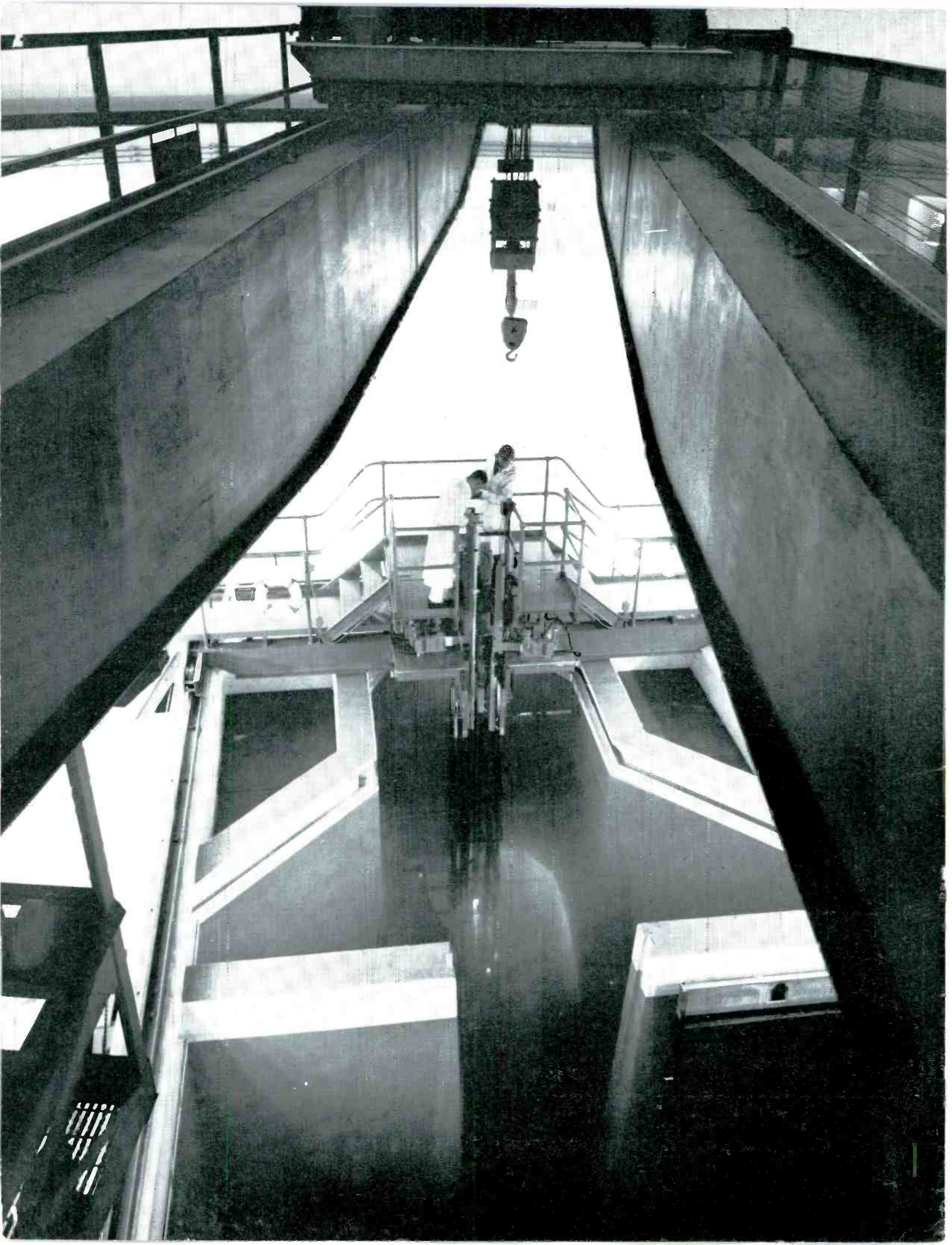
RCA Electronic Age

SPRING / 1959

SPECIAL REPORT ON COLOR TV



RESEARCH

MANUFACTURING

COMMUNICATIONS

BROADCASTING

TELEVISION

Electronic Age

SPRING 1959 / VOLUME 18 / NUMBER 2

In this issue...

COVER STORY: *Dinah Shore, star of the NBC Sunday evening "Chevy Show," is one of the top performers identified with color TV. Outstanding production, beautiful costumes and glamorous guests make Dinah's show a favorite with the growing color television audience, including newspaper columnists whose comments appear on page 21.*

NOTICE: When requesting a change in mailing address please include the code letters and numbers appearing with the stenciled address on the envelope.

