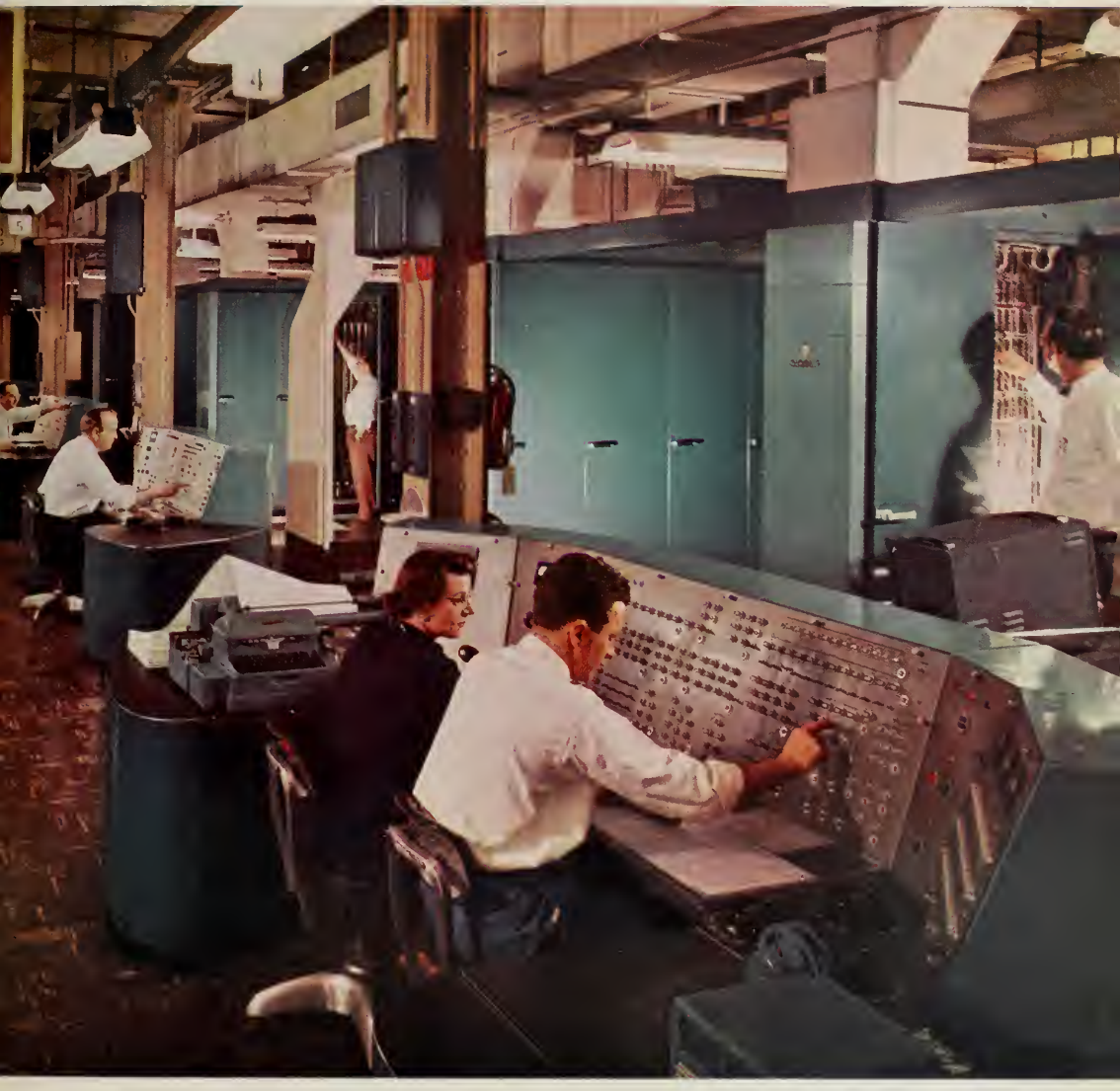
RADIO AGE

RESEARCH • MANUFACTURING • COMMUNICATIONS • BROADCASTING • TELEVISION

APRIL 1957



RCA's BIZMAC 'BRAIN' JOINS THE ARMY

The Radio Corporation of America in 1956 did the largest volume of business in its 37-year history. For the second year in succession sales exceeded one billion dollars.

Sales of products and services amounted to $1,127,774,000 in 1956, compared with $1,055,266,000 in 1955, an increase of 7 per cent.

Net profit before Federal income taxes was $80,074,000, and after taxes, $40,031,000. Earnings per share of Common Stock were $2.65 in 1956, as compared with $3.16 in 1955.

The Corporation's Federal income taxes, social security taxes, property taxes and other state and local taxes totaled $55,633,000 in 1956. In addition, the Corporation paid excise taxes of $32,170,000, making the total 1956 tax bill $87,803,000, an amount equivalent to $6.31 per Common share.

Dividends totaling $23,965,000 were declared by RCA in 1956. This included $3.50 per share on the Preferred Stock. Dividends on the Common Stock were $1.50 per share, the same as in 1955.

Color television continued to advance in 1956 with public interest stimulated by the RCA Victor line of new and simplified 21-inch color sets. Regular color programming on NBC was increased during the year and is being further increased in 1957. More programs should result in more sales of color TV sets and stimulate growth of the industry.

Engaged in the development of electronics as a science, art and industry, RCA is dedicated to pioneering and research, and to production of electronic instruments and systems of quality, dependability and usefulness. To the full extent of its resources and facilities, the Corporation contributes to the national security and expanding economy of the country. As one of the leading industrial organizations in the United States, RCA aims to advance the progress of radio-television, to provide new and improved service to the public, and to strengthen the preeminence of the United States in international communications.

David Sarnoff

Chairman of the Board

RESULTS AT A GLANCE

From RCA 1956 Annual Report

	1956	1955
Products and Services Sold	$1,127,774,000	$1,055,266,000
Per cent increase over previous year	6.9%	12.1%
Profit Before Federal Taxes on Income	80,074,000	100,107,000
Per cent to products and services sold	7.1%	9.5%
Per common share	5.53	6.91
Federal Taxes on Income	40,043,000	52,582,000
Per cent to profit before Federal taxes on income	50.0%	52.5%
Per common share	2.88	3.75
Net Profit	40,031,000	47,525,000
Per cent to products and services sold	3.5%	4.5%
Per common share	2.65	3.16
Preferred Dividends Declared	3,153,000	3,153,000
Per share	3.50	3.50
Camman Dividends Declared	20,812,000	20,901,000
Per share	1.50	1.50
Total Dividends Declared	23,965,000	24,054,000
Reinvested Earnings at Year End	222,087,000	206,020,000
Stackholders' Equity at Year End	273,753,000	257,682,000
Long Term Debt at Year End	249,996,000	250,000,000
Working Capital at Year End	300,839,000	327,175,000
Ratio of current assets to current liabilities	3.0 to 1	3.1 to 1
Additions to Plant and Equipment	57,517,000	31,039,000
Depreciation of Plant and Equipment	22,609,000	19,123,000
Net Plant and Equipment at Year End	189,972,000	157,994,000
Number of Employees at Clase af Year	80,000	78,500

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RADIO CORPORATION OF AMERICA

ELECTRONICS FOR LIVING

VOLUME 16 NUMBER 2

Radio Age

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COVER

An over-all view of RCA's Bizmac electronic "brain" unveiled recently at the Detroit headquarters of the Ordnance Tank-Automotive Command. (See page 16.)

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NOTICE

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

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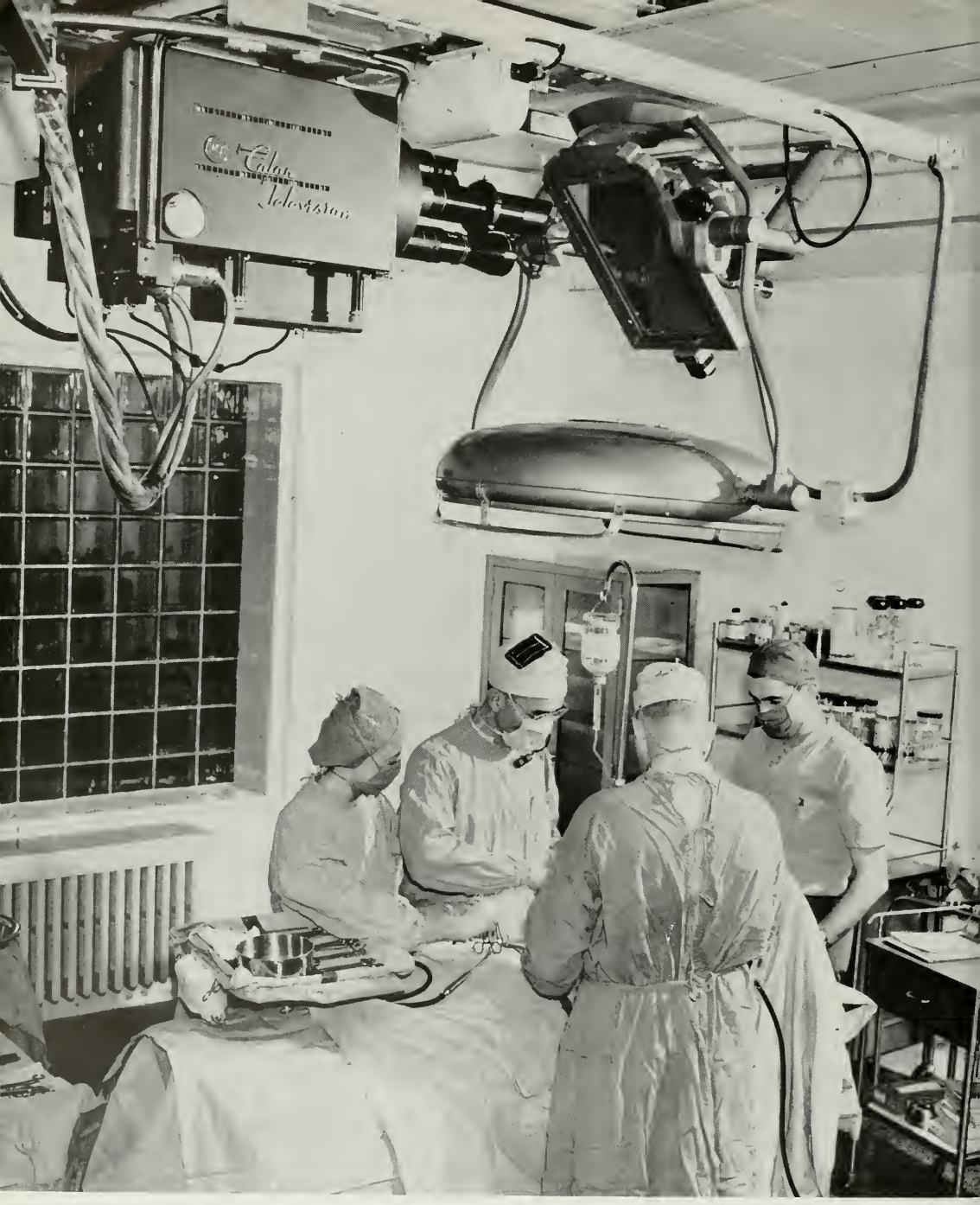


Newly installed RCA Victor color television system at Walter Reed Army Hospital in Washington, D.C.

'Radio Pill' Developed for Medical Research

Tiny Plastic Capsule Sends Out FM Signals as it Passes Through the Body; Believed to Hold Promise of New Data on Gastro-intestinal Ills

A "RADIO PILL" that sends out FM signals to medical researchers as it passes through the human body was demonstrated for the first time recently at the Rockefeller Institute. Designed for research in the intestinal tract, the new pill is a plastic capsule one and one-eighth inches long and four-tenths of an inch in diameter. It is the world's smallest FM radio broadcast station.

The "radio pill" has been developed and tested jointly by the Rockefeller Institute, the New York Veterans Administration Hospital, and the Radio Corporation of America. It was designed by Dr. V. K. Zworykin, Honorary Vice President of RCA and Affiliate in Biophysics in the Medical Electronics Center of the Rockefeller Institute, and his associates, as it had been envisaged by Dr. John T. Farrar, Chief of the Gastro-enterology Section of the New York Veterans Administration Hospital and Assistant Professor of Clinical Medicine at the Cornell University College of Medicine. The "pill" was developed by engineers of RCA's Commercial Electronics Products unit in Camden, N. J.

Seen Useful in Medical Research

"The 'radio pill' seems to offer many possibilities as an important new tool in medical research," said Dr. Farrar. "It can be swallowed like any other medicinal capsule without discomfort, and will permit measurements on internal organs with minimum psychological and physical disturbance to normal bodily functions. It is hoped that the pill will prove valuable in studying human digestion and absorption in normal and pathological states. The new information which may be obtained on the physiology of muscular contractions is expected to be important in understanding gastro-intestinal disorders.

