the general administrator of RCA's over-all personnel activities and organization development as well as labor relations.

Mr. Tuft has been Vice President in Charge of Organization and Development of the RCA Victor Division since July, 1951, coordinating activities concerned with developing manpower. He served previously for four years as Director of Personnel of that Division and as a Vice President from October 1950.

Mr. Tuft joined the RCA Tube Department in 1930 as an inspector. He rose through various promotions to Manager of Personnel at the Harrison, N. J., plant in 1941 where he remained until his transfer to the RCA Victor Division six years later. He studied industrial relations at Princeton University and is a Member of the American Management Association.



Edward M. Tuft



Thompson H. Mitchell

Thompson H. Mitchell was elected President of RCA Communications, Inc., on April 1. Mr. Mitchell, Executive Vice President of RCA Communications since 1944, succeeds H. C. Ingles who has retired.

Mr. Mitchell, a graduate of the United States Naval Academy at Annapolis (Class of '25), entered the communications field in 1927. He worked for two years in the Pacific Sales Division and Engineering Department of RCA Communications, and in 1929 became District Manager for the Radiomarine Corporation of America in Los Angeles.

He returned to the United States in 1935 to become Manager of the Southern California District Offices of RCA Communications. He continued in that position until 1942, when he accepted a commission of Major in the U. S. Army and was assigned to the Office of the Chief Signal Officer. In March, 1943, he was promoted to Lieutenant Colonel in Charge of the Traffic Operational Engineering Section of the Army Communications Service, Washington, D. C. Subsequently, he was promoted to Colonel, a rank he now holds in the Army Reserve.

Mr. Mitchell rejoined RCA Communications in 1944 as General Manager and soon after was elected Executive Vice President.

NBC's Film Division:

what it is—how it operates

By Robert W. Sarnoff

*Vice President in Charge of Film Division,
National Broadcasting Company*

A closely-knit activity which has expanded so rapidly that to many outsiders it must have appeared to be Topsylike in its growth, the Film Division of the NBC Television network is now functioning as the third principal operating division of the company. The other major operating units are the Networks Division, which includes radio and TV networks, and the Stations Division, embracing the five radio and five television stations owned and operated by NBC.

This expansion of the Film Division has been accomplished in the relatively short period of 10 months since it was established in June, 1952. On March 3 of this year it was set up as a self-contained operation by NBC's president, Frank White. Under this new arrangement, we hope to make the Division a centralized source of film services to the network, to the owned-and-operated stations, to our affiliates, and to other enterprises which may want our help.

Currently the Film Division functions with four major departments: sales production, film-and-kinescope operations (which includes the development of our vast film library), and the procurement of films for showing on the network as well as on our owned-and-operated stations.

The department heads report to Carl Stanton, director of the Film Division, a recently created position. Stanton was formerly manager of TV network programs for NBC. His task will now be to operate the Film Division and to shoulder much of the increasing administrative burden, so that more time can be devoted to the all-important job of long-range planning by the vice-president in charge of the Division.

The growing sales force, managed by John B. Cron, now has offices in New York, Chicago and Los Angeles—and will open additional offices as markets and stations increase. Among the major film series which are currently offered for sale to local stations and local sponsors all over the world (Canada, Cuba, Mexico and



Some of the 15,000,000 feet of motion picture film stored in NBC's Film Library.

Italy are already included) are "Douglas Fairbanks Presents," "Hopalong Cassidy," "The Lilli Palmer Show," "Dangerous Assignment," and a daily and weekly film-news summary.

Film Features for Local Sponsors

Such outstanding NBC network TV series as "Victory at Sea," and "The Doctor" (under the new title of "The Visitor") will soon be offered for local sponsorship in line with our belief that a popular film program should remain available to the general public and to new television stations as they go on the air.

In other words, through reissue, these programs will penetrate to millions of homes which may not have been reached on the first run. Fine network programs are a source for syndication after their initial broadcasts.

One of the advantages we can now offer local sponsors and stations when we sell an NBC Film program is a complete, professional and streamlined advertising-promotion-merchandising-publicity-exploitation campaign to go with the program.

The production department, under Stanton Osgood, manager, is responsible for supervising the production of film series—such as "Douglas Fairbanks Presents"—made especially for the NBC Film Division. It is also responsible for the re-editing of programs similar to "The Doctor," and the production of special film shows from footage now in the growing NBC film library. We may be able to develop everything from quiz shows to weather, sports and special holiday services to local stations.

Film and Kinescope Operations and Services, originally part of the television network, is managed by Frank Lepore within the new Film Division sphere of operations. This department handles the shipment of kinescopes of NBC network programs to our affiliates and to our owned-and-operated stations, as well as the shipping of our film programs which are syndicated on a local basis. This has now become one of the largest film exchanges in the country, and we hope to expand this phase of our activities to include a shipping service for other film distributors.

More than 2,000 Subjects in Library

We expect also to expand the scope of the business done by the film library, now one of the largest of its kind in the world. In fireproof vaults at 105 East 106th Street, New York, are row on row of metal containers holding in excess of 15,000,000 feet of film. More than 2,000 subjects are covered and catalogued so effectively that the most abstruse topic can be located in a matter of minutes.

With new film arriving at a weekly rate of about 55,000 feet (principally from the various NBC-TV news programs), we expect to make the film library a valuable source of film material for operations inside and outside of NBC.

Another important aspect of our work involves the procurement of films — features and shorter subjects — as a service to the network, to our owned-and-operated stations, to our affiliates, and to any other potential customers. David Savage, formerly manager of the WCBS-TV Film Department in New York, now heads Film Procurement for us. Last year, though not a part of the Film Division, this operation provided more than 600 films and short subjects for network programming and WNBT, New York.

As a result of the establishment of the Film Division as a separate operating unit of the company, a business office has been created. Managed by Robert Anderson, formerly of the NBC comptroller's office, the Film Division business office handles all budgeting, accounting, billing, pricing and office management.

It is much too early to foretell the future pattern



Readying a film program for air express delivery by NBC to its west coast television affiliate.

of the television broadcasting industry. Only time and experience will indicate the relationships of film and live programming. Our present objective is to develop the Film Division on a sound business basis with a strong organization and with enough flexibility to meet the challenges ahead. We expect not only to be a part of the future pattern but perhaps to have some influence in establishing it.

Compatible Color TV

(Continued from page 7)

to color on a limited basis in order that the personnel with experience in this field would be increased. RCA Victor Division has developed a nucleus of trained operators, supervisors, and engineers for a tri-color tube mass production unit.

5. *Field Testing:* During 1952, RCA and NBC carried on field testing of color receivers, exhaustive tests devoted to compatibility, and other technical phases of the compatible color system.

6. *Experimental Broadcasts:* Since 1949, NBC has been conducting experimental color broadcasts over its stations in Washington and New York. During that time, compatible color television signals have been on the air almost 2,000 hours.

7. *Color Receivers:* Since the introduction of our early color television receivers models, RCA has constantly refined and improved color receiver design. Current RCA color television receiver models contain less than one-half the number of tubes required by our early laboratory model receivers.

Dr. Engstrom pointed out that NBC's experimental work provides practical solutions to the new problems which the broadcaster faces in color. The NBC experience, he said, is also valuable as an aid in formulating plans to produce commercial programs on a regular basis.