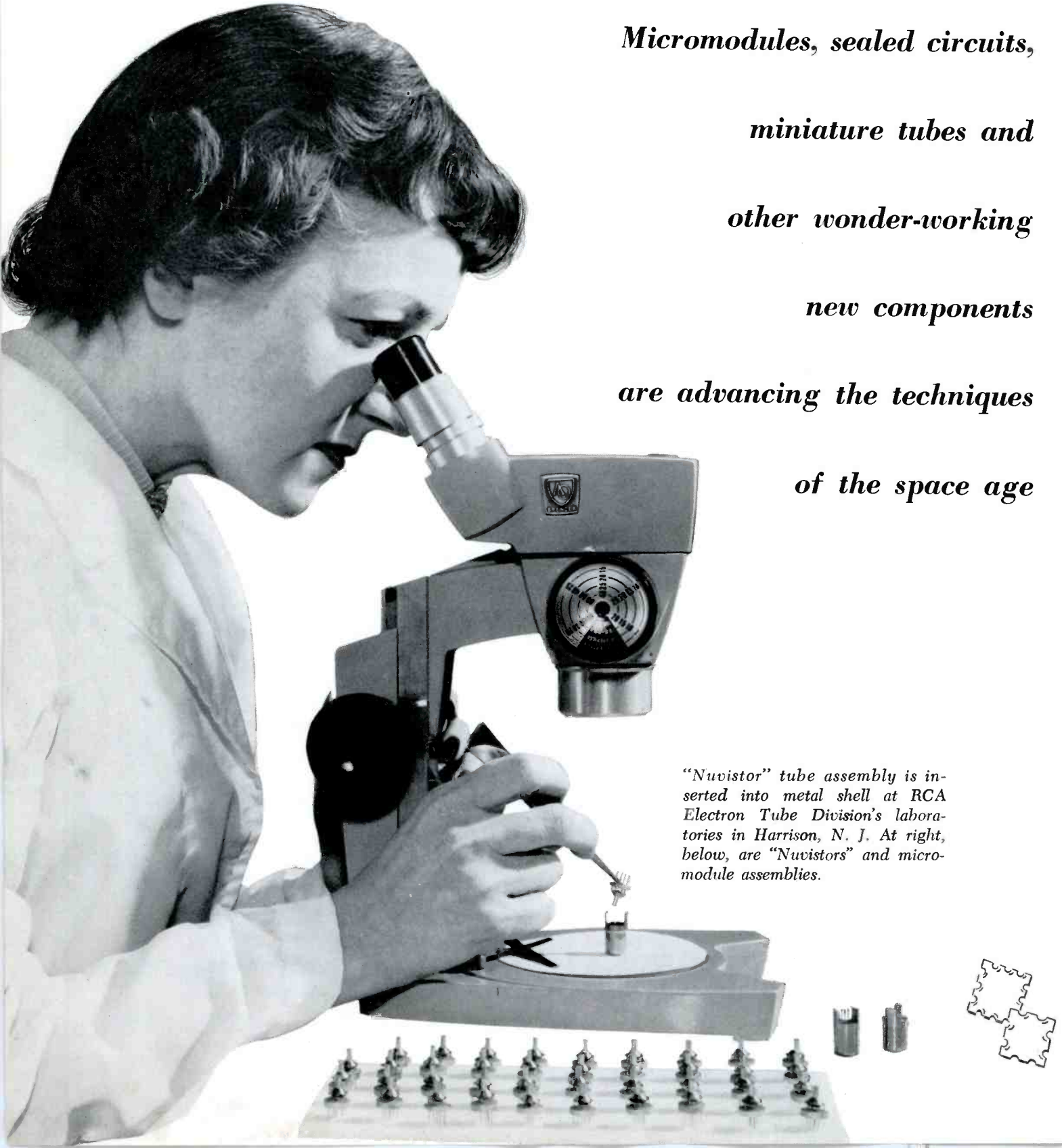
Nuclear reactor pool in operation at Industrial Reactor Laboratories, Plainsboro, N. J. See page 6.

RADIO CORPORATION OF AMERICA
30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.

DAVID SARNOFF, *Chairman of the Board* — JOHN L. BURNS, *President* — FRANK M. FOLSOM, *Chairman, Executive Committee*
JOHN Q. CANNON, *Secretary* — ERNEST B. GORIN, *Treasurer*

LITTLE GIANTS

Micromodules, sealed circuits, miniature tubes and other wonder-working new components are advancing the techniques of the space age



"Nuvistor" tube assembly is inserted into metal shell at RCA Electron Tube Division's laboratories in Harrison, N. J. At right, below, are "Nuvistors" and micromodule assemblies.

OF ELECTRONICS

ELECTRONICS ENGINEERS today are doing their best to make things smaller — they call it "miniaturization." The result of this major trend in the industry is a host of new electronic devices that are helping the U. S. effort in national defense and space exploration. It will ultimately provide improved products for industry and the home as well.

Dramatic results have already been achieved:

A 10-ounce radio receiver, designed for the Atlas satellite, was part of the system that recently relayed President Eisenhower's voice from Outer Space.

An entire computer has been compressed into a little black box to control a fighter plane in flight.

Tiny new electronic controls are providing ever-increasing accuracy for America's missiles.

An electron tube that's small enough to fit inside a thimble promises to revolutionize the tube business.

Smaller components and printed or "sealed circuits" are making possible more efficient and more compact computers for business and industry.

"Micromodules" for the military

One year ago, in April, 1958, the U. S. Army Signal Corps and the Radio Corporation of America began a program which has been called the start of the "cubist" era in electronics. Its purpose is to reduce the basic circuitry of a wide variety of electronic devices to small blocks, or "micromodules," of uniform size and shape.

The results to date were recently demonstrated publicly in New York City. Working models of modularized devices were shown, such as radio receivers no larger than a lump of sugar. It was announced that a tenfold reduction in the size and weight of many vital military devices will eventually be achieved. The modules themselves were revealed as circuit building blocks measuring only a third of an inch on each side, so that 27 of them can be assembled in a cubic inch. Each module is made up of "micro-elements" in the form of tiny ceramic wafers 3/10th of an inch square and 1/100th of an inch thick. On these are fused suitable active materials which enable each wafer to perform the function of a transistor, resistor, capacitor or some other component.

Colonel Harold Brown, Commanding Officer of the U. S. Army Signal Research and Development Laboratory, Fort Monmouth, N.J., explained the military advantages of micromodules. "The concept of the modern army compasses wide dispersion and high mobility," he said. "A look at the future shows the need for smaller and lighter tactical radios, surveillance drone systems, automatic communication systems, computers, data storage and display equipment, to name only a few.

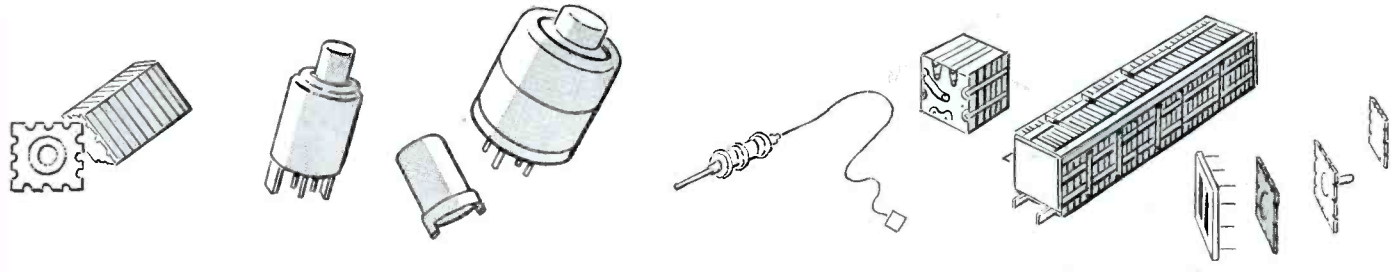
"We expect the micromodule to go a long way toward helping meet the requirements. Materiel tonnage, transport and storage should be cut down, the whole logistic complex simplified. Fewer skilled repairmen should be required, since equipment malfunctions would be easier to diagnose and replacement of defective parts or subassemblies made easier.