"The knowledge which is gained about the muscular activity of the right side of the colon, heretofore almost inaccessible to study, may prove useful in understanding the pathological physiology of such ailments as spastic colitis, ulcerative colitis and other organic and functional disease states. Besides measuring pressure changes in the digestive organs of the body, the 'radio pill' is being modified so it may generate and transmit impulses relating to temperature within the gastro-intestinal tract."

In addition to Drs. Farrar and Zworykin, other officials at the demonstration were Dr. Detlev W. Bronk, President of the Rockefeller Institute; Dr. John B. Barnwell, Assistant Chief Medical Director for Research and Education of the Veterans Administration; and Dr. George H. Brown, Chief Engineer of RCA's Commercial Electronic Products unit.

Electronic Components of the Pill

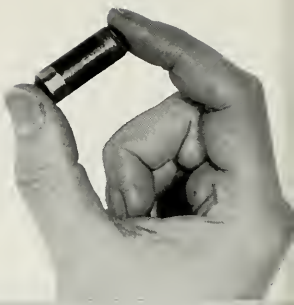
Dr. Zworykin, who pioneered in the development of the television tube and also did fundamental work in perfecting the electron microscope, said the new "radio pill" has several electronic components. It consists of a tiny transistor, an oscillator, a ferrite cup inductance core and other circuit elements, and a minute, replaceable storage battery which powers the oscillator and has a life of fifteen hours. This battery is similar to the one used in the famous proximity fuse for anti-aircraft shells during World War II.

Heart of the capsule is the oscillator which is so sensitive that its frequency varies with changes in the pressure to which the pill is exposed. Information about these pressure changes is transmitted continuously in the form of FM radio signals that carry for a distance of several feet. These signals can be picked up on an outside FM radio receiver when an antenna is held close to the body. They can be recorded on one or more of three instruments: a meter, a recording galvanometer which makes a permanent record of wavy lines on paper much like an electrocardiograph, and a cathode-ray oscillograph similar in principle to the picture tube of a home television set.

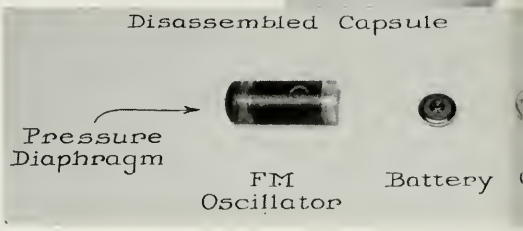
When the pill is swallowed by the patient, its course through the gastro-intestinal tract can be traced by fluoroscopy or other means. Since it has magnetic properties, it can be manipulated by magnetic forces outside the body. The capsule can be recovered and re-used in later experiments.

Studies involving use of the "radio pill" are carried out in the New York Veterans Hospital, for the time being at least, with the patient under continuous observation. In its present stage, the pill is an experimental technique. Its commercial possibilities will be evaluated following extensive laboratory tests and experiments.

Working with Drs. Zworykin and Farrar are Carl Berkley, Visiting Investigator at the Rockefeller Institute from RCA, and Fred L. Hatke, Rockefeller Institute electronics engineer. Both are members of the Medical Electronics Center at the Institute. Developments at RCA in Camden, New Jersey, have been under the direction of H. E. Haynes and A. L. Witchey. Preliminary testing has been conducted during the past year.



This photo shows the actual size of the "radio pill" which has been developed for research in the intestinal tract.



Electron Microscope — Researchers' Super-eye

Dr. Zworykin has long been active in the field of medical electronics. The electron microscope, on which he was a pioneer, has been acclaimed as one of the most important research tools of the Twentieth Century. At the flick of a switch and the turn of a dial, it reveals disease cells never before visible to man, and permits the study of intricate cell structures. With the electron microscope, medical researchers can view specimens smaller than one ten-millionth of an inch. The instrument provides direct magnifications up to 50,000 times. Photographs of the specimens, taken by an automatic camera within the microscope, are so sharply detailed that they can be enlarged to more than 300,000 times the size of the specimen. At this rate, a dime would be magnified to a diameter of more than three miles.

Because of its ability to make the tiny polio virus visible, the electron microscope played an important role in development of the Salk vaccine. It also made possible the photographing of influenza virus for the first time. Today it is helping researchers probe the destructive mysteries of cancer, multiple sclerosis and the common cold, among other diseases. It is used by such world-famous research centers as the Rockefeller Institute in New York, the Karolinska Institute in Stockholm, and the Venezuelan Institute for Neurology and Brain Research, as well as by numerous hospitals, medical schools, and laboratories.

At the Squibb Institute for Medical Research in New Brunswick, New Jersey, the electron microscope has stepped up the production of vital antibiotics as much as a week—by eliminating ineffective cultures before they are developed. Various species of the antibiotic-producing actinomyces are used to produce streptomycin, a Squibb product, as well as neomycin, chlormycetin, aureomycin, terramycin and other wonder drugs. During manufacture, each of these species is subject to attack by infectious actinophages, capable of destroying a complete strain of antibiotics. These actinophages are too small to be seen by a light microscope, and it would take several days of culture tests to detect their presence and introduce a new strain. But with the electron microscope, it is possible to detect them early and prevent lost time in production.

Dr. Zworykin said that in the years ahead, electronics may play an even more significant role in medicine than it does today.

Future of Medical Electronics

"It is quite clear," said Dr. Zworykin, "that the demand for high quality medical care will become more and more universal as time progresses. In this medical care, the preventive aspect should, and without doubt will, play a predominant role. In other words, before long our entire population may well expect detailed medical check-ups at frequent intervals. With the development of new diagnostic techniques, the number of tests included in any one check-up is likely to expand. Before long their interpretation, and eventually their performance, may well impose an impossible load on the time and the store of knowledge of the practitioner.

"There are other drawbacks in the techniques employed at the present time for physical examinations. The various tests are separated in time, rendering correlation difficult. The information provided by them might be considerably more meaningful if a whole series of measurements, such as electrocardiogram, temperature, blood pressure, and so on could be recorded simultaneously by a single piece of electronic equipment operated by a technician. In large part, the recorded data might be in the form of deviations from a prescribed norm for the age, height and weight of the patient, which could be set on the testing apparatus.

"Thus the trained physician would be provided simply with a record presenting physiological data in

the form most significant for the health of the patient. This data could be placed on punched cards to provide a permanent record for the patient. At each successive examination, the data from the punched card for the preceding examination would be compared with the newly obtained data, immediately indicating to the examining physician the changes which had taken place in the physical condition of the patient.

Diagnosis — by Electronics

"Looking further into the future, we can imagine the testing apparatus feeding the information derived from the tests and converted into numerical quantities into an electronic computer. The computer would have stored in its memory the best medical knowledge of the day. It would apply this stored information to the correlated data obtained from the patient, to arrive at a verdict regarding the physical condition of the patient and, eventually, indicating steps for the correction of malfunctions. While such a complete diagnostic device admittedly appears rather remote, it appears less fantastic to imagine an electronic system which would merely indicate whether the patient is or is not in need of further medical attention. Such more modest equipment might prove extremely useful in reducing the case load of the physician.

"This is just one way in which electronics may be expected to contribute to medical practice. Apart from it, an extrapolation of past developments makes certain a continuous refinement and extension of electronic aids for research, diagnosis and therapy. In summary, electronics may be expected to play an increasing role in supplying the physician and biologist with the tools required for an advance in his field."

Dr. John T. Farrar (right) holds antenna against Dr. V. K. Zworykin to demonstrate how FM radio waves are picked up from "radio pill" as the capsule passes through the body.

RCA Plays Key Role In Project Vanguard

SOMETIME after July 1, a powerful rocket will stand poised for flight on the concrete launching pad at the Air Force Missile Test Center in Florida. This needle-like projectile will actually be three rockets in one. Mounted in the nose will be a shiny magnesium sphere twenty inches in diameter and crammed with electronic equipment. Extending from the sphere's surface will be four collapsible antennas and a coupling device that will release it from the last of the three rockets needed to blast it into space as the earth's first artificial satellite.

In the Test Center's Operations Room, technicians and engineers of the RCA Service Company will be making their final check-ups to be sure everything is set for the firing. The RCA Service Company, which has responsibility for important technical aspects of operations at the Missile Test Center, is playing a key role in Project Vanguard, the vehicle by which the United States will attempt to launch several earth satellites between July, 1957 and December, 1958. This period has been designated as the International Geophysical Year, a worldwide effort devoted to exploration and study of the planet Earth.

T-time minus five hours — five hours before the scheduled firing — will find tension growing among the RCA men peering intently at the battery of scopes, sky screens and consoles in the Operations Room. One controller will be in touch with aircraft monitoring the electronic spectrum over the range to make sure there is no interference by radio signals from ships or islands. Another will be directing the aircraft and patrol boats whose job is to warn ships and planes away from the danger area. Others will be checking the telemetering channels through which the satellite launching vehicle will radio back to the ground information on its speed, altitude, temperature and other factors.

Finally, the "countdown" on the loudspeaker will reach its climax: "T minus ten seconds . . . nine . . . eight . . . seven . . . six . . . five . . . four . . . three . . . two . . . one . . . zero!"

From the launching pad the huge rocket will begin its rise, slowly at first but quickly picking up speed. The bright pink glow of its exhaust will light up the ground like a giant Roman candle. The first-stage rocket will push the craft up to an altitude of about thirty-six miles before it burns the last of its fuel and falls away into the ocean. Then the second-stage rocket will take over and the craft will continue to rise through the thinning air to a height of about 300 miles, and a speed of 11,000 miles per hour.

Then will come a tense moment for the men in the Operations Room. It is vital that the timing be exactly right on the firing of the third-stage rocket — the one that will kick the satellite into its orbit around the earth. If this rocket is fired too soon, the satellite's orbit will not be correct; it may dip too far into the atmosphere and lose its energy too rapidly because of the drag. For example, at an altitude of 300 miles, the satellite should keep going for one year. At 200 miles, its life would be only fifteen days. At 100 miles, atmospheric friction would destroy it in about an hour.

A tracking radar operated by RCA personnel at Grand Bahama Island, 150 miles from the launching site, will follow the big rocket and feed its information into an electronic computer that will determine the precise moment for firing the third-stage rocket. These data will be presented instantly on an electronic console to a Naval Research Laboratory controller at the launching site. If the automatic mechanism aboard the rocket fails to work, instruments on this console will tell the controller when to push a button that will trigger the third-stage rocket. With the pushing of the button, an RCA-operated Command Transmitter will send a signal to the rocket that will do the job.

Once launched, the big rocket will be tracked in a manner similar to that used by RCA personnel at the Air Force Missile Test Center in following guided missiles. There are tracking stations all over the Caribbean area, including three island outposts manned by RCA personnel for the Air Force on behalf of the Naval Research Laboratory.

In the spring of 1956, the Glenn L. Martin Company, prime contractor to the Naval Research Laboratory for the three-stage launching vehicle to be used in Project Vanguard, presented a list of the kinds of information needed during the launching from the range instrumentation at the Air Force Missile Test Center. The Laboratory included this list in the list of test requirements which were presented to the Air Force. RCA engineers went over the list, figured out what kind of electronic equipment and what kind of cameras would be needed to produce these test data, and prepared a support plan to be approved by the Air Force.

Radars had to be acquired that could track the big rocket at long-range and high altitudes. The tracking of the satellite launching vehicle requires greater precision than the tracking of most large rockets. Where a measurement error of, say, 500 feet may be negligible on a missile test, it is important to the scientist attempt-

ing to achieve the critical conditions of a satellite orbit. An error which might be unimportant on a 1,000- or 2,000-mile rocket test flight may have a very serious effect on a round-the-world satellite flight.

After studying the problems involved and deciding, in general terms, what kind of equipment was needed, RCA planners then went to RCA design engineers and had them draw up specifications for each piece of apparatus. Contracts for this type of equipment were put up for bid through Air Force procurement channels. When the actual work began, RCA inspectors conducted periodic check-ups to see that the production was on schedule and that the gear followed specifications.

Once the launching phase is completed and the satellites are orbiting, what will scientific observers learn from tracking and from tuning in on the radio data that they will send back to the earth?

Scientists feel the satellites will help improve our knowledge of many things; the following are typical:

Improvement In Mapping. Present maps contain errors of several miles in the position of islands, and even of cities in some parts of Asia. The hope is that by taking sights on the satellites, it will be possible to correct such errors and to improve the overall accuracy of geodetic measurements.

Improvement In Weather Forecasting. By supplying information about air-mass movement, formation of fronts, hurricane and typhoon behavior — all of which are difficult to observe clearly from the ground — the satellites should help make weather predictions more accurate. Satellite reports on weather activity all over the world might even make possible global forecasts months in advance, it is felt.