A Teleprompter user, reading his speech as it unrolls before him, is able to make his delivery sound extemporaneous. At left: An operator in the wings, working from an identical typewritten version of the text, adjusts the speed of the Teleprompter to the vocal speed of the speaker.

Teleprompter Aids the Orator

By E. C. Buurma
Sales Manager, Teleprompter Service,
RCA Service Co., Inc.

THROUGH the use of Teleprompter service, established by the RCA Service Company and now available to public speakers in all parts of the United States, persons addressing business meetings, conventions and public gatherings no longer need worry about forgetting their lines. This new service now offered through the district offices of the Service Company in New York and Philadelphia, will soon be extended to other major cities. In addition to its service, RCA supplies Teleprompter equipment on a rental or lease basis. Already, one hotel, the Statler in New York, has arranged to make the Teleprompter available for banquets, sales gatherings and other groups using its public rooms.

Although the Teleprompter has been in use for less than two years, it has won high praise in both television and motion picture fields.

The Teleprompter service begins with the receipt by the Service Company of a typewritten copy of the speech. The text is then copied on a continuous roll of specially designed, glare-proof paper by an electric typewriter called the "Videotyper." This typewriter prints in large-size, clear, black letters which may normally be read from a distance of 25 feet. A half-hour speech can be prepared on the Videotyper in less than two hours.

After the typed speech has been carefully checked

by experienced proofreaders, the paper roll is inserted into the Teleprompter script machine. An operator sits at a master control unit out of sight of the audience, and, with a duplicate script before him, can easily regulate the speed of the speaker's machine to conform with his speed of delivery. If the speaker adds comments not in the text or is interrupted by applause, the operator merely halts the movement of the script. When the lecturer returns to the printed speech, the paper begins again to move.

Use of more than one Teleprompter is sometimes required when it is desirable for the speaker to move about while demonstrating products and using charts or other visual aids as may be used at sales meetings, training courses or conventions. In such cases, the RCA Service Company is equipped to install as many as

(Continued on page 32)

SIZE OF SCRIPT

Electronic Action in Solids

By H. W. Leverenz

RCA Laboratories Division
Princeton, N. J.

THE German word for monument is Denkmal, that is, a reminder to think. In the thought-provoking sense, this article is a monument to electrons, with special emphasis on the innumerable environments in which they can exist and exhibit useful activity.

Electrons, the star performers in electronics, are obtained and generally used in combination with other particles. It is these other particles that make possible so many varieties of electron behavior. Fundamentally, then, there is a strong dependence of electronics on chemistry.

It is well known that electrons are negatively charged and are intrinsically identical. Relief from this monotonous condition is provided by the presence of positively charged protons which attract electrons monogamously, one electron wedded to each proton. A simple pairing-off would provide only hydrogen atoms, however, and so it is fortunate that protons can cling, with neutrons, as stable groups to form nuclei or cores of atoms. The known nuclei contain from one to 98 protons, and up to 146 neutrons.

Electrons cluster around nuclei and neutralize the positive charges of the nucleus. The nucleus-plus-electrons arrangements afford 98 species of atoms, ranging from one electron (hydrogen) to 98 electrons (californium). About ninety of these atomic species occur in nature and they are the usual chemical elements. The others have been synthesized by "atomic-energy" techniques. They are particularly radioactive, that is, their nuclei disintegrate spontaneously within a relatively short time.

There are noticeable differences of electron behavior in the various atoms. The behavior differences occur because a lone electron is bound (attracted) more securely to a nucleus with many protons than to one with fewer protons. Likewise, an electron interacts (mostly by repulsion) with other electrons, and the interaction varies for different numbers of electrons in the atom. The number of distinguishable electron environments in the 98 different atoms is 4851. That is, there are 4851 different energy levels, or strengths of bonding, of the electrons in the 98 kinds of atoms.

It is impressive that from essentially two elementary charged particles, the electron and proton, and one neutral particle, the neutron, there may be obtained 98 different atoms. It is even more impressive that the atoms can combine with each other to form millions of compounds, and the compounds can unite to form countless materials. Electrons behave differently in the multifarious compounds and materials, where they are influenced by numerous unlike atoms and ions.

There is practical allure in the potentialities of an infinite number of materials and electron behaviors. There is also a challenge to determine, (1) all the kinds of electron activity, (2) the best material for a given activity, and (3) the best techniques for producing and using a given material, alone, or in combination with others. Research in this field should always be interesting, because the possibility of finding new and greatly intensified electronic effects is ever present.

Three Kinds of Electron Activity

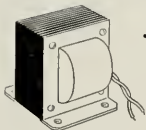
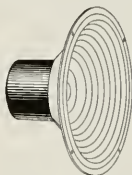
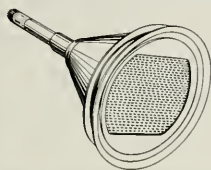
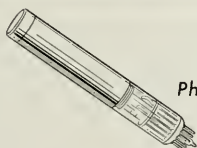
A somewhat similar challenge occurs in games. Different kinds of human activity, such as running, jumping, and throwing, have been used alone and in combination for different games. Recognition of the best performer, or group of performers, for a particular game is a matter of record. New games and new records are always possible.

Three of the known kinds of electron activity have been particularly useful in electronics. They are:

1. Orientation of the axis of the electron's spin.
2. Excitation of an electron (to a higher energy level) with subsequent emission of light.
3. Motion of an electron carrying charge and energy.

The first two activities are chiefly by electrons that are bound in a particular atom, or group of atoms. The third activity is by electrons that are freed from their parent atoms. These electron activities, with a representative solid for each, are outlined in the table.

Of the listed kinds of electronically active solids, all may be used, and many are indispensable, in an electronic system such as television. For example, the camera tube needs a photoconductor or photoemitter to transform light images into freed charge-carrying electrons. Free electrons are multiplied in number with secondary emitters, which emit several secondary electrons for each incident electron. In the receiver, amplification and detection are done with semiconductors and

1**ELECTRON REMAINS BOUND TO, OR NEAR, PARENT ATOM****A****FERROMAGNETIC SOLIDS** (Orientation of Spin)**TRANSFORMER CORES**
Non-Permanent (Soft)**RADIO AND TV LOUDSPEAKER CORES**
*Permanent (Hard)***B****LUMINESCENT SOLIDS** (Excitation and Photon Emission)**DOT-SCREEN TUBE FOR COLOR TV**
Spontaneous Emission**RADAR SCREEN**
*Non-Spontaneous Emission***2****ELECTRON LEAVES PARENT ATOM TO MOVE THROUGH CRYSTAL****Carrying a Charge****VIDICON**
Photoconductors**TRANSISTOR**
*Semiconductors***3****ELECTRON LEAVES PARENT ATOM, MOVES THROUGH CRYSTAL, AND EMERGES INTO SPACE****Carrying Charge and Energy****PHOTOTUBES**
Photoemitters**CATHODES OF ELECTRON TUBES**
Thermionic Emitters**MULTIPLIER TUBES**
Secondary Emitters

Pictorial representation of the three known kinds of electron activity and their corresponding practical applications.

vacuum tubes (which need thermionic emitters). From the thermionic-emitter cathode of the kinescope, or picture tube, there is produced a beam of free electrons. This beam is modulated and then deflected in a scanning pattern by deflection coils cored with a "soft" ferromagnetic solid, and driven by circuits with similarly cored transformers. The electrons in the beam are accelerated and expend their energy in a coating of a luminescent solid where the original visible image is reproduced. Simultaneously, the sound is reproduced by a loudspeaker using a "hard" ferromagnetic solid.