"And once again, as in so many of our other scientific advances, we foresee the possibility of a double dividend on the defense dollar. The primary purpose of the micro-module program is, of course, directed toward producing better military equipment at less cost. But, without encroaching on our military objective, we are certain that this new approach in electronics will have significant and far-reaching applications in civilian products."

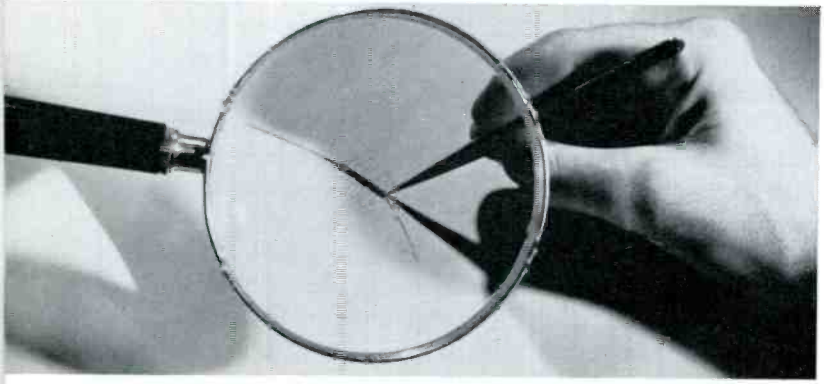
More than 60 sub-contracting firms in the electronics field have been working with the Signal Corps and RCA on the micromodule program. As explained by Dr. Charles B. Jolliffe, RCA Vice President and Technical Director, the module is a revolutionary concept and not just a new method of making components or packaging them. It involves a new order of reliability in component performance. It will bring about sweeping changes in all electronic design and construction.

The vital importance of miniaturization in the space age is shown by the fact that it takes between 500 and 1,000 pounds at liftoff to place *one* pound in orbit.

As leader contractor in the Signal Corps micromodule program, RCA Defense Electronic Products

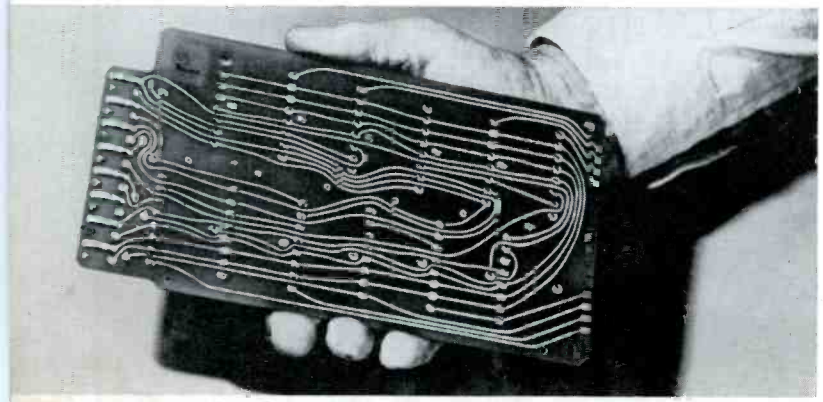


Rugged "Nuvistor" tube is small enough to fit in thimble.



New type of transistor is expected to replace 80 components.

Oscilloscope is used to test experimental devices.



Printed circuit boards make for compactness and strength.

has the basic task of establishing the systems concept or over-all approach. Today's supersonic weapons can no longer be considered as individual pieces of hardware or loosely linked assemblies. All elements must be as closely linked as possible for fast, efficient operation. "Only by maintaining the systems approach," says Dr. Jolliffe, "can we assure compatibility of the micromodule concept with its intended end usage in equipment production and in service applications."

New-look tube

While so-called "solid state" electronic components are being compressed into ever smaller packages, electron tube designers are also reducing the size of their product for new applications. Only recently a new design concept representing a major breakthrough in tube size, performance, and reliability was announced by D. Y. Smith, Vice President and General Manager, RCA Electron Tube Division. According to Mr. Smith, the design of the new tube, named the "Nuvistor," opens the way to "mass production of high-performance, thimble-size tubes having improved ruggedness and efficiency."

Now in advanced development stages at the Division's laboratories in Harrison, N.J., the "Nuvistor" will lead to important electronic advances in television sets, communications receivers, and computers, as well as to more compact and efficient equipment for jet aircraft and guided missiles.

Developmental samples of the "Nuvistor" will be introduced to the electronics industry within the next several months. A small-signal triode and a tetrode will be offered first and will be followed later by a beam power tube. According to present plans, RCA expects to start limited commercial production of the new-look tubes in 1960.

The "Nuvistor's" ruggedness has been demonstrated convincingly in torture and endurance tests. The tiny tube has functioned normally in an electronic circuit when placed alternately inside a furnace at 660 degrees Fahrenheit and then in liquid nitrogen at 320 degrees below zero Fahrenheit. In an impact test, it proved to be so tough that not even repeated heavy blows disturbed its operation.

Performance such as this is built into a "Nuvistor" by unique methods of construction. Its base is a strong ceramic wafer on which electrode assemblies are held rigidly in place by a tripod-like structure. The electrodes are supported in cantilever fashion — the same method used in bridge building when trusses are extended from piers. The simplicity of the new tube's design and its cylindrical shape will permit

highly mechanized assembly. Accuracy and uniformity will be built in.

The "new-look" design shows clearly that the electron tube has by no means approached its theoretical limitations. According to Mr. Smith, "the tube, long regarded as the workhorse of our industry, has an extremely bright future."

Sealed circuits — compact and rugged

In addition to micromodules and smaller tubes, advances in the use of printed or "sealed circuits" are helping to make electronic devices smaller and more rugged. Bulky hand-soldered wiring is being replaced in many instances by compact pre-fabricated panels with the circuit wiring permanently printed or etched in place. Components are then securely attached either by hand or by automatic machine.

Sealed circuits offer advantages of smaller size, rapid production, uniformity and reliability. They are being used in all sorts of electronic systems — in computers, TV and radio sets, and guided missile controls. In fact it has been estimated that nearly all radios and a great majority of the television sets produced today make use of printed circuitry.