Improvement In Radio-TV Communication. Sunspot activity has always upset radio communication. The feeling is that measurements of solar radiation by the satellites may help explain the problem and may lead to a way of solving it. The satellites also may enhance our knowledge of the ionosphere, the electrified layers of sky which reflect radio waves and make long-distance transmission possible. Fuller knowledge of these layers, it is hoped, may lead eventually to world-wide television.

Right, artist's conception of earth satellite rocket about to take off from its launching platform, built by Loewy-Hydropress Division of Baldwin-Lima-Hamilton Corp. Below, Operations Room at Missile Center in Florida.

RCA's New President

JOHN L. BURNS, who assumed the Presidency of the Radio Corporation of America on March 1, 1957, is no newcomer to RCA. As a senior partner and Vice Chairman of the Executive Committee of the management consultant firm of Booz, Allen and Hamilton, he has been intimately associated with RCA activities for the past ten years. He worked closely with RCA in periodic reviews of the Corporation's objectives, policies, organization planning, business programs and operations.

Mr. Burns succeeded Frank M. Folsom who became Chairman of the Executive Committee of the Board of Directors. Brig. General David Sarnoff continues as Chairman of the Board and chief executive officer.

A native of Watertown, Massachusetts, where he was born November 16, 1908, Mr. Burns was graduated as an electrical engineer from Northeastern University in 1930. He received his Master's and Doctor of Science degrees in metallurgy at Harvard, and taught there and at Lehigh University. While a student and instructor he was employed by the Western Electric Company and Dewey & Almy Chemical Company before joining Republic Steel Corporation in 1934. There he served in various executive capacities such as Director of Metallurgical Laboratories, Director of Quality Control, Director of Process Engineering, Superintendent of Large Ingot Manufacture, Manager of the Grand Crossing Works and Superintendent of the Wire Division. He left in 1941 to join Booz, Allen and Hamilton.

Made Studies for Major Corporations

As a management consultant he and his firm made studies and implemented programs for one-third of the hundred largest corporations in the country, covering 350 of the 500 different lines of business in the United States, as well as practically every department of the executive branch of the Federal Government and a number of foreign governments and public institutions.

The author of many papers on scientific and business subjects, Mr. Burns has served as a director of several important business and industrial corporations. He is married, the father of two children and lives in Greenwich, Conn. He is prominent in public affairs.

Mr. Burns is President of the Greenwich Community Chest and Council, Member of the Board and Executive Committee of the Boys' Club of America, Member of the Board of the Executive Committee of the American Heritage Foundation, Director of the Common Cold Foundation, Inc., corporate member of the Crusade for Freedom, and Member of the Board of Visitors for the Air University, U.S.A.F.

Fabian Bachrach

John L. Burns

Commenting on his election to the Presidency of RCA, Mr. Burns said: "During the past ten years of fine personal association with General Sarnoff and Mr. Folsom and their executive staff, I have acquired great admiration for the RCA team, what it does and what it stands for. As I considered the future, I was deeply impressed with the opportunity for public service offered by this job.

"RCA is an exciting company in an exciting industry. It was built well in the past and has a great base for the future. The company is important to the country's well being and defense, in education, in information and in entertainment, and this importance is increasing. The company provides products or services in all of the leading countries in the world today. The company has been wonderful in pioneering, outstanding in engineering, and a leader in merchandising in both products and servicing. From the Morse code era, it took the first great step into sound transmission through the air, then sight and sound, and now we have the new dimension of color with us. This is a young organization, even though it spans the entire development of the art to date.

"Today the principal problems for us to consider are these three: First, how do we get maximum profit from today's products and services? Second, how do we get the most effective results in putting color across? And third, where do we go from here, in the broad sense? RCA cannot be all things to all people, but it must be in a leadership position in important things in our chosen fields. This means increased growth and effort, but it also points up the great need for selectivity and the timing of our efforts."

What the Networks Are—and Are Not

By Robert W. Sarnoff *President, National Broadcasting Company*

THE NATIONAL television and radio networks have created electronic freeways of the spectrum, their broadcast signals criss-crossing the nation to hundreds of affiliated outlets, building mass audience circulation so that thousands of independent radio and television stations have found the ready-made audience base on which to grow and prosper. This network story is truly an American business romance. Someday, it will be chronicled, as it should, by an American Boswell. Right now, unfortunately, the networks lack the time for even social chit-chat with a Boswell. They are too busy defending themselves, indeed justifying their very existence, despite the recognition of their vital role as the foundation and creative spark of American broadcasting.

There are those who say the networks are monopolists, that they corral too much of the broadcast day for their own use, that they hold too tight a rein on their program schedules. There are others who want coin boxes attached to home television sets. They seek to erect toll booths on broadcasting's electronic freeways, and exact tribute for the programs which advertising now supports. They are the advocates of pay TV, more properly called "pay-or-you-don't-see-TV."

In facing their proposals, we can assume two positions of rebuttal. We can match them with equal stridency; we can smog up the issues, you might say. Or we can repeat, and keep repeating in the most direct possible language, the story of what networking is and does, and how the network system serves the welfare of the American people. This is the approach I have been trying to follow, although with what success I do not know.

In telling the network story, I like to begin by telling what the networks are *not*. First, and above all, they are *not* monopolies. How can a state of monopoly exist when three television networks are locked in a no-quarter, marathon battle for audience favor, when they compete relentlessly for talent, programs, station affiliations, and sponsors? In television, if you swivel your chair twice, a multi-million-dollar account can whiz by you. Network broadcasting is the most fiercely competitive business in America today. It is free enterprise in the most pure and generic meaning of the term.

Second, networks are *not* the playthings of a few exhibitionists who select by whim what the American public must see. A show that fails of public acceptance soon fails of sponsorship. Overnight it can change from a profitable operation into a costly liability. Programming commitments are arrived at only after exhaustive research and the most careful study by serious-minded and experienced executives. The networks are now in their spawning season for next fall's new programs. In this effort, NBC, for one, is risking many millions of dollars. If we fail to sell these new programs, or even if we do and they fail the test of public acceptance, we will be in the same position as the automobile manufacturer who builds his rear fin too high. That can be embarrassing.

Finally, in the area of what a network is not, it is

"Network schedules are studded with [public service] programs, both sponsored and unsponsored. Some examples are 'Wide Wide World,' 'Omnibus,' and the 'NBC Opera Theatre' (shown during 'Magic Flute')."

"We have seen TV alchemy at work in recent weeks. A young college instructor (Charles Van Doren) answers quiz questions and overnight becomes a national hero."

not a public utility. It does not charge the public for a service, it is not protected from competition, and it has none of the characteristics of a public utility. The networks do assume heavy responsibilities for public service, because they recognize that their success depends upon how well they satisfy the many diverse interests of the national public. But this assumption of responsibility does not make them public utilities.

So this is what networks are *not*. What *are* they?

Networks are the only organizations in broadcasting which offer a comprehensive national program service to stations and the public, day in and day out, regardless of whether or not the programs are sponsored.

Their programs are as wide-ranging and different as the public tastes to which they respond. The elements of their service fall into four broad categories, with considerable overlap among them.

First, there are primarily entertainment programs, live and film, color and black-and-white, forming the bulk of the network program schedule. They are not just a series of isolated shows, but a program structure, embracing all standard forms of show business, plus new forms created by television itself. This year the three television networks will present twelve times as many hours of entertainment as the entire output of Hollywood feature pictures. Not all of it will be great entertainment, but some of it will, and even the routine shows will entertain millions of Americans. Some critics say much of it is dull stuff, but the people seem to disagree. The American public devoted 15 per cent more time to watching TV this season than last year. Television commands more of their time than any other leisure activity.

Second, there is the category of network service in news, special events and public information. We maintain a nation-wide and world-wide news organization of hundreds of cameramen, reporters and commentators to cover developments from the scene as they occur. An uprising in Cyprus, the political campaigns, a World Series game, or a Presidential address — the networks are there, and the networks alone make it possible for Los Angeles, New York, and points in between, to see, at one time, events as they happen.

A third area of network service is loosely described as "public service" programming, and definitions of what it is are murky. In the full range of network programming, there are shows of varying cultural and intellectual degree, and people who talk about "public service" shows generally mean those of the highest degree — particularly when unsponsored. But I personally think a broadcast of the Old Vic Theatre's "Romeo and Juliet" is no less a public service function because it is sponsored. Nor, in my opinion, does advertising support make "Meet the Press" or "See It Now" of less public value. Throughout the year, the network schedules are studded with such programs, both sponsored and unsponsored. Some examples are "Wide Wide World," "Omnibus," and the "NBC Opera Theatre."

Direct Assistance to the Government

The fourth category is the least publicized and, for that reason, perhaps, the least appreciated. It embraces the area of direct assistance to the government and to scores of worthy causes that rely on public support. Last year, the three networks gave millions of dollars of air time to support Army recruitment, Civil Defense, "Get Out and Vote," and Hungarian Relief. Appeals for the Heart Fund, for Care, for Cancer Funds, for the Red Cross, dotted the networks. If you bought at going prices the 3,000 announcements NBC Radio and Television donated last year to these causes, you would be out of pocket $9 million — and the other networks did as well. Every station gives staunch support on the local level, but networking is the only means of placing this type of information simultaneously before the nation.

If this seems boastful, there is reason for it. Like the next fellow, the networks enjoy doing good things and then talking about them. More important, if they don't talk about them publicly, even boast a little, there

"Who else [besides the networks] would undertake government service on a national basis, provide great cultural programs like the Sadler's Wells Ballet (above, right), give nation-wide support to worthy causes? * * * The costly 'NBC Opera Theatre' (shown at left in a scene from Prokofiev's 'War and Peace') might not be supportable."

is the possibility they won't be able to continue doing them — because the attacks on the networks are centered on the two things that make possible this well-rounded schedule of national service. They are, first, the networks' responsibility for determining their own program schedules; and, second, the networks' method of clearing broadcast time for these programs over affiliated stations.

Each advertiser, outside producer, or film supplier is interested primarily in his own program, not in an overall program structure. That is why networks must be free to produce and to select programs for their own schedules. If they were prohibited from doing so, they would be unable to program for the varied tastes of 165 million highly selective Americans. The concept of a balanced service would disintegrate and networks, as we know them, would cease to exist.

Our clearance arrangement with stations — known as "option time" — is the very thing which enables simultaneous national broadcast of the network programs. Through it, a network can give advertisers assurance of national circulation for the programs they sponsor. Through it, our affiliated stations can rely on a regular schedule of network programs to increase their total audience.

Yet these two keystones of the network operation are the two under heaviest attack by interests who regard them as obstacles to their own ambitions. Their proposals, if adopted, would not only disrupt the network service, but would deprive networks of the resources which support non-revenue-producing services, and which permit them to plunge into uncharted program areas, to innovate and improvise, and keep the medium fresh. Who else would undertake government service on a national basis, provide great cultural programs like the Sadler's Wells Ballet, give nation-wide support to worthy causes?

Those organizations which attack the network structure do not propose to substitute a balanced service of their own, including news and information, special events, cultural programs or special government and charitable presentations. They are interested only in the profits from one category of service — the entertainment programs. To the degree they succeed in impairing the network structure — to that same degree, a great deal of unique public value will disappear from television.

Public Interest the Basic Issue

It is a natural tendency in the face of something new and powerful, I believe, to seek ways to harness it, to make sure that its power does not in the classic sense corrupt or harm. There is great government interest in network television today. During the past year studies have been conducted by three different Congressional Committees, by the Federal Communications Commission, and by the Department of Justice. The networks have been investigated from Dan to Beersheba, and still the investigations and studies continue. It is my earnest hope that they will not be sidetracked by the claims of self-interested groups, but that they will test these claims by the one basic issue: Will the public interest be advanced if network service is curtailed or crippled? The question must be weighed in terms of today's service compared with the program service that would be left if the network structure were dismantled. I am confident of the verdict when all the facts are in.

The foregoing are excerpts from an address by Mr. Sarnoff to the Los Angeles Rotary Club on March 22.

MINIATURIZATION—
The Big Trend Toward Smallness

By Kenyon Kilban

JUDGING by the progress of the past few years, electronic science appears bent on making the world a handier place for little people. The radio has been compressed to breast-pocket dimensions. A moderately healthy Cub Scout might carry the latest portable television station on a ten-mile hike without undue fatigue. The modern hearing aid could be wrapped in a special delivery stamp for mailing. An overnight bag would hold the equipment that enables an air-to-air missile to detect and destroy its hostile target.

The word for this trend in electronic equipment is miniaturization — but it signifies considerably more than simply making things smaller. With the reduction in size of many components and devices have come new dimensions of ruggedness, versatility and operating efficiency. The one-pound transistorized radio of today, for example, is superior in performance to the fifty-seven-pound "portable" first introduced by RCA in 1925, and is far cheaper to buy and to operate.