A similar account can be given of the vital role of electronically active solids in radio, radar, electron microscopes, fluorescent lamps, high-speed computers, and many other modern devices. Frequently, the solid is custom-made for the particular use. The number of useful solids, therefore, is much larger than the few listed in the table.

Inorganic Materials Most Fruitful

The best solids for the uses outlined in the table are inorganic and crystalline. Inorganic materials have been most fruitful because they may be made with all kinds of atoms, they have many degrees and combinations of ionic and non-ionic bonding, and they are relatively stable. Most of the useful materials are made by solid-state reactions at temperatures above 1,000° C. When these materials are cooled for use at room temperature, their chemical and physical stabilities are excellent. A few organic materials have been used, as in scintillation counters, but their performances and stabilities are generally unfavorable.

These solids must usually be in crystal form because particle motion, with minimum loss of energy, is easier through a crystal than through a non-crystal, for the same reason that it is easier to travel through an orchard than through a forest.

Controlled purity is necessary, also, because foreign atoms in the path of a particle may deflect the particle, or dissipate some or all of its energy as heat. Foreign atoms may also liberate or trap electrons to give spurious electronic characteristics. Harmful impurities, therefore, must be assiduously eliminated from ingredients, and excluded during reaction and crystallization. In some solids, as little as 0.00001 per cent of certain impurities markedly affects their electronic characteristics. Purification is then required just as it is necessary to clear a calculating machine before use.

There are beneficial impurities, as well as harmful ones. Foreign atoms, when controlled in kind and proportion, can be very useful in some host crystals. In luminescent solids, such perturbing atoms can produce, for example, (1) activator centers wherein

localized excitation and photon emission occur, (2) trapping centers that can detain electrons, for later release, in temporary storage of energy and information, and (3) sensitizer centers that can convert certain radiations into useful excitation energy that is transmitted to activator centers. In semiconductors, for example, foreign atoms can function as donors (convenient sources) of electrons, or as acceptors (traps) that take electrons from their host-crystal neighbors. A host-crystal atom that is so deprived is the site of a positive hole, because it lacks one electron charge. A positive hole can move by borrowing an electron from another host-crystal atom, which then becomes the site of the new positive hole, and the positive hole may continue to move by repeating the borrowing process along a line of atoms.

An intimate subatomic description has been used here, because it emphasizes the fundamental nature of research on electronically active solids. The unit processes are quantum phenomena of common interest to the various scientists involved. Some of the major sciences represented in this teamwork are: chemistry, crystallography, physics, ceramics, metallurgy, physical optics, and electronics. Major subdivisions of these sciences are also well represented. Important branches of chemistry, for example, are: synthetic inorganic chemistry, crystal chemistry, physical chemistry, kinetics, and analytical chemistry.

Sciences Benefit by Cooperation

There is mutual benefit in the cooperation of the different sciences. Chemical, optical, and electronic behavior, for example, depend strongly on the environments of the outlying loosely bound electrons of atoms in a solid. A scientist in one of these fields is, accordingly, encouraged to become more familiar with the others and thereby increase his knowledge and capability.

Research on electronically active solids is now mostly divergent. Creative effort is devoted to synthesizing new solids, as well as to analyzing the constitution and behaviors of old ones. This is characteristic of a young and vigorous enterprise.

Within the past few decades, some of the solids have become sizable production items. The production, which is usually done by electronics companies themselves, exceeds 2,000 tons a year of ferromagnetic spinels (ferrospinel), and 1,000 tons a year of luminescent solids (phosphors). It is reasonable to expect that chemical activities of electronics organizations will expand. Their unique research efforts should continue to provide new products for their own industry, and useful by-products (such as hyper-pure substances) for other industries as well.

Going Abroad?



This article was prepared by the RCA International Division for the guidance of staff members assigned to foreign posts. Although directed specifically to Division employees, the sage advice applies equally well to any American living or traveling abroad.

YOU are going abroad—perhaps for a few weeks, maybe for years. You are going not as a representative of business in general, but of our company, RCA, and of our country, the U.S.A.

How shall you behave? And how shall we advise you to behave? Shall we assume that you are perfect? If we were all people of culture and tolerance, there would be no courts of law, no crime, no wars, no mistakes.

Shall we assume you are *human*, like all the rest of us, subject to heat and cold, errors of commission and omission?

You are going abroad not primarily as an ambassador, a liaison worker, a goodwill agent—although you will be all of these. You are going as a business man. There is nothing wrong with business. In fact, that is why we are all *in business*—in the U.S.A. and in all the countries you will visit. Many of the people you will visit have a business ancestry going back thousands of years. If you have any reservations about business, its dignity and necessity, its services and its rewards—you had better drop the whole idea of your trip right now.

Business Is A Wonderful Thing

Let's get it straight: There is a lot of talk from the Communists about what they like to call the capitalist system. The Communists don't like to call it by its right name: The *private enterprise incentive system*, with opportunity for everyone. More than anything else, it is an *opportunity for growth*, the development of your *talent*. The Communist talk is double talk. Business is a wonderful institution. Everywhere you go, people will respect you if you feel that way about it. You don't have to shout business day and night to believe in it. The important thing is your training for it; how *you feel* about it.

For RCA, we want you to feel proud. You already do. Feel prouder when you go abroad.

Our reputation abroad is excellent. It has been won by character: That of our products; our conduct; our dealings with our customers and our friends. Ours is not the *legend* of leadership, but the *actuality*. We have a reputation all over the world for leadership. It is the fruit of wise management. It signifies quality. RCA is dedicated to the principle: Service with integrity. We have built upon firm foundations—our research and manufacturing experience in the U.S.A. We have chosen distributors of immense prestige and great stability. They enjoy the highest respect of their communities. The same is true of our own RCA associate companies.

We have organized manufacturing, distribution and service overseas with one thing in mind: *Our good name*. That sums up our service, whether it is to the home with a radio or TV receiver; records or Victrola* phonograph; or to the television station with a complete system; or to the government with the vision to plan ahead with microwave communications systems, or to take 16mm projectors into its villages to teach its people how to grow more from the land.

Our radio or TV set, the Victrola* phonograph, the record, the TV station, the microwave communications system, the 16mm projector has not been made or shipped or sold on a *price* basis only. It is fairly priced. It may cost a little more originally than its competitors. In the long run, we believe, it will cost much less. It incorporates engineering and research on which you could not put a price. It is extremely well made. It is one of the best values in the field. It will perform under the toughest of conditions. It will give years of perfect service. It will make its owner proud—of RCA.

So what shall you take with you when you go abroad for RCA?

You will have been advised about exchange, clothes, food, hotels, housing, education for children and the many other aspects of working outside of the U.S.A.

We are concerned here with your *attitude*: what

*Victrola is a registered trade mark of the Radio Corporation of America.



Pack understanding qualities. They're good everywhere.

you take in your mind and heart. If you could pack only two things, take with you tolerance and friendliness. Leave behind all intolerance and suspicion.

You have read of mistakes made by our fellow countrymen. We are never judged by the *best* of us, but by the *worst* of us. Let's see what Mark Twain wrote in "Innocents Abroad" in 1875.