"The sturdiness of sealed circuits is probably best illustrated by their performance in missiles," says Donald H. Kunsman, President of the RCA Service Company, which is responsible for missile tracking and telemetry on the Air Force's Atlantic Missile Range. "When you hurl an object into the air with a thrust of 400,000 pounds and propel it through space at 17,000 miles an hour, its parts have got to be mighty sturdy to perform properly. And the circuits in missiles are withstanding such rigorous tests every day."

RCA has also made use of printed boards and other techniques of miniaturization in making its new 501 computer as small, flexible and dependable as possible. Using new techniques originally worked out and proved in military equipment, the designers of the RCA 501 assembled transistors and other components on small plastic wafers with the electronic components on one side and the connecting wiring automatically printed on the other. The resulting assembly becomes a module. Several of these are then mounted on a plastic board to form a plug-in assembly which is installed in the computer simply by sliding it into position. These assemblies take up only one quarter of the space required by conventional circuits having the same performance capability.

Going beyond anything else so far achieved in miniaturization, scientists of the RCA Laboratories are now developing computer components so tiny that up to 100,000,000 such elements might be crammed into one cubic foot. They represent, according to Dr. Irving Wolff, Vice President, Research, "a new concept of integrated electronics."

Logic circuits are used in various arrangements in computers to calculate, sort, "remember" and control the flow of information. Present circuits employ tubes or transistors as active components to amplify signals, and resistors and capacitors as passive components to vary the flow of current. In the new concept of integrated electronics, all of these functions are built into a small piece of solid material, such as silicon.

Developments such as these are bound to bring many changes in American living. Devices now in the laboratory stage will make possible miniature electronic controls able to guide and land high-speed jet airliners automatically and safely. Desk-size computers for offices may eventually become as common as adding machines. Micromodules will find their way into appliances of every-day use in the home — in battery-operated portable TV sets and miniature hi-fi sets, in controls for many household functions.

Looking into the future, electronics engineers predict that some day soon tiny packages of micromodules and sealed circuits will be automatically guiding our cars down electronic highways, adjusting the heat, air-conditioning and lighting in our homes, running the kitchen and keeping all the members of the family in touch by personal radio communication. ■

RCA President John L. Burns shows officials of the Fidelity-Philadelphia Trust Co. a magnetic core unit from the RCA 501 computer.

Looking into a "hot cell" through three-foot-thick window, a technician at Industrial Reactor Laboratories handles radioactive materials with mechanical hands.

ATOMS FOR LIVING

At Plainsboro, New Jersey, the world's largest privately owned nuclear research reactor has been built to develop new products and processes

By Kenyon Kilbon

A GRACEFUL SILVER DOME, rising from a clearing in a wooded area at Plainsboro, N.J., near Princeton, is the striking symbol of a promising new trend in scientific research by American industry. Within the aluminum-sheathed structure is the world's largest privately-owned nuclear research reactor, erected by ten of the nation's leading industrial companies — among them RCA — as a powerful new tool for scientific studies in their diverse fields of interest.

Incongruous in its rustic surroundings, the shining dome is the major distinguishing feature of Industrial Reactor Laboratories, Inc. (IRL). IRL is one of the most ambitious attempts by private enterprise to solve the problem of increasing cost and complexity in the scientific tools required for advanced research today. The solution in this case is the equal sharing by ten non-competing companies of the more than $4,500,000 cost of a most powerful research tool — a 5-million-

watt nuclear fission reactor.

The purpose of IRL is implied in the motto framed by its sponsors — "Atoms for Living." Out of research to be conducted there will come a wide range of products and techniques for the home, for industry, and for defense, as well as new basic materials — chemicals, metals, and synthetics.

Participating companies include American Machine & Foundry Company, American Tobacco Company, Atlas Powder Company, Continental Can Company, Corning Glass Works, National Distillers and Chemical Corporation, National Lead Company, Socony Mobil Oil Company, Inc., United States Rubber Company, and the Radio Corporation of America.

Scientists of all of these firms will use the reactor as a source of powerful nuclear particles — neutrons and high-energy beta and gamma rays — to bombard hundreds of different types of metals, chemical substances, electronically-active materials, plastics, and organic matter. They will use radiation to alter the atomic structure of materials, creating new substances to meet specific needs.

The reactor went into operation early this year with the start of a controlled chain reaction. The glistening dome, eighty-seven feet high, was given its novel shape to provide the strongest construction without internal supports and the best interior lighting. The reactor is of the pool type, with the core of uranium fuel situated at the bottom of 27 feet of circulating water. The water acts as a protective shield against radiation and removes heat.

The controls for the reactor occupy a glass-enclosed room on a platform that runs two-thirds of the way around the top of the pool. Scientific experiments will be conducted at the ground-floor level, where materials can be inserted in special "ports" or chambers built into the reactor structure for exposure to various types and degrees of radiation. In shielded rooms adjoining the reactor dome, radioactive materials can be handled remotely and temporarily stored.

A passage leads from the dome to an adjacent one-story building occupied by IRL staff and scientists of the ten participating companies. Each company has identical laboratory space, and each will maintain its own scientific staff on the premises.

The reactor is located about five miles from RCA's David Sarnoff Research Center at Princeton. Dr. D. A. Ross, of the RCA Laboratories technical staff, heads RCA's laboratory at the IRL building.

RCA's over-all objectives have been explained by Dr. E. W. Engstrom, Senior Executive Vice President:

"The knowledge resulting from research at the reactor will be of value in at least two specific areas: first, in determining the effect of atomic radiation in altering the characteristics of many materials used in electronic systems, as well as in the development of useful new materials; second, in studying the effects of radiation on the various types of electronic equipment for communication, navigation, control, and other commercial and military functions in which electronics plays a leading role. RCA has already explored with initial success the direct conversion of atomic radiation to electrical energy through an experimental atomic battery. The facilities of IRL will permit further work in this important area."