Even more important, however, is the fact that the ability to pack a variety of electronic functions into tiny components has led not only to phenomenal improvement in familiar devices, but to the creation of electronic equipment to do jobs that formerly were out of the question for either technical or economic reasons. There is no precedent for electronic cooling, electronic light, solar batteries, or the recording of television images on magnetic tape.

Vital to the Armed Forces

The trend has gone a lot farther than the average consumer would guess on the basis of the small radios and smaller hearing aids he sees.

The possibility of electronic equipment that performs sophisticated functions but can be toted around by one man or stuffed into the nose of a rocket has been of vital concern to the military forces. Rear Admiral Rawson Bennett, Chief of Naval Research, says that "without miniaturization much of the electronics equipment now in ships and planes and many of the Navy's newest weapons would be impossible." Industrial users of electronic communication and control equipment, too, have been vitally interested in new developments that mean less bulk, greater versatility and ruggedness, and low power consumption. Thus, among recent RCA developments in the line of miniature equipment, we find important advances in fields seldom encountered by the consumer:

• A military Image Orthicon television camera, with transistor circuitry, weighing only thirty-one pounds and using only fifty watts of power, as against 600 pounds and 2,000 watts for previous standard types.

• A fifteen-ounce transistorized interphone system for Air Force ground crewmen, permitting them to communicate with personnel inside a plane being serviced or checked for takeoff. The system enables ground personnel to carry equipment normally installed in the plane itself.

Fifty-seven-pound portable radio, in foreground, introduced by RCA in 1925, compared with present model.

RCA's lightweight Weather Radar, weighing scarcely fifty pounds, fits snugly into nose of a plane and enables pilots to "see" and avoid menacing storm formations.

• An all-transistor voice-multiplexing system for military microwave radio communications that will be 90 per cent smaller and lighter than comparable conventional equipment and will consume 95 per cent less power. Scarcely larger than a 14-inch portable television receiver, it will weigh only about 85 pounds compared with 1100 pounds for conventional multiplexing systems.

• An ultra-miniature FM radio receiver that can be carried in a shirt pocket, yet is designed to provide extensions of several miles for radio systems now operating on the 150-megacycle band.

• A miniature magnetic memory unit for electronic computers, capable of storing 1,000,000 bits of information in a space little larger than a shoebox, and of relinquishing any or all of the items in a few millionths of a second.

• A complete television station, including four-pound camera and fifteen-pound back-pack transmitter that can be handily carried by one man and transmits television signals up to a mile to a receiving point for rebroadcast.

• A midget power supply unit for television studio equipment, reducing tube and space requirements by more than 70 per cent, permitting the power needs of a color TV camera chain to be handled with two small units instead of a full rack of power supplies.

For the Consumer Market

These highlights typify developments occurring on a wide scale in military, industrial and commercial electronics to meet the continuing demand for compact, rugged and economical equipment. It is logical to expect that further advances in miniaturization will have an increasing effect in the consumer field as well.

In addition to the familiar examples of transistorized radios and subminiature hearing aids, there have been subtle changes inside many of the electronic items in the consumer market as a result of miniaturization in components. Printed circuits, for example, are finding their way increasingly into radios, television sets and phonographs. Printed on a flat board into which components are inserted, these elements not only save considerable space, but they lend themselves easily to high-speed automatic production techniques that help to lower cost and price. Then, too, the pocket-size transistorized radio has achieved Lilliputian proportions with the added help of new miniature loudspeakers made possible by improved magnetic materials and design ingenuity.

Breakthrough in Research

Electronic miniaturization, with all that it implies in new or improved performance and economy, is the direct result of a massive breakthrough in research during the past two decades. The essence of this breakthrough is the discovery that, electronically speaking, we have been doing things the hard way.

The operation of every electronic device calls for a supply of electrons whose actions can be controlled in various ways to perform such tasks as amplifying an electrical signal, oscillating to produce radio waves, or sensing and reacting to heat, light or pressure. The electronics industry, until recently, performed its wonders chiefly with supplies of free electrons laboriously "boiled" out of a heated filament in the vacuum tube.

In this process, electric current is supplied in substantial amounts to heat a cathode to the point where its atoms vibrate with enough violence to knock loose a useful quantity of electrons at a useful rate. These emancipated electrons move through the vacuum to an anode, or collector. During their passage, they may be influenced by the charge on a metal grid interposed between the emitter and the collector. A small effect,

This transistorized, ten-ounce pocket-size FM radio receiver is forerunner of a complete line of RCA personalized communication receivers and transmitters.

such as a little charge, applied to the electron stream at the grid, for example, will be amplified into a far greater effect when the electrons arrive at the collector. From the collector, they are directed through a variety of circuits to the particular job at hand.

This way of handling matters seemed eminently satisfactory until research workers, impelled by a desire for greater compactness and efficiency in electron devices, began exploring possible ways to employ electrons without all the work of expelling them from the cathode into a vacuum.

Guides from the Past

For the electronic scientists, there were some guides from the past — notably the use in early radio equipment of certain natural crystals, such as galena, which detected radio signals. The phenomenon was not, however, thoroughly understood at the time. The intensified studies led to greater understanding, and finally to a picture something like this:

The atoms of a crystal are arranged neatly in rows, like trees in an orchard, facilitating the movement of electrons through the material. In certain types of crystals possessing the right environment, it is possible to cause a movement of electrons from one extremity to the other by the application of a small amount of electrical or radiant energy. This occurrence within the material is comparable to the movement of electrons from the cathode to the anode in the electron tube. Furthermore, as in the transistor, it is possible with the application of a weak voltage across an area between the two extremities within the crystal to achieve effects like those produced by the grid in a vacuum tube.

These discoveries and their application represent a long step toward miniaturization on a grand scale. Compressing within a small crystal the basic functions previously handled by electron tubes represents a reduction of perhaps over 100-fold in space occupied. But, equally important, the amount of power required to perform these functions within a solid is many times less than the total needed to heat a cathode to the "boiling" point in an electron tube.

In the tiny solid device, the transistor, a small crystal serves as the environment for the precisely controlled movement of electrons to perform a number of oscillating, amplifying and detecting tasks previously handled only by electron tubes. Many of our present examples of electronic miniaturization are based on the use of transistors, whose small appetite for power and simple circuitry permit further reduction in the size of equipment in which they are employed. Another important point is that the transistor does not generate or require undue quantities of heat that must be carried away.

The discovery and application of a method for moving electrons through solid materials is only a part of the story. Electronic science makes use of other types of electron action as well. One is the spinning of the electron on its axis as it revolves around the nucleus of

Soldier-scout (left) sends live video pictures to his Command Post with eight-pound TV camera built by RCA to Army Signal Corps specifications. Engineer (below) examines some ultra-miniature transceivers and receivers for commercial and military use, in comparison with a standard U. S. Army helmet in the background.

RCA's new 110-degree, 21-inch television picture tube (right) is almost six inches shorter than conventional 90-degree tube (left) and permits more compact styling.

the atom, just as the earth rotates on its axis in its revolution around the sun. The other is the tendency of the electron to jump from one orbit around the nucleus to another orbit removed farther from the nucleus as the result of some external influence such as a collision with a particle entering the atom from outside, and to return to its normal orbit as soon as possible.

The first of these motions — electron spin — is responsible for magnetic properties, which are exhibited when the "north" and "south" poles of all of the available electrons in the material are lined up in the same direction. The second — the movement of an electron from one orbit to another — relates to luminescence. When an electron returns to its normal orbit after having been jarred to an orbit farther removed from the nucleus, it gives up the extra energy that was required to keep it on the more distant course. This energy is expelled in the form of a photon of light, visible to the eye. It is this phenomenon that occurs in the phosphor materials on the face of a TV tube, when electrons within the phosphor return from the wider orbits into which they have been jarred under the bombardment of electrons from the "gun" at the rear of the tube.

These phenomena of spin and orbit-jumping have involved electronic science even more deeply in miniaturization. In both cases, use is made of electrons that stay with the parent atom. Compared to the process of moving electrons from one point to another within small crystals, practicing tricks within the confines of the individual atom represents a further 10-million-fold reduction in the area of operation.

The study of all of these happenings and the applications of the new knowledge have created — and are still creating — large numbers of electronically active materials with highly useful electronic properties.

Some have an ability to conduct current in controllable amounts. Lying between conductors and insulators in their performance, they are known as semiconductors and are typified by the germanium and silicon employed in transistors. Others, known as photoconductive materials, can convert light or nuclear radiation directly into electrical energy. Another group can be magnetized and can retain, relinquish, or alter this magnetic property on demand. Finally, there are many materials that emit light under electron bombardment, such as the phosphors in the TV picture tube.

In every case with these materials, it has become possible to obtain the desired effect with unprecedented economy. The application of an extremely weak current, a split-second electrical pulse, or the energy contained in a flicker of light is sufficient to influence the behavior of electrons within the particular material in precisely the desired way.

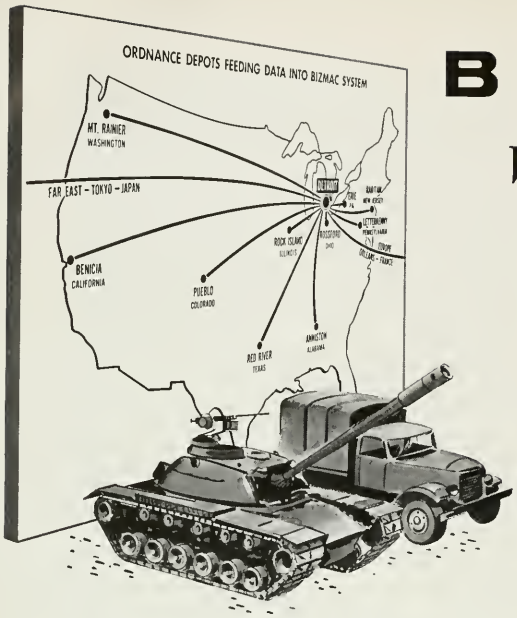
Possibilities for the Future

It would appear from current research and development that the achievements so far in creating smaller electronic packages of greater versatility are only a drop in the bucket compared to the future possibilities. Here again, the story lies largely in developments in new materials. To pick an extreme case, there is the electroluminescent phosphor. Electroluminescent materials emit light when they are influenced directly by electric current. So far, they have been employed experimentally in electronic lighting panels and in RCA's light amplifier panel. For the average consumer, these materials promise more exciting future developments, such as electronic room lighting panels or screens, and a new kind of television set. This is the mural television receiver, hanging on the wall like a picture. Miniaturization in this case will mean the compression of today's picture tube into a thin, flat layer of electroluminescent material, perhaps surrounded by a frame containing the transistorized circuits.

The use of compact, efficient electronic equipment promises increasingly to remove the drudgery of many repetitive tasks with which we cope each day at home and at work, and at the same time to provide us with more versatile systems of communication for business, education and entertainment. To a great extent, these advances are tied in with the increasing compactness and effectiveness of our electronic tools. In this sense, as our electronic equipment becomes smaller, our horizons become broader.

BIZMAC-

World's Largest Electronic "Brain"



1. Information on more than 170,000 separote tank and automotive spare ports is fed into the Bizmac system doily from depots shown on the map.

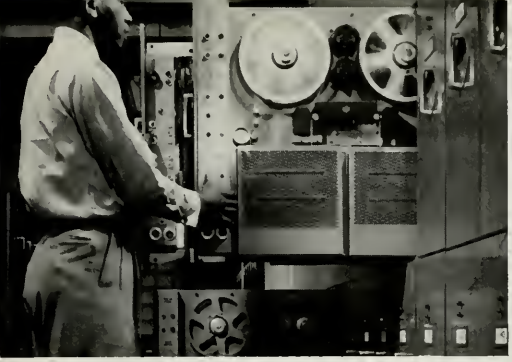
2. The information comes in on punched cards and is transferred to magnetic tape. Each reel, above, holds as much information os ten file shelves.

RCA's Bizmac, the world's largest electronic "brain" was demonstrated publicly for the first time recently by the Army Ordnance Corps which estimated that the new system would save "many millions of dollars." The $4.1 million electronic data processing system is installed at the Army Ordnance Tank-Automotive Command headquarters in Detroit where it has reduced months of paper work to minutes of push-button operation. It keeps track of more than 100,000,000 facts about the Army's vast inventory of tank and automotive spare parts throughout the world — everything from nuts and bolts to entire engines. Bizmac maintains up-to-the-minute information about what supplies are on hand, how fast they are being used, what has to be ordered and in what quantity.