"We were troubled a little at dinner today by the conduct of an American, who talked very loudly and coarsely, and laughed boisterously where all others were so quiet and well behaved. He ordered wine with a royal flourish, and said: 'I never dine without wine, sir' (which was a pitiful falsehood), and looked around upon the company to bask in the admiration he expected to find in their faces. All these airs in a land where they would as soon expect to leave the soup out of the bill of fare as the wine!—in a land where wine is nearly as common among all ranks as water! This fellow said: 'I am a free-born sovereign, sir, an American, sir, and I want everybody to know it!' He did not mention that he was a lineal descendant of Balaam's ass; but everybody knew that without his telling it."

We Learn From Canucks

But we are not alone. Here is an excerpt from an editorial from *MacLean's*, the widely read Canadian magazine. The editorial by Lionel Shapiro is called: "When the Canucks Hit Europe Again."

... "Every French person of my acquaintance, without exception, has his or her 'American story' to relate . . . mostly of an inexplicably arrogant attitude—and it is related with all the more bitterness because Parisians have lived with the problem since 1944.

"At the moment this is an American problem because American troops are the only ones to be seen in Paris in any numbers. But it will soon become a Canadian problem, too. Before the end of the year Canada will have almost fifteen thousand uniformed men

in Europe and there is no reason to believe they will prove any more immune than their American comrades to the traditional behavior forms of the soldier away from home.

"In 1944 and 1945 the Canadians were equally unpopular in Brussels and, after the fighting, in Amsterdam. Many of them were rowdy, thoughtless, overbearing and in some cases, criminally cruel. Many of them behaved as they would never *dare* or *dream* of behaving at home.

"At that period there was some excuse for battle-weary men. Today there are no such excuses. And today the consequences of bad feelings between the North American serviceman and the European civilian can be far greater than they were in 1945. The solidarity of the Western world, which is essential to its survival, cannot be guaranteed by treaties alone. Its real guarantee—and that guarantee does not as yet exist—is the understanding of continent for continent, the *tolerance* of nation for nation, the *respect* of man for man.

"In combating rowdyism the first task for the Canadians, *while they are training in Canada*, is to weed out the potential trouble-makers and to leave them at home. This is not an insuperable requirement. Within a few weeks of the beginning of training every company commander knows the two or three chronic trouble-makers in his outfit.

"The problem of arrogance is not so easily tackled. In the soldier it usually stems from ignorance of the country where he is stationed and from a mistaken conception of the mission in which he is engaged. On both points, trouble can be avoided if the soldier is properly indoctrinated *before he is dispatched overseas*.

Welcome Guest—Not Necessary Evil

"It is the rare and exceptional soldier who is aware of the truth: That the defense of his country depends on the defense of Western Europe, that if anyone is

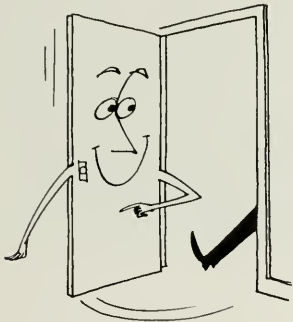


"It can't turn her head to have several servants."

being imposed upon in this common effort it is the Western European who finds himself sitting in the first line of the defense of North America.

"This point of indoctrination must be hammered home to the young Canadian destined for European duty. If he understands this thoroughly it will make the difference in his attitude between *arrogance* and an *easy tolerance*. It will make him a *welcome guest* in Western Europe and not a *necessary evil*. He will have a better time on his tour of duty; he will learn more; and he will return a better citizen, a *more enlightened man*."

That's straightforward talk. Any soldier in any uniform can profit by it. So can the man in mufti.



"Keep doors open. Be wanted back."

Times have changed; and they keep changing. Social and political upheavals of vast significance have changed whole countries. But good manners *never* change.

Going abroad requires a truly international outlook, today more than ever. No matter what your personal convictions may be on religion or politics, or education, for example, you must cultivate an *understanding* point of view, toward the situations you will encounter. By all means, lead your own spiritual life, according to your conscience. If any missionary work is to be done, let it come from *good example*.

You will have studied the countries you are going to visit, their political history, their racial strains, their culture. Keep up these studies. There are social customs in Asia or Africa that you may not find in Latin America or Europe. Some of these customs you adopt. Others you do not. This does not set you apart. It may indicate your *respect* for a local tradition.

National customs vary but the basic pattern of our



"Flag waving is a bore and a sin."

behavior does not. Here are navigating beacons for any traveler:

Be polite: The first commandment. We, in the U.S.A., often have a casual attitude toward many of the gracious little ways of life. Abroad these ways are part of life; sometimes formalized; always important. Be courteous—and *mean* it.

Be tolerant: Of religion, social and economic custom.

Be informed: On history, politics, racial heritage, literature, cultural achievements.

Be friendly: To all your contact. Don't be a Sir Walter Raleigh—and save your cloak only for *queens*. Be friendly to *people*, not *position*.

Be business-like: That's what you are there for—business.

Be thorough: *Finish* the job.

Be a listener: Keep your ears and eyes open; you'll learn more. Don't talk *too much*. Samson killed a lot of Philistines with a jawbone of an ass. The jawbone of an ass is *still* a lethal weapon. Many friends, many business contracts have been killed by it.

Be healthy: Have a hobby.

Be sensible: Your wife is more important to your success than she thinks. The frustrations and worries of life abroad will weigh more on her than on you. She must be prepared for *devotion* of an extraordinary nature. The subject of family life, of social adjustments abroad, is a book in itself. Your wife did the housework back in the States, as most American women do. In foreign countries, she may have a cook, a laundress, a maid; maybe a nurse; perhaps a chauffeur and a gardner. That's part of the set-up. She must succeed in not letting these *luxuries* (to an American—commonplace to the people of the country) turn her head.

And don't let *anything* turn yours, either.

Be patient: This country you're in was doing things that "old fashioned" way when Daniel Boone was shooting his way West. And maybe it's not such an "old fashioned" way at that!

Be international: Don't "gang up" with your American friends all the time. Make friends within the country, among its people. Don't *clique* up at the "American Colony." In some places the "Colony" is just that—too *insulated*.

Be loyal: And give *credit* when and where it is due.

Be circumspect: Remember a fountain pen can be filled with poison as well as ink. Don't write boomerang letters back to your company, home town, or college paper.

Learn the language: Make the effort. We like to hear our foreign friends speak English. Their language will help you in hundreds of ways. *Your wife should learn it, too.* It will help her to cope with *many* problems.

We have records that teach some languages. The best way to learn to speak a language is by *sound*. Have a friend come in for breakfast regularly—and have him *speak* to you in the language—and then translate it into English. Everyday phrases—news of the day. In the office, have your secretary speak to you all morning in the language of the country. Make the effort. You'll make a big hit.

Be hopeful: Things will get you down, harass your family. Have faith—and work with *optimism* and intelligence.

Be a good American: This is a *constant* navigating beacon! Be a good American. North American, that is. You are, in a sense, representing the U.S.A. as well as RCA. To have a little *bumility* is better than to "invent" everything—like the Russians.

Be polite: That's the last commandment as well as the first. Remember all the kind things *your family* taught you—and do them. The Spanish have this saying: "No quita lo cortés a lo valiente." Courtesy in no way detracts from valor. If you are ever in doubt as to what to do—do the *kind* thing.