According to Dr. Ross, the specific major projects to be undertaken by RCA at the reactor are these:

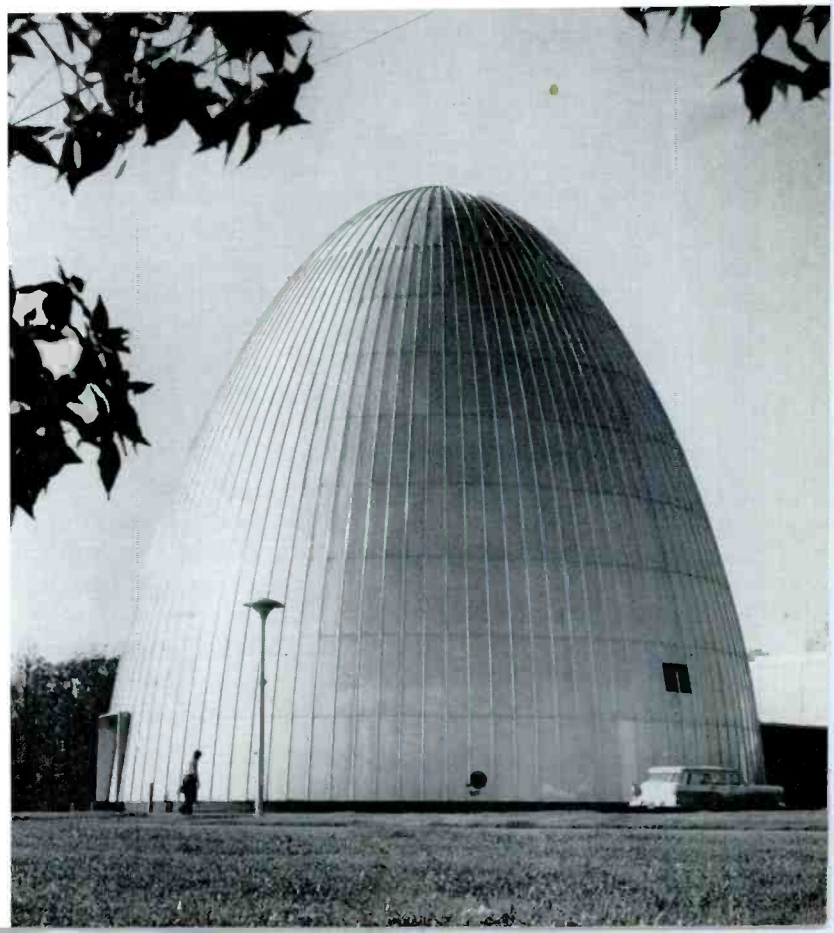
1. Tracer studies of luminescent phosphors, semiconductors, and other electronic materials.

2. Use of neutrons — nuclear particles that have no electrical charge — to study the arrangement of atoms that cause magnetic effect.

3. Studies to determine how radiation damage affects the behavior of various materials used in electronic devices and systems.

4. Creation of useful new effects in materials, such as semiconductors, by subjecting them to radiation. In this way, different types of electronic functions might be built "on order" into a single piece of material, forming the basis of a useful new device. ■

Aluminum-sheathed dome of reactor lab has become a New Jersey landmark.



Robert W. Sarnoff and NAB President Harold B. Fellows.

Is television broadcasting meeting the needs and satisfying the tastes of the American people? The Chairman of NBC proposes a campaign to answer that question effectively

THE IMAGE OF TELEVISION

By Robert W. Sarnoff

Chairman of the Board
National Broadcasting Company, Inc.

THERE is an issue today which increasingly concerns all those involved with the radio and television industry. At its core is the allegation that broadcasting is not fulfilling its true public responsibility.

Currently, the issue is wrapped in a package of slogans: television is mediocre, television is unworthy, television is time wasting. These slogans originate in certain arcane regions and are spread through different channels to an increasingly broad audience. Like most slogans, they depend on constant repetition to produce unthinking acceptance. This acceptance, in turn, has become the basis for an expanding attack on television, and radio, too.

The result is a curious paradox: on the one hand, there is wide public support for television and radio which supply what most of the people want most of the time; on the other hand, there is persistent criticism of these media because they serve majority tastes and interests.

Can we, reflecting on broadcasting's vast growth and popularity, dismiss the current criticism as an irritant rather than a danger? I believe not, for if we do, we will only harm our enterprise and the public it serves. Already, in certain areas, the slogans are being accepted as authentic currency.

As a result, a climate is being created for more Government regulation of broadcasting. Yet, this is only one offshoot of a broader danger — the creation of an unflattering image of broadcasting which could undermine its public acceptance. This image is being painted with many brushes in many places: in social gatherings; in speeches and articles; in print attacks, such as *Fortune's* recent exercise in gamesmanship; in the egging on of dissidents within our own house; in the continued repetition of slogans intended to make television viewing a symbol of inferior status.

Challenge and response

It is this last approach which I consider the most direct threat to our service. If the average viewer is constantly told, without contradiction, that he is guilty of a shameful act in watching his favorite programs, then he might begin to approach his set the way the small boy approaches the cookie jar. As a medium which draws its strength and prestige from its universality of appeal, broadcasting could find itself artificially downgraded in the eyes of its two main supporters — its audience and advertisers.

How can the broadcasting industry respond? First, I think, by defining what we are and what we believe

in, as an industry; second, by ourselves understanding — so that we can help others understand — the nature and consequences of the criticism levelled against us; and third, by considering steps to meet it on an organized and comprehensive basis.

The first step is not difficult, for do we not all believe in these fundamentals:

1. Broadcasting, as a mass medium, best serves the public interest through programming which meets the desires and interests of the majority of the people.

2. Broadcasting assumes a secondary function of programming for minority tastes and interests, and by doing so, offers the majority continuing opportunity to absorb new interests.

3. Broadcasting's responsibility to the public is harmonious with its responsibility to advertisers, for the more effectively it serves the public, the greater value it offers advertisers.

4. Broadcasting depends on public acceptance of its programs in competition with all other forms of entertainment and information, and can best serve the public through the free play of competition, with a minimum of Government regulation.

5. Broadcasting, as the nation's greatest unifying communications force in peace or war, is entitled to the standing and privileges of other free communications media.

Here are five points on which I think we can all unite. As a broad credo for broadcasting, they can serve as the tapestry on which we seek to weave a true image of our industry.

As the next step, we must analyze the sources and nature of the criticism so that we can help others achieve a more valid understanding of our function and contributions.