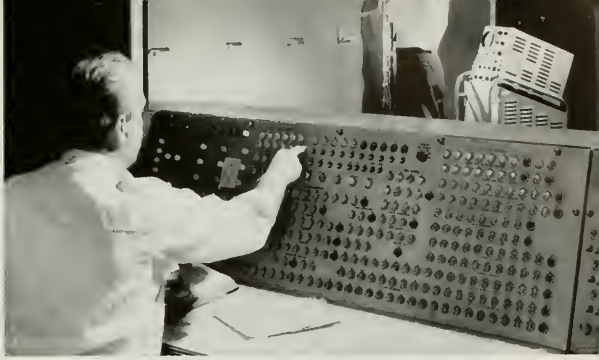
Maj. General Nelson M. Lynde, Jr., Commanding General of OTAC, said: "From what we have seen of the Bizmac system in operation so far, we feel that it can contribute importantly to our job in two ways. First, it can streamline our operations and help the system to be more responsive to the Army's demands. Second, it can save the taxpayers substantial sums of money."

The Bizmac installation in Detroit includes some 220 units of nineteen different but fully integrated types of equipment. It can handle more work than any other data processing system because of its ability to do a number of operations simultaneously and to control and coordinate them from a central point. The system can complete in forty-eight hours an inventory procedure that once took up to three months; process by computer in one hour as much work as 400 girls with hand calculating machines could turn out in the same time; read from magnetic tape at 1,700 words per second — a rate at which it could finish Tolstoy's "War and Peace" in about five minutes.

The Detroit installation is the first Bizmac system to go into full operation, but others are on order. One will be installed early next year in the home office of The Travelers Insurance Company in Hartford, Connecticut. The system will be put to work on life and accident premium notice writing, and will rapidly be adapted to a multitude of other insurance projects.



3. Some 182 Tape Stations, like the one above, serve as basic storage medium. Each station can be connected to other units at the push of a button.



4. The magnetic tape is run through a Sorter, above, which does the electronic equivalent of "paper shuffling"—putting data in the proper sequence.

5. Tape is then processed through the Computer which automatically updates the files and singles out items for the attention of the supply manager.

6. When Computer finds a depot short of an item, it passes information on to Electro-Mechanical Printer which prints re-order form at 600 lines a minute.

7. If ane particular fact is needed quickly, this Interrogation Unit can search system's entire 100 million facts and find answer within three minutes.

8. All af Bizmac's 220 units can be operated by remote control from this room, known as System Central, which is similar to a telephone exchange.

A scene from last year's Annual Meeting of RCA stockholders in a studio of the National Broadcasting Company.

The Men and Women Who Own RCA

On Tuesday, May 7, about 1,000 stockholders will assemble in a studio of NBC in New York City for RCA's 38th Annual Meeting. These people are representative of approximately 170,000 shareholders throughout the United States and in seventy-five foreign countries who own shares in RCA, making it the ninth most widely held company listed on the New York Stock Exchange.

The people who own RCA stock come from all walks of life. There are housewives, merchants, executives, farmers, clergymen, doctors, lawyers, mechanics, salesmen — men and women from virtually all occupations.

The overwhelming percentage of those owning American business are in the middle-income ranges, according to a recent survey made by the New York Stock Exchange. Almost two-thirds of the adult shareowners live in households earning under $7,500 a year. Today's average corporate owner, the survey shows, is 48 years old and lives in a community of 25,000 people.

Among holders of RCA common stock, the ladies are in the majority with 43½ per cent of the total while the men account for 40 per cent. Men however still carry the larger portfolios, holding an average of sixty-two common shares each compared with forty-nine shares for each woman.

The ladies also are the largest group of preferred stockholders, representing 48 per cent of the 900,824 shares. One fourth of the preferred shareholders are men, with the rest divided among joint accounts and other classifications. On the average, women hold thirty-four preferred shares and men own forty.

Colleges and Universities

Approximately 10 per cent of the common stock and 5 per cent of the preferred are held in joint accounts with most of the remainder owned by estates, trusts, foundations, institutions and insurance companies. A number of well-known colleges and universities hold stock in the Corporation. Dividends from the stock are used to help defray their various operating expenses.

Dividends which are paid out of earnings generated by increased productive capacity represent the stockholder's return on his investment. Common stock dividends have been paid since 1937 and totaled $20,812,000 during the past year. This included $1.00 per share of regular quarterly dividends together with a year-end extra dividend of 50 cents, duplicating the dividends declared for 1955. Since the preferred stock was issued in 1936, dividends at the rate of $3.50 per share have been paid regularly each year. These dividends amounted to $3,153,000 in 1956.

RCA shareholders live in metropolitan areas such as New York, Chicago and San Francisco; in towns like Chippewa Falls, Wis., and Middlebury, Vt.; and on the rural free delivery routes of St. Clairsville, Ohio, and New Port Rickey, Fla.

Where They Come From

New York, Pennsylvania and Massachusetts have the largest number of shareholders in the RCA Family. In the Empire State, over 37,000 people own nearly 5½ million common shares. Fifteen thousand residents of the Keystone State have more than one million shares and 12,000 Bay Staters own 800,000 shares. Other states with large concentrations of shareholders are California, New Jersey, Illinois, Ohio and Connecticut. A substantial number of RCA shareowners are also found in Florida, Michigan, Missouri, Virginia and Maryland.

Hawaii leads other territories of the United States with 329 common stockholders. Of the foreign countries, Canada, France and England have the largest number of shareowners.

The average holding among individual common shareholders is 55 shares. The most popular figure is 100. There are over 13,000 "small shareholders" who own one share of common. A good number of the smaller holdings are owned by people who have purchased their stock under the Monthly Investment Plan inaugurated by members of the New York Stock Exchange. RCA has proved to be one of the ten most popular stocks among Monthly Investment Plan participants.

Youngest Investors

In thirteen states and the District of Columbia, the names of infants and teen-agers appear on RCA stock certificates. State laws permit an adult to serve as custodian of stock gifts, while the certificate itself bears the youngster's name. In many instances, a share of RCA stock is the first gift a new-born child receives from his godparents.

Recently a group of twenty-one young investors from Scarsdale, N. Y., decided to buy one share of RCA stock. These enterprising sixth grade pupils of the Fox Meadow Public School had raised a tidy sum by cutting grass, raking leaves and washing cars. The original purpose of their fund-raising project was to finance a trip to Sturbridge, Mass., for a study of Puritan culture. However, after making a three-month analysis of fifteen leading companies listed on the New York Stock Exchange, the boys and girls chose to invest in American industry. Since they were minors, the stock was purchased in the name of their teacher.

When asked why they selected RCA, one youth remarked, "We have studied several industries and decided electronics is going places; RCA is prominent in that field."

Thousands of persons, now retired from business, have invested a portion of their savings in RCA stock. One of RCA's oldest shareholders is a 92-year-old retired dentist in Maine. He has held stock in RCA since its beginning in 1919. Prior to that time, he had been a stockholder of the Marconi Wireless Telegraph Company of America which was acquired by RCA. He realized the tremendous potential of wireless as early as 1903, before the famous "audion" or three-electrode vacuum tube was invented. He frequently writes to the company and vividly recalls the early days of wireless when the skeptics called it "hen wire."

Keeping Stockholders Informed

Like the owners of any company, RCA shareholders take a keen interest in their Corporation and look forward to receiving news about it. The gigantic task of mailing literature and dividend checks is processed by the RCA Stockholders' Records Department, situated only a few blocks from the Stock Exchange in New York City. With each dividend check, the company sends an informative folder describing various activities or products. The Annual Report, which was delivered last month, represents one of the largest mailings of industrial reports handled by the U. S. Post Office Department. These reports, weighing approximately 55,000 pounds, are mailed at a cost of over $5,000.

One thing most RCA shareholders seem to have in common is an excellent appetite. This fact was discovered at the 1956 Annual Meeting when box lunches were served for the first time. The 800 stockholders consumed 2,000 sandwiches, 1,000 portions of ice cream, 50 gallons of coffee and 15 gallons of milk.

Among RCA's youngest shareholders are these sixth-graders from Scarsdale, N. Y., shown with their teacher. They recently bought one share of Corporation's stock.

Story Behind a Spectacular...

"Assignment: Southeast Asia"

By Robert D. Graff

Behind the 90-minute color spectacular "Assignment: Southeast Asia," soon to be seen on NBC-TV, lies a colorful story of an NBC film crew's three-month visit to that strategic area. The story is told by the show's producer and director.

WE FULLY expected an incident or two in the filming of NBC's 90-minute color spectacular, "Assignment: Southeast Asia," and in this we were not disappointed. Once we set up our equipment on the fringes of a riot in Singapore. Suddenly the rioters turned on us and, quite impersonally, smashed our cameras to bits. Again, when one of our sound-camera crews went out into the hills near Djakarta, Indonesia, for a close-up of life in the villages, they were so threatened and harried by guerrillas that they had to finish the job under escort of police armed with submachine guns.

But by and large, whether in the office of a prime minister or in the hut of a farmer sharing a bowl of rice, we were welcomed with surprising warmth and good will. Surprising, that is, because Southeast Asia is a highly combustible mixture of old fears and new hopes. Here are seven nations, many of them just emerging from colonialism, with 200,000,000 people who are, in effect, waking up to the Twentieth Century. These people are determined to make some kind of better life, if not for themselves, at least for their children. They are living through one of the world's great adventures — and in our own time.

If we in the West are to help the Southeast Asians we must first understand them — which in itself is no easy thing. James A. Michener, who acts as narrator and guide in the film, is well aware of this difficulty. In his years of writing on Asia he has found out just how thoroughly Americans are oriented toward Europe.

"It's only logical for us to be more interested in Europe than Asia," he says. "Nine-tenths of us in America probably have our roots in Europe. Our family names are European. The streets in our towns have European names; we have no streets named Hong Kong. But present conditions demand that we take greater interest in Asia than we have in the past."

The very complexity of Southeast Asia forced us to move slowly, learning as we went. We began with six months of research during which we studied all the material we could lay our hands on. This was followed by an exploratory trip to the area by assistant producer Milton Fruchtman and unit manager John Herman, who looked over specific locations for filming and came back to New York to outline an itinerary. By mid-August of last year we were ready to start actual shooting. We set out from New York — Miss Beatrice Cunningham who is an associate producer, Messrs. Fruchtman, Herman and myself — stopping in London long enough to round out a crew that included cameramen W. Suschitzky and Kenneth Reeves, and sound men C. L. Mounteney and Peter Pardo.

By Car, Truck, Oxcart

When we arrived in Southeast Asia, we began the job of tracking down the locations and people that could best convey the feeling of each country. This meant aerial searches; trips by car, truck or oxcart; trudging through rice fields and wet rice paddies. Once, near the Thai-Burmese border we traveled for five lurching miles on the backs of elephants. In all, we covered 100,000 miles and filmed at more than fifty places in Burma, Thailand, Cambodia, Vietnam, Malaya and Indonesia. We concentrated on Thailand as the oldest free nation in the area, and on Indonesia as one on the world's newest nations, and, after the U. S. and the Soviet Union, the richest in raw materials.

To cover this vast area we had to work on a schedule which turned out to be perilously tight. In Indonesia, for instance, we spent several anxious days waiting to film an interview with President Sukarno, who had been delayed in returning from his trip to Moscow and Peiping. We finally filmed the President and then raced to the airport, taking off just before it was closed down by a strike against foreign airlines. Again, traveling from Bangkok to Chieng-Mai, we nearly missed con-

nections when we were stopped by soldiers who made a minute inspection of every piece of baggage and equipment to make sure that we were not carrying arms to the insurgents along the northern borders.

Yet, almost everywhere we went, we were offered help. In Indonesia, the Government film studio, PEN, supplied eight technicians to fill out our crew for the first six weeks of filming. For the second half of the trip, Malayan Film Unit men from Kuala Lumpur replaced the Indonesians and carried on their work. At times, we had two and even three sound-camera crews filming simultaneously, sometimes close by one another, sometimes thousand of miles apart. Working together were not only Americans and Britons, but Indonesians, Malayans, Thais, Cambodians and Vietnamese, all bringing fresh insights to our film.

We shot the film in 35mm Eastman color, using a variety of equipment from hand cameras to studio-size blimped models. A special problem was the hot, humid climate which, if we had not taken special precautions, would quickly have ruined our color film. On the trip from the United States we kept all our film packed in dry ice. Once on the scene we stored it in hotel refrigerators or ice plants or any other cool place we could find, and carried it into the field in specially cooled picnic baskets.

We found our actors on the spot — farmers, fishermen, tradesmen in the villages. They were quick to learn and made fine appearances in the film. There was no camera-shyness about the youthful dancers of Bali — who, by the way, have been compelled under a new law to dress more modestly than in the past. In general, the country people seemed more at ease than many of the statesmen, artists and other city folk sophisticated enough to feel self-conscious their first time before the cameras. In the cities, the problem was to control the curious crowds which sometimes overflowed the scene. The policemen who were assigned to help were often just as curious about us as the crowds.