Using these navigating beacons you can be, not a robot, but thoroughly an individual, developing your own personality, living a life of satisfaction. This is a pattern of *growth*.

Whether you are to remain in a country for a few weeks or a few years, remember that when you leave, the RCA distributor or the RCA company will benefit from the reputation you have made or will bear the burden of your conduct. You go, but your imprint—your reputation—will stay.

The goodwill that surrounds the name of RCA will manifest itself to you wherever you go. Put an RCA monogram in your buttonhole—and be careful. Your pride may do things to you.

Airline pilots and hostesses will tell you about RCA transmitters or portable radios they operate; a stranger will introduce himself to you as a theatre man—it will develop he has a big chain of cines in his country—RCA equipped. You will meet *wonderful people* in many professions and walks of life who know our recorded music, our radio or TV sets, our broadcasting equipment, our sound film recorders or reproducers, our electron microscopes, TV transmitters, our diversity receivers, our microwave and VHF radio relay systems—spanning their country, speeding their communications.

These are our customers—high on the list of our most *valuable resources*. Theirs will be a pride of ownership, a sense of belonging to a family with *dignity* and *meaning*.

Our company has the great good fortune to serve the *individual*, the *industry*, the *government*. We cross the lives of people and the lifelines of nations. Our products are instruments of culture and attainment; of social and economic distinction. As new nations emerge and old nations face new problems, we are helping them on *all fronts*—economic, cultural, ideological—with our products and services.

We have a fine name, certainly. And people everywhere expect the finest of us—of our *products* and our *men*. Doors will open to you because you represent RCA. Remember that when great courtesies are bestowed on you, as they will be. You represent a symbol of success. *You can make it greater.*

We cannot sit back and let our name alone carry us. We must go to all nations, study their needs, learn how to utilize their many great talents, find the best way to be of service.

The better you represent RCA, the more *honor* you bestow on it and on *yourself*.





Rear view and mirrored front view of RCA Personal radio receiver showing newly developed long-life "A" and "B" batteries in position. In foreground is a "B" battery with case opened to show stacks of alkaline cells.

cient utilization of the cell's active materials. Accordingly, it is possible to reduce the size of both cell and battery.

The "crown type" cell employed in the new battery is a compact, self-contained unit which delivers more useful energy per unit of volume than do conventional types of cells. The cell resembles two shallow soda bottle caps placed near together, and measures only 0.9 inch in diameter and 0.23 inch high.

Sandwiched between the two "bottle caps," within a protective plastic ring, are the positive electrode can, the positive and negative electrodes, and the electrolyte pad. One cap serves as the positive terminal; the other, the negative.

To take full advantage of the new alkaline battery's longer playing life, the conventional 1½-volt "A" battery was redesigned to make possible balanced-life operation with the new "B" battery in a "personal" portable. RCA's new "A" battery is approximately twice the length of the popular "sealed-in-steel" type, but has a life capacity nearly four times greater. In a

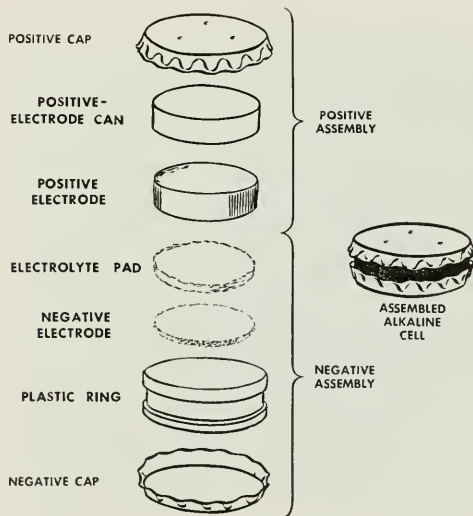
(Continued on page 30)

Long-Life Batteries Give Greater Playing Capacity to Personal Radio Sets

MORE than a million dollars and three years of engineering research preceded the development of the revolutionary new alkaline "B" radio battery now being marketed by the Tube Department of RCA Victor Division. The new battery is nearly 25 per cent smaller than present comparable types, yet offers double "personal radio" playing capacity for the modern radio set designed around it.

The 67½-volt "B" battery, specifically designed for use in personal portable radios, is the first radio dry battery to utilize the alkaline-cell principle which heretofore had been applied successfully only to wet-type, non-portable batteries.

The alkaline principle makes possible a more effi-



Sketches showing elements of RCA's long-life alkaline cells which provide double playing capacity for radio receivers designed around them.



Robert E. Sherwood



Thomas W. Phipps

NBC Signs Two Noted Playwrights To Lift Quality of TV Programs

Robert E. Sherwood, Pulitzer Prize Winner, and Thomas W. Phipps, Film and Magazine Writer, Commissioned to Create One-Hour Dramas for Network.

By Charles C. Borry
*Vice President in Charge of Programs
National Broadcasting Co., Inc.*

As radio did a quarter century or more ago and the movies before that, television looked to its sister forms of entertainment to provide it with talent to fill its program schedules.

The stars of radio, movies and stage became the stars of television. Bob Hope came over from movies and radio; Dennis Day brought his talents, developed by radio, to the new medium; Jimmy Durante transformed his energetic sketches of radio, stage and night clubs to the requirements of television.

At the same time, television brought in the relatively new and untried artists and developed them as stars. Thus came Sid Caesar, Burr Tillstrom, Wally Cox and a host of others who found their artistic stature in the new medium. This process continues constantly; artists playing bit parts today are tomorrow's stars.

We have found that this same twofold growth would be applicable in other creative aspects of programming for television. Contracts negotiated recently by the National Broadcasting Company with Robert E. Sherwood,

Pulitzer Prize winner, and Thomas W. Phipps, dramatist, demonstrating how this is so in the vastly important but often underestimated field of writing.

NBC contracted with Mr. Sherwood for him to write nine original one-hour plays over a five-year period. The distinguished playwright and author, winner of three Pulitzer prizes for drama and one for biography was accorded complete freedom and independence in the selection of his subject matter and treatment of his story.

In announcing the successful negotiations for Mr. Sherwood's services on the air, NBC's president expressed his pride in welcoming to the network's creative staff one of America's most successful and honored writers. "It is a significant milestone in the progress of television," he said, "when a man of Mr. Sherwood's stature in the theatre and in contemporary writing brings his talents to us. This is another of NBC's steps for continually elevating the quality of American radio and television. It is my hope this will have a constructive influence in attracting other prominent authors to these fields."

It is our concept at NBC to intrigue as many of the great minds of other mediums of entertainment as

(Continued on page 30)

Maedel Elected Head of RCA Institutes

Election of George F. Maedel as President of RCA Institutes, Inc., was announced on March 2 by Brig. General David Sarnoff, Chairman of the Board of Radio Corporation of America. Mr. Maedel, Vice President and General Superintendent of RCA's technical school since 1948, succeeds Major General George L. Van Deusen, (USA, Ret.), who retired on March 1. General Van Deusen, Commandant of the Eastern Signal Corps Training Center during World War II, served as head of the Institutes since October, 1947.