Broadcasting in a free society

I believe that much of the criticism is rooted in a fundamental misconception of the role of broadcasting. The only hope of eliminating the confusion is to make explicit the fact that broadcasting in a free society is and must be a service designed primarily for the majority. We and our detractors must recognize that it is the only medium which brings a service of broad popular appeal *directly* into the homes and consciousness of a minority with specialized tastes. We must understand that it is minority distaste for programs chosen by the majority that has triggered the slogan of mediocrity — and we must label this slogan for what it truly is, a failure to respect freedom of taste, and an effort of the few to impose their tastes on the many.

We must make equally clear that, within the mosaic of our service, there are many programs appealing to minority tastes. The price of finding them is the small effort of selection, the same effort that goes into selecting a book, a magazine or a play of personal interest.

We must point out that the specialized programs which broadcasting offers — its analysis of public issues, its exposure to the world of ideas, its great theater, its material on the arts, sciences and humanities, its presentation of public figures — these are not only for the minority, they are for the majority as well. Through such programs, broadcasting offers the average American unparalleled opportunities for cultural and intellectual experiences; and, in doing so, it is fulfilling one of its vital responsibilities — one it must constantly seek to enlarge as the audience progressively responds.

The question of quality

To achieve greater understanding, we must also clear away the semantic confusion which automatically labels a discussion program "worthwhile" and a mystery program "worthless." We must challenge the use of the word "quality" as applicable only to programs of limited appeal. Is light entertainment "bad" because it does no more than meet the need of most active Americans for relaxation? Is not this a principal function of broadcasting—the reason most people purchase sets?

There should be no inference, in our efforts to achieve better understanding, that broadcasting has found all the solutions to its problems and should now devote itself to defending the status quo. A service which regards criticism as an affront is leading from weakness, and there is much in broadcasting that can be improved by knowledgeable criticism.

My hope is that from our efforts there will develop greater comprehension of broadcasting's true function and, consequently, fewer stereotyped slogans; and that broadcasting will come to be regarded as a medium which properly seeks to please most of the people

Key (right) was awarded NBC Chairman for speaking "with candor and courage of the place of the broadcasting network in the American social and economic structure," and for "forceful defense of the American system of entertaining, informing and selling through radio and television."

most of the time, instead of a few all of the time. The ultimate question — how much popular programming and how much specialized fare — is a question which neither the minority nor we alone can answer. The answer, however imprecise, must come from the public.

The second group to whom we must convey a clearer understanding is the lawmaker at state and national levels. Here we face a paradox. Representatives of the people are normally responsive to the people's wishes. When they deplore television's emphasis on popular programs, when they propose investigations aimed at program regulation, they in effect separate themselves from the interests of their constituents. Just as they have a popular mandate, so too do we—and it is unrealistic that the two should be in conflict.

The existence of this conflict is more our fault, and the public's, than the lawmaker's. We both have failed to convince him that the audience itself enforces the public interest in broadcasting by its free choice of programming; and that the price of Government intervention in this area must be an inferior service for those he too serves.

Finally, we must convey to the public itself a conscious understanding of our service. This, too, might seem paradoxical, for every measuring device at our command—audience size, sales of broadcast-advertised products, direct communications—indicates that we enjoy public favor to a degree unparalleled by any other communications medium.

With our public, the job is to warn that this service on which it relies so heavily is being threatened—and why. Our tens of millions of viewers must realize that the very programs they have made popular are the ones under censure. They must be shown that any attempt at program regulation is in effect an attempt to curb their own freedom of program choice.

This leads to the third and key step in meeting the challenge—how to tell our story forcefully, articulately and continuously to the dissident minority; to the lawmakers who may be influenced by their criticism; and to the public which may be injured as a result.

The thrust against us is so widespread and pervasive that it calls for the inauguration of a massive communications effort—an effort which can be successful only if all elements of our industry band together for centralized and coordinated action.

The need for such action has long been recognized by many thoughtful broadcasters. In voicing the need here, I am sure I echo what many of you believe; and at this annual forum of broadcasters, the opportunity is at hand to focus our collective thought and will on action *now* — and not some distant tomorrow.

Outlining a program

Without presuming to suggest methods or mechanics, I invite consideration of three elements:

First, we should consider the possibility of commissioning an independent survey of public attitudes toward television. Such a survey of radio in the 40's gave it more than 80% endorsement, more even than churches which occupied the second highest rung of public favor. I am confident that television would get equally high marks.

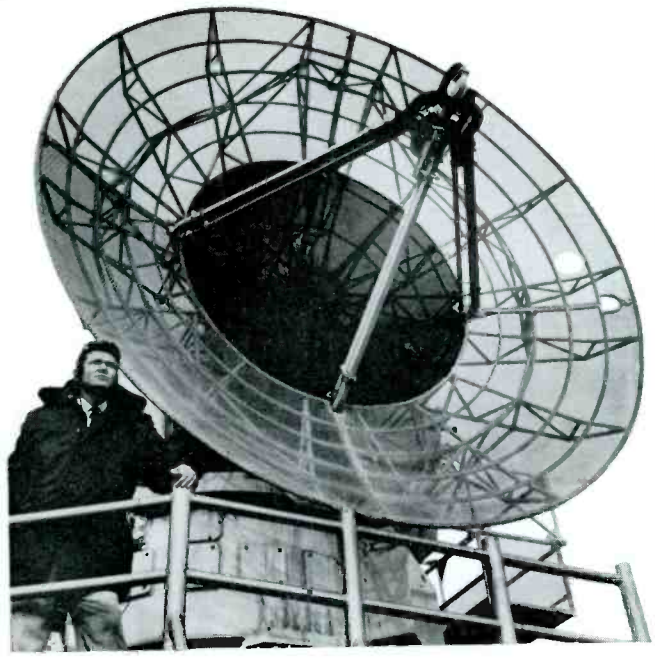
Second, we should consider the most effective methods of using our own facilities to create wider understanding of our medium and how it functions in everyone's interest. If our popular mandate is of the landslide proportions we think it is, then this electronic route might be the swiftest means of mustering support.

Third, we should consider the most practical way to organize and guide the effort. Perhaps it should be within the framework of the NAB as the existing industry association, but with the activity itself specially financed, staffed, and operated as a distinct new effort. It should in fact reach beyond the broadcasters themselves to seek financial support from all those with a stake in the medium.