85,000 Feet of Film

In our three months in Southeast Asia we shot 85,000 feet of color film, which film editor Sidney Meyers is now boiling down to a 90-minute program, with narration by Mr. Michener, a script by Sheldon Stark and a musical score by Alan Hovhaness conducted by Carlos Surinach. We hope "Assignment: Southeast Asia" will whisk people to the other side of the world, immerse them emotionally in the sights and sounds of the area. If we are successful, at the end of the hour-and-a-half, people will be amazed to find themselves back in their own living rooms.

Robert D. Graff (lower right) reports that during the filming of "Assignment: Southeast Asia," children like the youngsters of Bali (top right) followed the camera crews everywhere. Below, a cameraman gets a closeup of an inscription in temple of Angkor Wat, Cambodia.

James M. Toney, Vice President and General Manager, RCA Victor Radio and "Victrola" Division, with the popular consolette model Stereophonic tape player.

Stereophonic Sound

There has been increasing talk lately about "Stereophonic Sound" and its present and future capabilities. What follows is an interview with James M. Toney, Vice President and General Manager, RCA Victor Radio and "Victrola" Division, in which he answers the questions most often asked on the subject.

What is Stereophonic Sound?

We often say that Stereophonic Sound is three-dimensional sound because it has depth, realism and direction exceeded only by a live performance. These qualities are achieved, first, by recording the original performance with two microphones on a double-track high fidelity tape, and, second, by using two separate speakers for playing back. The theory is simple. Because the ears are separated, each ear hears a different sound. The recording microphones are placed from eight to thirty feet apart according to the effect desired by the recording technicians, the size of the hall and the size of the orchestra. The play-back speakers are placed several feet apart to approximate the two sides of the orchestra.

Is all Stereophonic Sound also high fidelity sound?

Not necessarily. The two are separate entities. Stereophonic Sound can be just as lacking in high fidelity qualities as the most inexpensive 78-rpm record player or single-track tape recorder. Stereophonic Sound is a *method* of reproduction while high fidelity is a *quality* of reproduction. We must combine Stereophonic Sound and high fidelity in order to have an instrument producing true three-dimensional sound.

What type instrument is required for this combination?

One with two magnetic heads, two amplifiers and two speaker systems, each of the same high quality and capable of producing the highs and lows required for true high fidelity. The key to Stereophonic High Fidelity Sound is a good acoustical system. If either channel plays through an amplifier or speaker system considerably inferior to the other, the resulting sound can even be displeasing to many hi-fi-trained ears.

How much do complete home Stereophonic tape players cost?

RCA now has a portable model which is nationally advertised at $295. It consists of a dual-track tape player, two amplifiers and a pair of matched speaker systems which total at least six speakers and provide an amazing three-dimensional quality to high fidelity. Another popular low-cost model is a consolette nationally advertised at $350.

How much music is now available on Stereophonic tapes?

Approximately 250 tapes are now on the market, compared with about twenty-five one year ago. Beginning this fall, RCA Victor will issue six a month. A year from now, we will have a broad basic classic catalogue plus Stereophonic tapes on all best-selling popular and jazz albums.

How expensive are Stereophonic tapes?

They are still more expensive than long-playing records but the price will probably continue to drop as we reach mass production. However, we may never get as much music on Stereophonic tapes for the price of the equivalent on records. This extra cost is counterbalanced by the fact that quality loss on tapes is a very small fraction of that on records so that the life of our music is practically endless. Stereophonic tapes range in price from $6.95 to $18.95, according to their length.

How does the popular recording artist fit into the Stereophonic sound picture?

Since Stereophonic tapes carry permanent, long music we will hear our popular artists in groups of selections such as we now get in their albums. Tapes of Broadway musicals and New Orleans jazz are already available and in the future we can expect more popular tapes. In the early days more classical music was played on high fidelity sets but that fact is now reversed. The same may soon be true of Stereophonic Sound.

'Hot Line' for Hot News

WHEN an excavation wall collapsed on a construction crew in Little Rock, Arkansas, recently, NBC reporter Jim Harper was on the telephone to station KARK in Little Rock within minutes after the first bulletin. He talked to KARK reporter Les Bolton, who had just returned from the scene of the accident, and got from him a clear and detailed account of it. Harper had the phone call recorded on tape and quickly edited. Then he switched on the NBC "hot-box", which connected him immediately with affiliated stations all over the country. For two minutes he "talked up" the story — summarizing it as he counted off the seconds before the tape would run, giving the stations time to decide whether to put it directly on the air or record it for later broadcast. When the two minutes were up, the spot was fed out, bringing NBC affiliates the first eyewitness account of the accident and the first accurate report of the casualties.

This and other news beats in recent weeks are the direct result of NBC Radio's new "hot line" system which enables NBC to service its stations across the country on news breaks, even when they are not in network program time. The scope of the service is seen in the three main categories of "hot line" news — the "spot report," which involves news important enough to break into regular programming and is used several times a day; the "bulletin report," which covers the kind of major news break that might occur only half a dozen times a year; and the "emergency alert," which would be used only in case of enemy attack or a disaster of equal magnitude.

News as it Breaks

With the "hot line," the first such service ever attempted by a radio network, NBC News can contact the stations instantly and bring them the news as it is breaking. The service, in effect, gives each of the affiliates a world-wide news-gathering organization staffed by expert reporters and commentators. For their part, the affiliates often cover news stories in their own areas for the entire network.

Since the service began, in mid-January, NBC newsmen have scored a whole series of exclusives. Bryson Rash, for example, had the first story on Dr. Paul Dudley White's examination of President Eisenhower.

Chet Huntley (left) and David Brinkley, two of the brightest stars of the NBC radio and TV news team.

Welles Hangen was hours ahead of other reporters with an account of Egyptian Army units rioting in the streets of Cairo. In addition, NBC commentators have drawn on their years of experience for background and interpretive pieces.

The "hot line" provides two other services. It brings the stations the actual voices of top people in the news, whether President Eisenhower at his press conferences or Prince Rainier announcing the birth of a daughter. These are edited down to three or four-minute segments which are "hot lined" to the stations for use either on a "live" basis or in regular newscasts. In addition, the "hot line" is used for interviews with NBC correspondents like Irving R. Levine when he returned from a long tour of duty in Moscow, and Pat Trese arriving back in the United States from his trip to the Antarctic.

The NBC affiliates have been quick to pitch in with suggestions for pickups and with solid reporting when asked to cover spot news. Among the outstanding jobs of radio reporting were those turned in by KDYL in Salt Lake City on the riot at the Utah State Prison;

NBC's Radio Central is one of the points of origin for "hot line" news broadcasts.

WSAZ in Huntington and WIKE in Pikeville, Kentucky, covering the recent floods; and WSB in Atlanta with a report on the Georgia State Senate declaring the 14th and 15th Amendments unconstitutional.

A few excerpts from the "hot line" log of a single day indicate the flexibility and speed of the service:

9:07 A.M. — Spot report by Ed Newman, London: Duncan Sandys reports to British Cabinet on United States defense mission.

9:41 A.M. — Spot report by Welles Hangen, Cairo: exclusive on Egyptian officials' concern over situation inside Gaza.

1:53 P.M. — Spot report by Bob Schumacher, WBRE, Wilkes-Barre, Pa.: colorful on-the-scene story of fire in one of the city's largest churches. The story was on the air even before it appeared on the wires of two of the press services.

5:43 P.M. — Spot report by Lee Nichols, Los Angeles: major gas explosion.

6:07 P.M. — Special service "feed" from Washington on Secretary Dulles' press conference with tape excerpts of the Secretary's remarks.

The "hot line" is one of two major innovations designed to strengthen network radio news. The other is the five-minute, on-the-hour newscast which NBC now provides for the stations seventeen hours a day, Mondays through Fridays.

Altogether, the NBC News Department now broadcasts over twenty hours of regularly scheduled network radio and television news programs per week, according to William R. McAndrew, Director of News.

Five years ago, there were nine Monday-through-Friday network radio news shows per day, seven on Saturday and six on Sunday. On the present schedule, there are twenty-four radio network news shows per day Mondays through Fridays, seventeen on Saturday and sixteen on Sunday. In combined radio and television network time devoted to news, NBC now broadcasts three-and-a-half hours more scheduled network news than it did five years ago. This does not include specials and the "hot line" service.

To provide NBC radio and television audiences with the most comprehensive coverage possible, NBC News employs more than 300 reporters, cameramen, commentators, and writers, and hundreds of top news "stringers" around the globe.

Between 20,000 and 30,000 feet of news film a week is sent into NBC News headquarters in New York. There it is processed, screened and edited for use on network and local television shows. NBC started its own TV news film operation in 1944, ten years before its competitors.

Permanent foreign bureaus are maintained in London, Paris, Rome, Beirut, Bonn, Berlin, Cairo, Tokyo and Hong Kong. The coverage provided by these wide-ranging correspondents is supplemented by stringers and reciprocal agreements with foreign newsreel concerns. In the United States, NBC News has national bureaus in New York, Washington, Philadelphia, Chicago, Los Angeles, San Francisco, Dallas and Atlanta. The trained news staffs of NBC affiliated stations provide thorough coverage on the local level.

Campus to Corporation: An Engineer's First Year

By Henry W. Kaiser

Lehigh University, '56

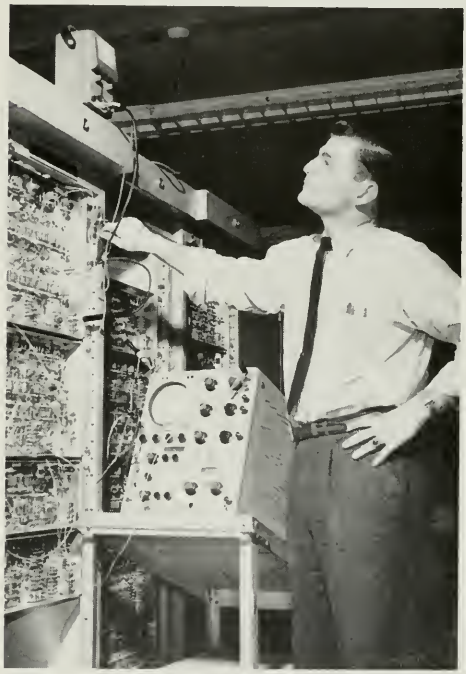
For the first two years of college I looked forward only to graduation. Call it immaturity or lack of foresight, but I never bothered to concern myself with anything other than getting out of school with an electrical engineering degree. As time went on, however, I began to realize that there were many more problems concerning my future than I had allowed myself to believe. It was during my third year that I really started to consider these other aspects. What phase of communications did I want to work in? What would industry expect of me? What could I expect of industry in return? Frankly, I hadn't the slightest idea.

Some of these questions were answered during job interviews in my senior year, but on the whole I was still uncertain. I figured that the only way I could get satisfactory answers and at the same time decide on the type of work for which I was best suited was to join a company that offered some type of training program. It was with this almost experimental attitude that I accepted an offer from RCA to become a Design and Development Specialized Trainee in February 1956, after my mid-term graduation from Lehigh University.

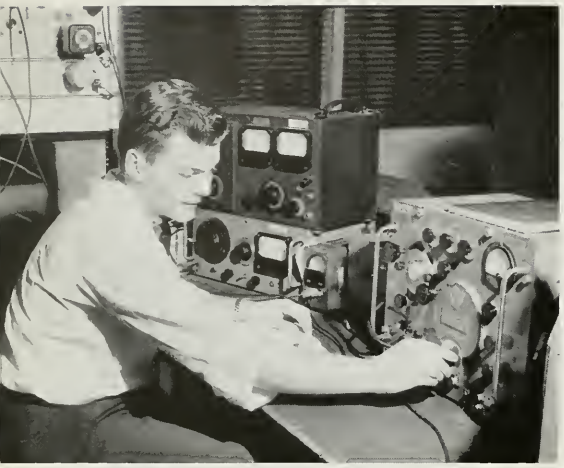
Essentially, the Design and Development Specialized Training Program at RCA is divided into two parts. The first part consists of a one-week orientation and four five-week rotated assignments within the company. The second part is a thirty-one week semi-permanent assignment.

"More Than in Four Years of College"

My first assignment was with the Aviation Communication and Navigation section in Camden, New Jersey. At that time, the group was concerned primarily with a data processing system. My area of work was centered around a time-measuring device to be used as an integral part of the equipment. Needless to say, on my first contact with my project I was completely "snowed". I didn't know the first thing about digital computers, and frankly I hadn't even heard of most of the circuits involved. It wasn't long before I realized that I was going to have to get some help quickly but where? Well, the primary source of information turned out to be right in the section. Through technical discussions with my supervisor and "bull" sessions with some of the engineers, I was able to pick up enough information to start my project. I learned not only in the office but also, perhaps more important, in the lab. I soon began to feel as if I had picked up more during the first few weeks on the training program than I had in four years of college.