Mr. Maedel joined RCA Institutes in 1933 as the first instructor of the Mathematics Department. He was transferred to the Radio Frequency Department in 1936 and four years later was appointed Chief Instructor. In 1944, Mr. Maedel became Assistant Superintendent and in 1947 was appointed the Superintendent of the Institutes. During the following year, he was elected Vice President and General Superintendent.

A native of Brooklyn, N. Y., Mr. Maedel attended Columbia University where he received an A.B. degree in 1924 and an E.E. degree in 1926. He is a licensed professional engineer in New York State and is the



George F. Maedel

author of two text books on mathematics which are in use at RCA Institutes.

Since 1950 Mr. Maedel has served two terms as President of the New York State Association of Private Vocational Schools. He was Vice President of the Association from 1945, when it was formed, until his election as President. Prior to joining RCA Institutes, he was associated with the New York Telephone Company as a Traffic Engineer and served as an instructor in mathematics at the evening classes of Pratt Institute in Brooklyn.

New Blast-Proof Microphone

A new highly sensitive and directive microphone that is smaller and less obtrusive than existing designs and for that reason well suited to the needs of television, radio and film studios was described before the recent I. R. E. Convention, in a paper prepared by Dr. Harry F. Olson, John Preston and John C. Bleazey of the David Sarnoff Research Center of Princeton, N. J.

The new device is called a uniaxial microphone because it is most sensitive to sounds arriving along the axis of the instrument, the RCA engineers explained.

In addition to its improved directional characteristics, this microphone, the engineers stated, incorporates a blast-proof vibrating system capable of withstanding sound shocks from guns, pistols and small explosions.



Architect's drawing of new facade to be constructed on the Bloomington, Ill., plant of RCA Victor Division. Production lines will occupy the first floor; offices above.



This bathing suit saleslady was far less effective than her conservatively clad sister, selling the same product.

What is YOUR Taste in TV Commercials?

NBC Launches Project to Study Effectiveness of Program Advertising for Benefit of Sponsors

TO the average American who watches television, the commercials are accepted as part of the program. Those which depict bright little cartoon characters performing household tasks with ease and abandon evoke chuckles of appreciation. The more prosaic types capture attention in direct ratio to their informative nature.

It is these very commercials which have provided the financial backing that has put American TV so far in the forefront of video throughout the world. These sales messages from the advertisers sponsoring TV programs have been proved to be among the most potent methods of selling products to the American public.

As such they occupy the time and attention of vast numbers of highly skilled people in the advertising field. A sizable industry is devoted to the production of commercials alone. There are literally hundreds of people of diverse talents engaged in making the finished products that appear on the home TV screen for anywhere from 10 seconds to a full minute. And each of these people is vitally concerned in making sure that the commercial which the public sees will sell the product.

These commercials, professionally done, and inserted into a popular TV show, should ensure the advertiser a large sales return. Yet it has become apparent in the

past several years that such is not always the case. John K. Herbert, vice president in Charge of Networks for the National Broadcasting Company, recently stated:

"Our research into sales effectiveness shows wide difference in what television advertisers are getting for their money. We found, for example, that two advertisers were reaching the same number of people at about the same cost. Yet one advertiser was getting eight times as many extra customers as his competitor.

"We at NBC have been concentrating on building great shows. Obviously, that's the most important job we can do for advertisers. However, it appears that, in many cases, improving the commercial may actually produce tremendous sales returns."

Testing Service Inaugurated

With this in mind, NBC authorized a research project by the Schwerin Research Corporation to determine "How to Increase the Effectiveness of Television Commercials." The results of that survey have been made public, and on the strength of those findings, NBC has announced an unprecedented commercial testing service for all its advertisers.

Mr. Herbert in announcing the results of the study



When 10 scenes followed one another rapidly during a commercial, the effect on the viewer was only one third that of the simplified presentation at the right.

and the plans for the testing service, explained:

"NBC's publication of the report and its new service are both designed to help advertisers win even greater returns from their television campaigns. These unique contributions underline our belief that the network has a continuing responsibility to the users of the medium."

The new NBC Commercial Testing Service is available to all network advertisers on a non-profit, cost basis. NBC is making its studios available at specified times for the rehearsal and shooting of rough commercials. These films, unlike the product seen on the air, need not meet finished production standards. Simple sets, a minimum of props and performers, and limited camera work can serve the purpose. The primary objective is merely to determine the relative superiority of various techniques, so that the commercial which will eventually appear on the air will stand a greater chance of selling more goods.

After these rough commercials are made, they are shown to test audiences by the Schwerin Corporation, to determine how well the sales points get across to the public. This audience reaction method is the same as that used in conducting the initial survey mentioned above.

The conclusions of that study, "How to Increase the

Effectiveness of Television Commercials," were based on audience reactions to approximately 2,000 different TV commercials for several hundred different nationally-advertised products. The purpose was to discover what sales points in each commercial were best remembered and why they were remembered. Immediately after seeing programs in which the commercials had been inserted, viewers were asked to write down the brand name of the product advertised and everything about it they remembered having seen or heard in the commercial. At a later point, they were asked whether they believed certain key claims made in the commercial.

The information thus gained was analyzed and refined into five basic principles—signposts to more effective TV commercials. Stated simply, they are:

1. Correlate the spoken claim with the visual action
2. Demonstrate the product
3. Keep the commercial simple
4. Use the proper "presenter" for the product
5. Keep the setting authentic

The importance of Point One was emphasized in comparing audience reaction to two similar commercials. In commercial "A" the announcer stood beside

(Continued on page 32)

IDEA PRESENTED

**BOTH IN AUDIO & VIDEO
AT SAME TIME**

Responses per 100 viewers

Audio only

5

Both
audio and video

41

SUMMARY

- 1 Correlate audio and video
- 2 Demonstrate
- 3 Keep it simple
- 4 Use right presenter
- 5 Use right setting

NBC Signs Two Playwrights for TV Programs

(Continued from page 26)

possible. We know that a playwright such as Mr. Sherwood who has given so much to the theatre and to the motion pictures can do the same for television. The audience he can reach by this electronic means is so much more vast than any visual system heretofore available to him. It would be a great loss to that audience if a man of his calibre did not lend his talents to their enjoyment and intellectual stimulation. When a man like Mr. Sherwood joins us, we know we have reached an artistic maturity which deserves the talents of the best that can be borrowed from the other, older show-business mediums.

It would be shortsighted, however, if we relied alone on our ability to lure the proven talent of other mediums to television. For a time this might suffice, but in the end artistic atrophy would set in and we would find ourselves flapping helplessly on the muddy bottom of a drying pool. We must grow from within, and grow quickly and vigorously, for the other entertainment forms are dwarfed by the vastness and the hunger for creative ideas that characterize television.

Essentially a Product of Television

An indication of our recognition of this vital truth as it relates to writers is contained in the arrangements worked out with Mr. Phipps. Although he previously had established a considerable reputation with his work for leading magazines and for motion pictures, he is essentially a product of television. He came to it with his plays several years ago when television's audience was small by comparison and the rewards of writers were on a like scale. Soon his original one-hour dramas were being seen regularly on the "Robert Montgomery Presents" and "Television Playhouse" programs and he came to be identified as one of television's most prolific and successful authors. We recognized that stature and asked Mr. Phipps to sign a contract calling for him to write twelve original hour-long dramas for network use within the space of a year. His plays will continue to be seen on the programs which already have shown his work, but now they will have the added significance of being evidence of our intention to give ever greater recognition to writers in television.