Meeting the challenge decisively on a national basis will require greater financial support than the industry now provides in the information area. But this should give us no cause to flinch. In ten years, television broadcasting has become a business of $1.3 billion annually. In another ten years, it should more than double that figure—provided it acts now to assert its stature and assure the proper climate for growth.

Whatever the tools we select, we should draw courage from the history of other communications media in this country. Newspapers and magazines have great public prestige, and they have earned it, because of vigorous espousal of their own rights. Broadcasting too has a heritage in which it can take pride. It is time for it to live up to that heritage; to seek by its own efforts an honored position in the ranks of those free communications media which make enduring contributions to the knowledge and enjoyment of the American people. ■

(This article is a condensation of the keynote address delivered by Mr. Sarnoff before the National Association of Broadcasters in Chicago on March 16th. A committee has already been formed to carry out his proposals.)



FLOATING LAB PUTS TO SEA

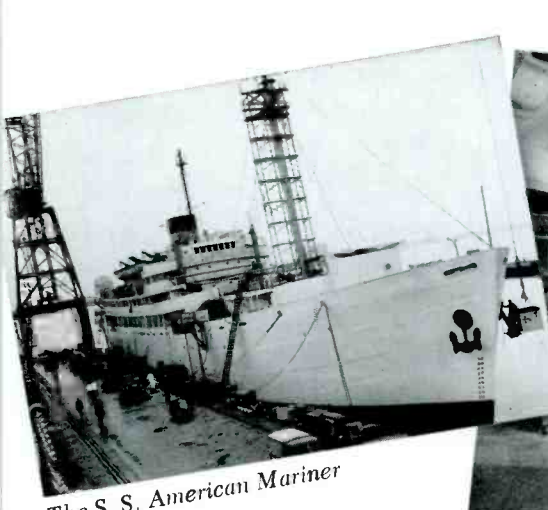
Newly-equipped tracking ship will collect test data on the Atlantic Missile Range

A WORLD WAR II LIBERTY SHIP, until recently consigned to the "mothball fleet" in New York's Hudson River, has been returned to space-age duty on the U. S. Air Force Atlantic Missile Range. The refurbished cargo vessel S. S. *American Mariner* has been turned into a floating laboratory of advanced electronic and optical equipment. Its assignment is to aid in tracking test missiles fired from Cape Canaveral, Florida. It will provide the most precise data yet collected at sea on missile flights, according to Arthur L. Malcarney, Executive Vice President, RCA Defense Electronic Products.

RCA is "systems management contractor" for the ship, and fifty civilian scientists, engineers and technicians on board—not counting the ship's crew—are employees of the RCA Service Company and Defense Electronic Products. The Service Company is also responsible for missile tracking and data collecting on the island bases and picket ships on the Atlantic Missile Range. The range extends from Cape Canaveral more than 5,000 miles southeast to the vicinity of Ascension Island, in the South Atlantic half way between Brazil and the coast of Africa. The ship is now keeping lonely vigil somewhere at sea far from well-traveled trade routes.

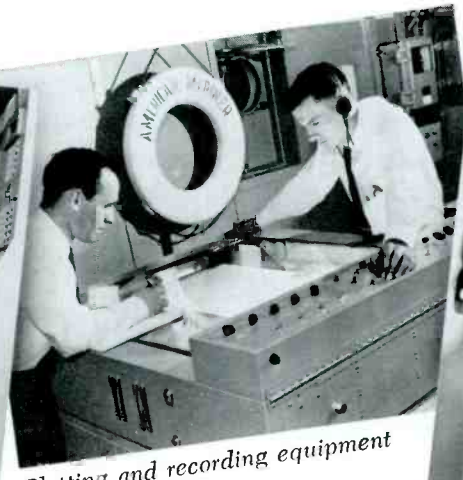
The *American Mariner* is a 10,000-ton vessel measuring 440 feet overall. Among its most important pieces of equipment are two dish-shaped radar antennas standing on the deck at the stern. These are "AN/FPS-16" tracking radars, acknowledged to be the most accurate in use in the free world. They are the first specifically designed for guided-missile range instrumentation, and are the result of a 10-year research and development program carried out by RCA in conjunction with the Applied Physics Laboratory of Johns Hopkins University, the Navy Bureau of Ordnance and the Navy Bureau of Aeronautics. They have already done duty on Missile Range land stations, and have been used to put U. S. satellites in orbit and track Russia's sputniks.

The AN/FPS-16 tracks in total darkness, through clouds and at long range. Tracking data are almost immediately reduced to their final form. Previously, weeks were required to translate this material to in-



The S. S. American Mariner

Central control room



Plotting and recording equipment

Long-range communications

telligible form.

Still another feature of this highly accurate radar is its ease of control. Only a single operator is needed for each unit. It is also reliable, functional under all weather conditions, flexible and highly standardized for use by all three services—thus eliminating duplication of effort.

The information collected by the ship—by radar, by telemetry and by optical apparatus—will supplement the data already being gathered on the missile range by ground stations and picket ships. A video tape recorder, similar to those used for recording and rebroadcasting television programs, will make a permanent record of the telemetry data from each missile test. Precise observations on the characteristics of a missile's performance will be made from the beginning of its ascent to its remote flight through space and down to its final plunge to sea through all levels of the earth's atmosphere. The data will be shared by all branches of the armed forces.

The Navy has provided precision computing equipment to compensate for the ship's roll, thus making possible accurate radar measurements even in heavy seas. Other agencies participating in the planning and direction of this comprehensive missile and satellite measurement program include the Advanced Research Projects Agency of the Department of Defense, and the Rocket and Guided Missile Agency of the Army Ordnance Missile Command.

Technical direction of the program is the responsibility of the Research and Development Division, Army Rocket and Guided Missile Agency at Huntsville, Alabama. Operational support will be provided through the vast facilities of the Air Force Missile Test Center under the command of Major General Donald N. Yates.