The author calibrating equipment as part of tests on a major precision tracking radar system for missiles.



Engineering trainee Kaiser measuring the performance of an experimental military receiver in laboratory.

From Camden, I went to the Tube Division in Harrison, New Jersey, where I was assigned to the Test Engineering section. Before this, except for a few lab experiments in school, I had never been concerned with a vacuum tube itself. Again, there was a lot more to it than I had believed. Through lectures, tours, and actual performance I soon became familiar with some of the principles and problems involved in tube design.

Problems of Circuit Design

The next assignment was back in Camden in the Communications Engineering section. Here the group was involved with a mobile UHF radio relay system. My project was to design and develop a deviation monitor which would provide an indication of the amount of deviation of a frequency modulated wave. While on this assignment I became familiar with basic amplifier design, and the problems involved in circuit design and testing where high frequencies are employed.

After five weeks, I was assigned to the Power Tube Application group in Lancaster, Pennsylvania. On my previous assignments, I had been concerned with the design and development of a new piece of equipment. Now, however, my work consisted of investigating customer complaints about certain tube types already in existence. This was a phase of engineering about which I had never given much thought. By now, because of my experiences at Harrison and Lancaster, I realized that I enjoyed circuit design far more than tube design and that I would most likely request to be placed in the former when my training period was over.

While in Lancaster, three other trainees and myself rented a summer cottage near a stream about ten miles from town. We slept and ate in the living room and had to run outside and down to the basement to shower and dress. Weather conditions played havoc with our living routine — but the experience was so far removed from anything we had ever done before that it was fun. Many times we sat around after dinner and discussed one another's job. Through these discussions and the planned lecture series while on the job, we were able to learn a great deal about many sections within the company other than those with which we had worked.

Time for Decision

The time was rapidly approaching when I would have to make a decision on where I would like to be placed for my semi-permanent assignment. By now I had been exposed to many different types of engineering, met many people, and had a fair idea of what was expected of me. My decision as to final assignment was based on many factors; namely, type of work, people with whom I would be working, and section location. The most important, of course, was the type of work and it was upon this factor that I counted most heavily in reaching my decision.

As is usually the case, I was assigned to work in the area which I had requested — Aviation Communication and Navigation. The group was still working on a data processing system but where we previously had used tubes we now used transistors. On this score I was pretty much in the same boat as many of the engineers in the section in that I knew very little about semiconductors. We all learned together. As a matter of fact, I just recently completed an after-hours course offered by RCA on transistor circuit fundamentals.

"Definite Aims in Mind"

After a few brief assignments designed to orient a new engineer to the Data Link project, I was given the responsibility of designing and developing a transistorized regulated power supply. This was far more important than any project I had had on the rotated assignments. Now, because of the techniques, experience and most of all, the confidence gained during the first phase of the training program, I could accept this responsibility with a more mature outlook. I now have a definite responsibility, and I feel that I can plan my future with definite aims in mind.

Equal Job Opportunity: A Case History

In a recent address before a Washington conference sponsored by President Eisenhower's Committee on Government Contracts, Brig. General David Sarnoff, Chairman of the Board of RCA, outlined the company's policy on the hiring and promotion of Negroes and other minorities. Excerpts from his remarks follow.

In talking about hiring people for the city payroll, New York's late Mayor Fiorello LaGuardia used to say that "there is no Democratic way of disposing of garbage, and no Republican way of cleaning the streets." In our employment policy, we have operated on a similar principle — that there is no white man's way of assembling television sets and no Negro's way of constructing electron tubes. All we ask is that a man or woman be qualified for the job.

RCA is certainly not alone among industrial corporations in practicing non-discrimination, but we are proud to be among those who have practiced it from our very beginning. Since the company was organized in 1919, it has followed two cardinal principles. One is that job opportunities are open to all qualified persons solely on the basis of experience and aptitude. The other is that advancement is based on the individual's achievement and potential for promotion.

Through the years, our policy and our methods of implementing it have worked out satisfactorily. Today, in the RCA, we have a substantial number of employees from the principal minority groups. More and more of these employees are taking on positions of greater responsibility and authority. And their performance record is excellent.

Fears of Reaction Groundless

Some companies are reluctant to open jobs at all levels to Negroes because they fear a reaction from other workers and from consumers. Our experience demonstrates clearly that such fears are groundless.

In our manufacturing plants, we have Negroes as well as white employees working as Group Leaders supervising from ten to twenty-five workers. In our laboratories, we have Negro engineers, scientists and technicians working harmoniously beside their white associates. In our Personnel set-up, we have Negroes as job analysts, interviewers, and training specialists. For example, during the past year, two Negroes were among the ten young college men graduated from the training program of our Personnel Department — and this, of course, is just one of many departments in the company. One of the Negro graduates is now an Employment Interviewer in our Moorestown, New Jersey, plant, and the other is a Training Specialist in our Harrison, New Jersey, plant. Each is doing a splendid job.

We have no hesitancy whatever about placing Negroes in positions where they are constantly coming in contact with the public. One is a staff member at the RCA Exhibition Hall in New York, greeting and answering questions for the thousands of visitors who pass by every day to look at our products. We have qualified Negroes as service technicians, repairing television sets in the homes of white citizens. To the best of our knowledge, there has never been any adverse reaction to these Negro technicians.

Bloomington Plant as an Example

Since Negroes make up the largest minority group in our country, it is only natural that our experience with them is more extensive than with others. However, our policy of merit employment is not designed to favor any particular minority, and our employees include members of many different races and nationalities. On the assembly line of our Bloomington, Indiana, television plant, for instance, we have Chinese, Japanese and Indian girls — wives of students at the University of Indiana.

The National Broadcasting Company, a service of RCA, and the RCA Victor Record Division have many Negro artists whose names are familiar to all of us. One RCA Victor recording star — Harry Belafonte — spoke up eloquently not long ago on the subject of Negroes and the TV networks.

"I sincerely believe," he said, "that the networks are color blind. They are not interested in a man's pigmentation, but in his skill as an actor, a dancer, a singer or whatever craft he can perform well for the millions of television viewers. * * * The TV cameras are not bigoted. Television, with its broad scope, its constant need for newness and originality wants the Negro performers and the Negro craftsmen."

I can tell you from personal experience that in television when we talk about "color," we are referring to that new dimension in entertainment that brings rainbow hues right into our living room — color television. That is the *only* color we are interested in.

Candid Camera on Como

Relaxed but never careless, Perry has a vocal repertoire that runs from jazz to semi-classical, from hymns to "jump" numbers. His friendly voice has an appealing quality that sells some 4 million records each year.

THE Perry Como Show is, in the parlance of television, one of the hottest shows on the air. Since its debut in the fall of 1955, the program has moved faster and farther than any other. Over the past three months, it has been consistently among the "top ten" shows in the national ratings, reaching an audience averaging about 44,500,000 viewers. Recently Como was awarded a coveted "Emmy" by the Academy of Television Arts and Sciences for the "best continuing performance by a male personality" (NBC personalities won nine of the twelve performance honors).

Como's success is, of course, gratifying to NBC, especially since the program holds down a key time spot on a key evening (8 to 9 P.M. on Saturdays). But the only discernible effect the plaudits have had on Perry himself is to make him more relaxed than ever, even during the grueling hours of rehearsal and planning. Pictures on this page show the NBC star and his supporting cast getting ready for a show.

Como knows that from fatigue come jitters, so he saves his energies for his songs, and the results are gratifying. Here, he listens as members of the Ray Charles Singers go through a number in preparation for the show.

With Perry each rendition must be the best that constant rehearsal can produce. Here he looks on carefully as the pianist polishes up a few bars of music and a stagehand holds cue-card for the words.

Perry and some of the technicians clear up a paint so that his on-the-air telecast will be up to par—par being a "top-ten" performance every Saturday night against top-flight competition on the other television networks.

With the Ray Charles Singers providing the melodious background Perry tries out a new number. The towel draped around his neck serves as protection against drafts which might affect those valuable tonsils.

Airline Communications

By L. R. Engler *General Sales Manager, RCA Communications, Inc.*

Six minutes out of New York's International Airport on the first leg of a trans-Atlantic flight, passengers can easily pick out a familiar air navigation check-point — the 3,000-acre antenna forest of RCA's Rocky Point transmitting station. Dominating the scrub oak of eastern Long Island, these masts have been landmarks for overseas pilots since Charles Lindbergh made the first trans-Atlantic solo flight in 1927.

In recent years the antenna towers have added a new function to their long list of overseas communications jobs. Since 1948 these arrays, along with their companion transmitters and receivers, have played a vital role in a unique airway communications system that daily shepherds dozens of commercial airliners safely and quickly across the Atlantic.

In connection with their global flight operations, most international airlines now run their own private communications systems — elaborate teleprinter networks that parallel the routes of their overseas flights. Although airline personnel handle the terminal equipment, the facilities are leased from carriers like RCA Communications, Inc. which currently provides international radio teletypewriter channels for major U. S. overseas airlines such as Northwest Airlines, Inc., Pan American World Airways, and Trans World Airlines. Many foreign flag lines, too, like BOAC, Japanese Airlines, KLM, Quantas Empire Airways, Swissair, Sabena, and Scandinavian Airlines System use RCA radio facilities to support their over-ocean flights.

These overseas radio channels link the land line teletypewriter networks maintained by the airlines in the United States with others that they operate in countries abroad. In each case, the airlines lease from RCA the 24-hour-a-day use of point-to-point overseas radio teletypewriter channels.

The system works like this:

At an airline office in New York, a girl types out a message — about weather reports, passenger reservations, or perhaps spare parts for planes — on a teleprinter similar to those used in newspaper offices. This message is received instantly, in typewritten form, on a similar teleprinter in the airline's London or Paris or Rome office. Pan American, for example, funnels as many as 135,000 messages a month through its leased channels between London and New York.

Developed during the War

Radio teletypewriter systems, a proven product of World War II, fast became the workhorse of RCA's overseas communications network in the post-war era. At the same time RCA stepped up its installation of the time division multiplex equipment — electronic devices that made it possible to transmit simultaneously four messages over a radio circuit that previously could carry only one. The multiplex terminals not only enabled RCA to handle increased volumes of message telegraph traffic, but made available extra channels as well. It was this additional capacity coupled with the speed,

accuracy and simplicity of the newly installed teletypewriter systems that paved the way for the development of leased channel service.

In September, 1948, RCA made available the first airline leased channel to Pan American World Airways. Since then, RCA's leased channel service has grown rapidly until today, airline leased channels cover the Atlantic, Pacific and Caribbean areas.

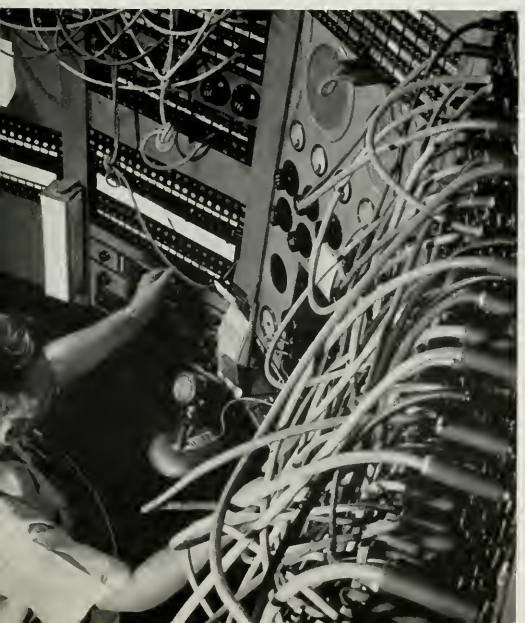
Advantages of Leased Channels

From the outset, leased channels were a natural for the airlines. The rapid growth of their overseas routes had produced an equivalent increase in the volume of airline communications to the extent that conventional international telegraph methods became cumbersome and costly. Leased channel service gave the airlines instantaneous use and direct control of their overseas communications facilities. Moreover, it enabled them to integrate their transoceanic communications with their domestic teletypewriter operations, effecting an almost uninterrupted flow of messages between their offices in all parts of the globe.

Aside from continually increasing the volume of messages and adding new channels, the airlines are forever finding new applications for their overseas communications facilities. One large airways system recently perfected the technique of sending weather maps by teleprinter. Through the use of grid coordinates matched to the line width and keyboard of the teletypewriter, the changing picture of trans-Atlantic weather is instantly transmitted several times daily to key control centers overseas. The airlines are also developing punched-card data processing systems that will enable even their most remote foreign outposts to forward tabulated supply requisitions by teletypewriter directly to a central storage depot in the United States. This system will trim thousands of hours from the job of airline logistics.