It is perhaps unfortunate that writers cannot be developed like television tubes. In the scientific end of our business, the inventors and technicians can work in their laboratories until they are sure they have the fully matured mechanisms for transmitting the action and the words of the television stage. Their frustrations are

known only to themselves until they are at last ready with a new, perfected wonder of science.

Not so with writers. Their work must be exposed to public view and then the verdict is rendered for them by the viewers. A producer can think he has something good, a cast can learn the lines and the movements of the play and deliver them with great spirit, but they can never be sure, never take for granted the public's acceptance and approval of what they are offering. A writer must do his work in the crucible of public gaze.

We are happy, then, to be able to underwrite the efforts of a writer such as Mr. Phipps — and to look for others who have grown up with the medium — in order to assure our own future. For this is the age of television, and in the final analysis television must have its own artistic and scientific technicians, discovered within the medium, given the chance to develop their skills, and encouraged to make this new art form something of which we can be proud.

Long-Life Batteries

(Continued from page 25)

"personal" receiver, two of these batteries will balance the life of the new alkaline "B" battery.

RCA Victor engineers have improved the design of personal portable radios, so that models such as the 2B400, employing the balanced-life combination of one alkaline "B" and two redesigned "A" batteries, will play up to ten times longer without battery change than was heretofore possible with small portable receivers.

The physical shape of the "crown type" cell makes for simplicity and compactness in constructing the multiple-cell stacks around which batteries are built. The stacks are held in place in a paper tube. The metal outside shell is crimped over a hard fiber insulator which, in turn, puts pressure on the cell stacks. A small jumper strip makes the connection between the stacks.

The number of cell stacks that go into a battery depend upon its electrical requirements. In the RCA alkaline "B" battery, two stacks of these exclusive "crown type" cells are combined to provide the correct voltage output.

After manufacture of the individual cells, each cell is placed in storage for a short time to allow it to become stabilized and to expose any potentially weak cells. After storage, each cell is tested, and acceptable ones are assembled into batteries which, in turn, are tested and aged for several days. Following this aging period, the completed batteries are again tested.

Electronics' Next Era

(Continued from page 13)

partment of the Army to provide complete stock control at one of their large bases. Large insurance companies and utilities are making analyses of the cost savings which may be obtained by electronizing some of their clerical operations.

We can expect, however, that the greatest change in our way of life will result from the tool which the electronic computer gives us to extend our mental power.

I will illustrate this first with a rather simple, straight-forward example.

Computer for Weather Prediction

At the Institute for Advanced Study in Princeton, N. J., a computer using several thousand vacuum tubes has been built for the express purpose of giving us improved weather prediction. The physical laws underlying the flow of weather are, we think, reasonably well known. The problem of assembling the data required to accurately compute the weather in advance and making the computations is, however, so stupendous that, using ordinary computer methods, the weather would be long past before the calculations could be made. In addition, we must be able to check the laws we assume hold against the actual performance in order to increase the accuracy of our predictions. This requires many trial computations, each one of which would be terrifically involved.

The electronic weather computer solves both problems for us. (1) It enables us to make the difficult calculations we could not make otherwise, and (2) it permits us to make sufficient checks of performance against hypothesis to enable us to develop the hypothesis which gives the correct results.

As a concluding item, I will try to illustrate more completely what I mean by using another example.

Let us suppose that we want a machine to predict continuously the future price of some farm commodity. Such a machine might be useful to some government agency whose function it would be to stabilize the price of the commodity. We can assume that the price at some future date is completely predictable with sufficient knowledge of the factors which determine price and the laws governing the interactions between them. Among other variables which must be introduced are certainly the supply of the commodity, factors which determine future supply, such as weather, planting, labor market, etc., the present and projected demand, including government operations, and other more subtle factors which

determine price, such as the economic condition and mass psychology of buyers and sellers and the reaction of price changes on them, and last but not least, the eventual effect of the existence of the machine, which is doing the price predicting, on the price of the commodity. I assume that the laws governing the interactions of the factors which are introduced will not be too well known when the machine is put in operation and that some rather wild guesses as to their characteristics will at first have to be made.

However, with any given input the computation will be made in a matter of seconds so that an enormous number of hypotheses can be introduced in a reasonable time, and the several predictions can be compared with the actual price to determine with fair rapidity which hypothesis gives the most accurate result. The electronic computer thus makes possible the same interplay between theory and experiment which has been so successful in determining the laws of natural science. In due course we would expect to develop a number of general mathematical laws which could be built on as the method is extended to more complicated problems in economics. You will note that the example I have chosen is a particularly simple one in that the correct experimental result is expressed by a single number — namely, the actual price at a particular time.

Problems are Similar

The analogy between the economic problem which has just been discussed and the weather-prediction problem is strikingly close. In both cases we must assemble at considerable expense and effort large amounts of data to put into the computation. In both cases the relations between the various data which have been gathered are complicated, and involved mathematical calculations are required in order to solve the problem. In both cases, given sufficiently accurate primary data and knowing the laws which govern the phenomena, the desired result is certainly predictable and it is easy to compare the predicted result against the actual happening. The two problems differ in that the physical laws underlying the phenomena in the weather-prediction problem are reasonably well known while the laws underlying human behavior are still to be ascertained.

If an electronic computer using vacuum tubes can solve the weather-prediction problem, it is not unreasonable to hope that the vastly more erudite machine using the new products of our solid-state research will be able to solve the more complicated problems of the social sciences.

What is YOUR Taste in TV Commercials?

(Continued from page 29)

the product, a household appliance, and spoke of a special feature. Only five out of every 100 viewers remembered that feature. In commercial "B" the same announcer, standing beside the same product, told the same story and pointed to the special feature as he spoke of it. Out of every 100 viewers, 41 of them recalled the feature in this commercial, proof of the impact of having picture and sound tell the same story simultaneously.

The efficacy of product demonstration was proven in reactions to commercials wherein a kitchen cleanser was actually shown in use; in another where a model washed her hair with a shampoo which produced more suds than that used by another model, and in still a third where a side of meat was shown being trimmed away to get down to the choicest portion, which went into a package. In all cases, these demonstrations evoked greater remembrance among viewers than commercials which did not demonstrate.

Simplicity as a virtue in commercials was illustrated in a comparison of two cigarette commercials. The first had all the elements of a major production. Within a period of 60 seconds, it introduced no less than 10 scenes. First an announcer praised the product, then the product was shown, next an athlete gave a testimonial, a second announcer appeared, the product was shown in use, another testimonial was given, etc. This expensive commercial drew only 13 responses from 100 viewers. Simplification to three basic elements—a picture of the product with an unseen announcer's voice, a testimonial by a housewife, and a final closeup of the product—won remembrance from 32 out of 100 viewers.

The use of a proper "presenter" was shown when a pretty girl made the same product speech, fully clothed, in one version and wearing a pin-up type of costume in another. The revelation of her physical charms proved such a distracting element in the latter that only 2 out of 100 viewers remembered the product. In more conservative attire, she won the attention of 13 out of 100 viewers for the product.

The examples cited here are but a few of the thousands which bore out these five basic tenets of constructing an effective television commercial, one that will sell goods. The entire survey, and the new NBC Commercial Testing Service which it fostered are further evidence of the painstaking effort devoted by the network toward giving its customers, the advertisers, fullest value for the money invested in NBC programs.

Sarnoff Honored by I.R.E.

(Continued from page 5)

century will make those of our generation pale into insignificance. Our great hope for continued advance stems from the fact that the sum total of our knowledge of science and nature is but a drop in the ocean of knowledge that spreads to the far distant shores of the future.

"All of you, as engineers, have a right to take special pride in the fact that America, supremely the land of Liberty, is also supremely the land of science. This is no accident, my friends, but a matter of cause and effect. Freedom is the oxygen without which science cannot breathe. At their best, at their most creative, science and engineering are attributes of liberty—noble expressions of man's God-given right to investigate and explore the universe without fear of social or political or religious reprisals.

"Without freedom there can be no genuine research, which is the uninhibited pursuit of truth no matter where it may lead. In the final analysis science is a search for the truth about the natural laws governing the universe. The task of engineering is to translate those findings into products and services to enrich man's life. The role of radio engineers in this dynamic enterprise has been great. It is destined to be even greater."

Teleprompter Aids Orator

(Continued from page 17)

four units to keep the individual within reading range of his script. All machines are electronically synchronized so that each brings into view the same portion of the script at the same time.

The RCA Service Company also has available a Teleprompter concealed within a speaker's rostrum. This unit includes warning lights which flash when the speaker is ten, five, three minutes and one minute from the end of his address. Two clocks mounted on the rostrum indicate the time of day and the minutes of speaking time which have elapsed. With these aids, a speaker is able accurately to judge the speed of his delivery.

The RCA Service Plan for public speakers is highly flexible and can be tailor-made for different requirements. The Teleprompter permits a person to relax and to devote all his attention toward getting the subject across to an audience. It eliminates the tedious chore of memorizing speeches, avoids omitting important points and reduces rehearsal time to a minimum. The Teleprompter can make anyone a better speaker.



Developed by RCA Victor, the new "45 Extended Play" record gives music lovers more music for less money plus a perfect medium for playing shorter classical works and multiple popular selections.

Twice as much music on the same size record

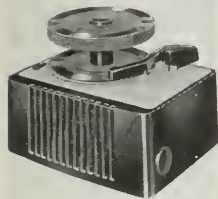
Another RCA achievement in electronics:

A challenging question was asked RCA engineers and scientists in 1951. How can we increase the playing time of a 7-inch "45" record, *without using a larger disc?*

Sixteen months of research gave the answer, "45 EP"—Extended Play. Public response confirmed this as *the most important achievement in the new recording speeds.* More than 2 million RCA Victor "45 EP" records were bought in the first four months of their existence!

Research leadership — your guide to better value: the ability of RCA Victor to solve the problem of more music on a "45 Extended Play" record accents the importance of research *to you.* Whether you plan to buy television, radio or any other electronic instrument, research leadership adds more value to all products and services trademarked RCA or RCA Victor.

Secret of "45 Extended Play" is RCA Victor's discovery of a new way to cut a master disc — with an electrically heated stylus. Grooves are closer. Sound quality is cleaner, clearer, more alive.



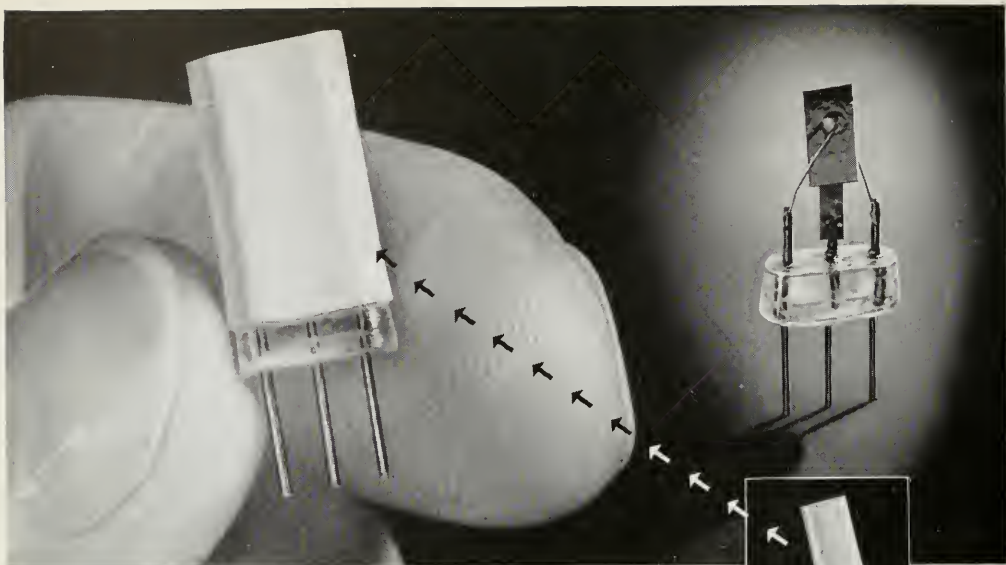
Compact RCA Victor "45" player — first system where record and player were designed for one another. With RCA Victor "45 EP's," it plays up to 16 minutes per record, and the "breaks" come only where the composer planned them.



RADIO CORPORATION OF AMERICA

World leader in radio—first in television





Enlarged photo shows the transistor before and after being encased in its plastic shell. Inset, Transistor actual size.

Transistor

mighty mite of electronics

Increasingly you hear of a new electronic device — *the transistor*. Because of growing interest, RCA—a pioneer in transistor development for practical use in electronics—answers some basic questions:

Q: What is a transistor?

A: The transistor consists of a particle of the metal germanium imbedded in a plastic shell about the size of a kernel of corn. It controls electrons in solids in much the same way that the electron tube handles electrons in a vacuum. But transistors are not interchangeable with tubes in the sense that a tube can be removed from a radio or television set and a transistor substituted. New circuits as well as new components are needed.

Q: What is germanium?

A: Germanium is a metal midway between gold and platinum in cost, but a penny or two will buy the amount needed for one transistor. Germanium is one of the basic elements found in coal and certain ores. When painstakingly prepared, it has unusual electrical characteristics which enable a trans-

istor to detect, amplify and oscillate as does an electron tube.

Q: What are the advantages of transistors in electronic instruments?

A: They have no heated filament, require no warm-up, and use little power. They are rugged, shock-resistant and unaffected by dampness. They have long life. These qualities offer great opportunities for the miniaturization, simplification, and refinement of many types of electronic equipment.

Q: What is the present status of transistors?

A: There are a number of types, most still in development. RCA has demonstrated to 200 electronics firms—plus Armed Forces representatives—how transistors could be used in many different applications.

Q: How widely will the transistor be used in the future?

A: To indicate the range of future ap-

plications, RCA scientists have demonstrated *experimental* transistorized amplifiers, phonographs, radio receivers (AM, FM, and automobile), tiny transmitters, electronic computers and a number of television circuits. Because of its physical characteristics, the transistors qualify for use in lightweight, portable instruments.

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RCA scientists, research men and engineers, aided by increased laboratory facilities, have intensified their work in the field of transistors. The multiplicity of new applications in both military and commercial fields is being studied. Already the transistor gives evidence that it will greatly extend the base of the electronics art into many new fields of science, commerce and industry. Such pioneering assures finer performance from any product or service trademarked RCA and RCA Victor.



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