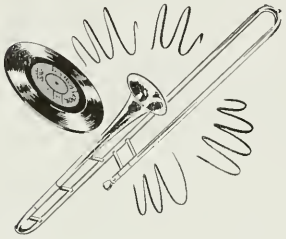
On occasion, trans-oceanic leased channels have been used by the airlines to compensate for failure in local communications. Not long ago, one airline found it impossible to get messages between two of its neighboring airports in Africa. Although only 200 miles apart, the airports had lost their direct land line connection because of a local strike. For days following the labor dispute the airports maintained contact by sending their messages completely around the world via leased channels. Despite the vast distances involved in the leased channel transmissions, traffic moved faster and with greater accuracy than had ever been possible over the land lines.

Leased channels have been used not only by airlines, but by the Armed Forces, Government agencies, and press services. More recently, international brokerage houses have begun adapting leased channel facilities to their needs. Airlines, however, provide the prime example of the far-reaching effect this new overseas communications service has had on the post-war expansion of international business. And with the era of faster, jet air transportation just over the horizon, they have already begun to plan for even more widespread use of this specialized service.



Each day thousands of airline messages pass through the master control console (left) at RCA's Rocky Point, Long Island, transmitting station. Focal point of RCA's vast trans-Pacific communications network is the central control room in the San Francisco terminal (below).

RCA news in brief



Tribute to Tommy . . .

A special two-album "Tribute to Dorsey" has been released by the RCA Victor Record Division as a memorial to the late bandleader Tommy Dorsey. The thirty-two numbers include selections from the bandleader's ten-year recording career for RCA Victor, and contain Dorsey classics which previously had not been released on long-play records.

Van Doren on Teaching . . .

"I am a teacher," quiz wizard Charles Van Doren explained on NBC-TV's "Home" show recently, "because I am interested in the truth. That statement may sound presumptuous, or it may sound simple-minded. I am willing that it sound either way. Presumptuous, because I may be asked, 'Well, isn't everyone interested in the truth?' My answer is: No, they are not. Most people are interested in success, or making money, or having a good time. Only occasionally do they think about the truth itself. The truth never changes, and everything else does, and we are more aware of the things that change than of the things that do not. This is a paradox. But it's nevertheless true. Simple-minded, because I may be asked, 'Well, isn't the truth simple, and what good does it do you to think about it?' My answer is: No, the truth is not simple. And it takes an entire lifetime to make a stab at understanding — and as to the good it does to think about it, I only know that I must. For me there is no other way."

"Tele-Sell" . . .

Field specialists of the RCA Service Company installed equipment for the nation's first two "Tele-Sell" programs, closed-circuit TV hook-ups designed to dramatize the latest selling techniques to small businessmen, merchants and door-to-door salesmen throughout the country. The two 90-minute seminars originated from New York and were viewed in some thirty cities from coast to coast. The "Tele-Sell" programs were sponsored by local sales executive clubs, Chambers of Commerce and other business groups.

All-Glass Picture Tube . . .

The RCA color television picture tube, which opened the way for color TV on a nation-wide basis, will soon be produced with an all-glass, as well as metal, envelope for home receivers. A new round all-glass bulb and a new technique of glass sealing have been developed by glass manufacturers with the cooperation of the Engineering Group at RCA's Electron Tube Division plant at Lancaster, Pa.

Radar for Missiles . . .

An RCA-developed instrumentation radar system makes possible for the first time direct calibration and immediate evaluation of the performance of guided missiles. It can track missiles over long distances, in darkness, through clouds and under any atmospheric conditions. The equipment is now in production for use at Army, Navy and Air Force test ranges.

Ivan Likes Elvis . . .

Recordings by RCA Victor star Elvis Presley, cut on discarded hospital x-ray plates, are selling in Leningrad for 50 rubles apiece, according to *The New York Times*. That is $12.50 at the official rate of exchange. Returning travelers report that the singer is the latest craze of the Soviet zoot-suiters, or stilyagi, as they are called. American jazz broadcasts, over the Voice of America and Swedish and German short-wave stations, can be heard every night in the dormitories of Moscow University.

ENGINEERING and SCIENCE at RCA

STARTING SALARIES: non-managerial to $15,000 . . . managerial open

FIELDS OF ENGINEERING ACTIVITY		MANAGERS	TYPE OF DEGREE AND YEARS OF EXPERIENCE PREFERRED											
			Electrical Engineers			Mechanical Engineers			Physical Science			Ceramics Glass Technology Metallurgy		
			0-2	2-3	4-15	0-2	2-3	4-15	1-2	2-3	4-15	1-2	2-3	4-15
• ***SYSTEMS*** *(Integration of theory, equipments and environment to create and optimize major electronic concepts.)*	**AVIATION ELECTRONICS • CONTROLS**		W	W	W C	W	W	W C	W	W	W C			
	DIGITAL DATA HANDLING DEVICES	M C		M C	M C		C	C		C	C			
	MISSILE WEAPONS SYSTEMS • RADAR	M W	W	M W X C	M W X C	W	M W C	M W C	W C	M W X C	M W X C			
	INERTIAL NAVIGATION			W C	W C		W C	W C		W C	W C			
	COMMUNICATIONS		C	C N	C N	C	C				C N			
• ***DESIGN • DEVELOPMENT*** **MISSILE WEAPONS SYSTEMS**—Planning and Design—Rodar—Fire Control—Servomechanisms—Computers		C M	W C M X	W C M X	W C M X	W C M	W C M	W C M X	W C M	W C M X	W C M X			
AVIATION ELECTRONICS—Radar—Computers—Servamechanisms—Shock and Vibration—Circuitry—Remate Control—Heat Transfer—Sub-Miniaturization—Automatic Flight—Automation—Transistorization—Infrared—Airbarne TV		W C	W C X	W C X	W C X	W C	W C X	W C X	W C X	W C X	W C X			
RADAR—Circuitry—Artenna Design—Servo Systems—Gear Trains—Intricate Mechanisms—Fire Control—Information Handling—Displays		M C	W M C X	W M C X	W M C X	W M C X	W M C X	W M C X	W M C X	W M C X	W M C X			
COMPUTERS—Systems—Advanced Develapment—Circuitry—Assembly Design—Mechanisms—Programming—Digital Data Handling Devices		M	C W	M C X W	M C X W	C W	M C X W	M C X W	C W	M C W	M C W			
KINESCOPES (B & W and Color), OSCILLOSCOPES—Electron Optics—Instrumental Analysis—Solid States (Phosphors, High Temperature Phenamena, Photasensitive Materials and Glass to Metal Sealing)			L	L Y	L Y	L	L Y	L Y	L	L Y	L Y	L	L Y	L Y
GAS, POWER AND PHOTO TUBES—Photasensitive Devices—Ceramic to Metal Sealing—UHF and VHF—Super Power			L	L	L	L	L	L	L	L	L	L	L	
RECEIVING TUBES—Tube Design—Test and Application Engineering—Chemical and Physical Develapment—Methads and Pracess Engineering			H	H	H		H	H		H	H		H	H
MICROWAVE TUBES—Tube Development and Manufacture (Traveling Wave—Backward Wave—Magnetron)		H	H	H	H		H	H		H	H		H	H
SEMICONDUCTORS—Materials research (surface studies—crystallography)—device design—circuitry—process engineering—automation.			V	V	V	V	V	V	V	V	V	V	V	V
COMMUNICATIONS—Specialized Systems—Microwave—Mobile—Aviation—Audio—Propagation Studies—Acoustics—Transducers			C N	C N	C N		C	C	C N	C N	C N			
BROADCAST AND TV—Manachrame and Color Studia Equipment—Cameras—Manitars—High Power Transmitters			C	C	C	C	C	C	C	C	C			
• ***SYSTEMS APPLICATION*** *(Evaluation and Planning—Design and Development—Modification—Specification)*														
MISSILE TEST INSTRUMENTATION (Data Acquisition and Processing)—Radar—Telemetry—Timing—Communications—Optics—Computers		F	F S	Z F S	Z F S	F S	F S	Z F S	F S	Z F S	Z F S			
RADAR—Airborne—Surface—Shipboard—Sonar—Fire Control		F	F S	Z F S	Z F S	F S	F S	Z F S	F S	Z F S	Z F S			
COMMUNICATIONS—Radio—HF—VHF—UHF—Microwave—Telephone—Teletype—Telegraph Terminal Equipment—Wave Propagation		F	F S	F S	F S	F S	F S	F S	F S	F S	F S			
• ***MACHINE DESIGN*** Mechanical and Electrical—Automatic or Semi-Automatic Machines			L H	L H	H	L	L H	H		L	L			

Locations: **C**—Camden, N. J. **F**—Cocoa Beach, Fla. **H**—Harrison, N. J. **L**—Lancaster, Pa. **M**—Moorestown, N. J. **N**—New York, N. Y. **S**—RCA Service Co. (Cherry Hill, N. J.; Alexandria, Va.; Tucson, Ariz.; Dayton, Ohio; San Francisco, Calif.) **V**—Somerville, N. J. **W**—Waltham, Mass. **X**—West Los Angeles, Calif. **Y**—Marion, Ind. **Z**—White Sands, N.M.

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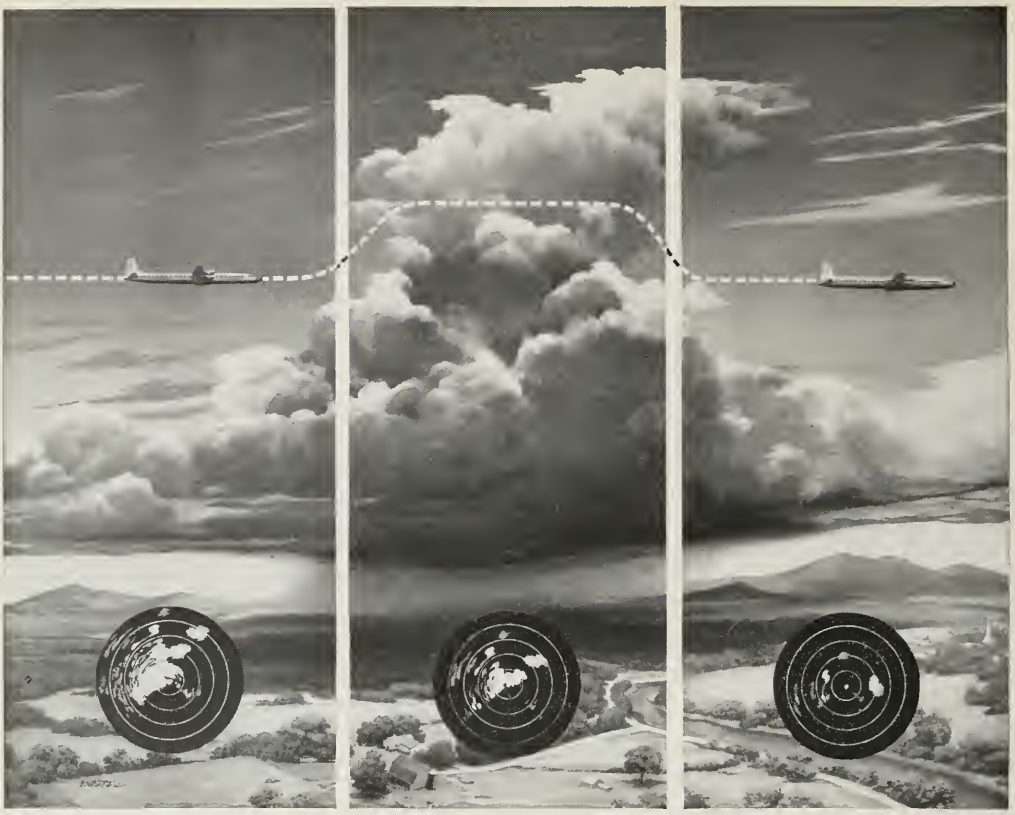

RCA Weather Radar screen shows approach of storm. Screen guides pilot around turbulent area. All's well as plane leaves storm behind.

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No longer need you, as a traveler of the sky, experience the discomfort of bouncing around during storms. If your plane is equipped with RCA Weather Radar, you enjoy comfort and speed throughout—because the plane can by-pass turbulent elements.

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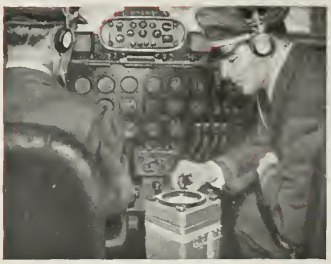

LEADING AIR LINES installing RCA Weather Radar include American Airlines, Continental Air Lines, Pan American World Airways, Trans World Airlines Inc., United Air Lines; and these European Air Lines: Air France, BOAC, Iberia Air Lines of Spain, Sabena Belgian World Airlines, Swissair; Mexicana.

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