The new "missile measurement ship," as the military calls it, was completely refitted at the Baltimore yards of the Maryland Ship Building and Dry Dock Company. The Barnes Engineering Company, of Stamford, Connecticut, was in charge of the design and operation of non-radar measuring projects. ■

WHAT'S FUNNY IN RUSSIA

Since 1955 Irving R. Levine, radio and television commentator for the National Broadcasting Company, has observed life in the Soviet Union. His recent book, Main Street, U.S.S.R., *is a penetrating report on the daily life of the average Russian. His stories of what makes Soviet citizens laugh are especially revealing.*

ON HUMOR:

Many Russian jokes seem pointless, but not all. Russians tell the story of a man who called Minister of Culture Mikhailov a fool and received a sentence of twenty years—five years for slander and fifteen years for revealing a state secret.

ON STALIN:

A foreign diplomat was traveling through the Soviet countryside and struck up a conversion with a collective-farm member. He asked the Russian the name of his farm. "Until *now*," replied the peasant, "it's *been* called the Stalin Collective Farm."

ON HISTORY:

A history teacher, lecturing on World War II, attributed victory over the Germans to the wisdom and unerring leadership of the Communist Party. A bold student raised his hand. "How did we ever win the war against Napoleon when there was no Communist Party?"

ON POLITICS:

Lenin is supposed to have remarked once with engaging candor that there could be any number of political parties in the Soviet Union but only on one condition. The Communist Party must be in power and all the other parties must be in jail.

ON ECONOMICS:

Strategists in the Kremlin were plotting war.

"We could send ten men to the United States with atom bombs in suitcases," suggested the leader.

"No," interrupted his comrade, "we couldn't do that."

"Why not? We have plenty of atom bombs."

"Yes, but where are we going to get ten suitcases?"

ON PROGRESS:

An American visitor was trying out reception on his midget transistor radio while riding on a Soviet train. Russians watched with curiosity as he held it to his ear. Finally a Russian, unable to contain himself any longer, blurted: "We have those too . . . What is it?" ■

SPECIAL REPORT ON COLOR TV

COLOR TELEVISION

FIVE YEARS OF PROGRESS

During five pioneering years color TV has opened a bright new window on the universe and given a fresh dimension to American home entertainment

COLOR TELEVISION—five years old this year—is transforming itself from an agreeable novelty into a durable force in the entertainment field. On all sides, there are unmistakable signs of a genuine groundswell of enthusiasm and excitement about color.

At the invitation of the White House, RCA will stage a color TV exhibit this summer in Moscow as a highlight of the American National Exhibition.

TV columnists are increasingly enthusiastic. Says syndicated columnist Hy Gardner: "Color perfection is here, ready to be welcomed into every home, ready to be enjoyed."

Color set owners are excited about the performance of their sets. A New York businessman enthused: "It's the most marvelous thing that ever came into my home—with the exception of my wife."

Distributors and dealers find color TV boosting their home-instrument business. In one recent month, RCA distributors in some areas of the country had greater sales in color sets than in black-and-white.

Programmers are doing more and better shows in color. Last month NBC put on ten major color specials in addition to its regular color schedule of two hours each day.

Advertisers are looking with greater favor on color. Kraft Foods recently signed Perry Como to do sixty-six hour-long shows in color over the next two years.

The Governor of California proclaimed April as Color Television Month "in celebration of the fifth anniversary of color TV as a great achievement in communications."

"These heartening signs add up to sharply increased activity in color," said Charles M. Odorizzi, RCA Group Executive Vice President. "This new interest already is reflected in an encouraging sales trend—a trend which we are confident will be accelerated as we progress into 1959."

Mary Martin made color TV history with "Annie Get Your Gun" in 1957.

In the five years since color television went into commercial production at RCA's plant in Bloomington, Indiana (recently designated "The Color Television Capital of the World") notable progress has been made in every phase of this new art, science and business.

Here, in brief, are the highlights of color TV's five years of progress:

1. **Color sets** have been made technically superb, simpler, easy to tune, and highly reliable.

2. **Improvements in the design** and engineering of color receivers have sharply reduced the number of service calls required and the cost of service contracts. Contract costs have been cut 30 per cent in the last year alone.

3. **Color programming** has expanded, both on the network and local levels, and 97 per cent of all American homes have been brought within range of color broadcasts.

4. **Public interest** in color has mounted steadily, a fact pointed up by the rising sales trend and the growing number of advertisers and retail dealers becoming active in the new medium.

5. **The elaborate color facilities** that have been built and the new technical advances that have been made — like the development of color television tape —have opened the way for still further expansion of color schedules in the future.

1. Progress in Color Receivers

Since the first sets appeared on the market in 1954, color receivers have been vastly improved, greatly simplified, and substantially reduced in price.

Splendid theater comes alive on color television. Below, the Old Vic Company production of "Romeo and Juliet."

The first color sets had a 15-inch screen, forty-two vacuum tubes, four color controls, and a price tag of $1,000.

In today's models, the screen size has been increased to the popular 21 inches. The number of tubes has been reduced to twenty-six through the use of improved circuit designs. Some 80 to 90 per cent of the circuitry is on high-quality sealed-circuit boards—panels with the wiring permanently etched or stamped on. The color controls have been reduced from four to two, and a remote control unit has been developed for color. Suggested retail prices start as low as $495—far less than the cost of "extras" on a new car. Easier credit terms and increased trade-in allowances make it possible to buy a color receiver for almost the same installment payments as a black-and-white set—about 50 cents a day.

The once-widespread misconception about color sets being hard to tune and easy to get out of commission has been largely erased from the public mind.

Engineering refinements have simplified the tuning equipment to two knobs — one marked "Color" and the other "Tint." A simple adjustment of the "Color" knob gives the degree of color desired. A twist of the "Tint" knob produces the shading and flesh tones most pleasing to the eye. That's all there is to it.

Not long ago, when a color set at the RCA Exhibition Hall in New York got slightly out of focus, a grey-haired spectator stepped out of the crowd, turned one of the control knobs gently, and brought the picture once again into sharp register.

"How did you learn to do it?" another spectator asked enviously.

"My 8-year-old grandson taught me on our color set at home," came the crisp reply.

2. Servicing Simplified, Cost Reduced

Statistics show that the number of service calls required for a color set has been surprisingly moderate. The RCA Service Company has found that in the first ninety days, a black-and-white set requires an average of two service calls, while a color set requires an average of only 2½ calls.

Expert color TV servicing is readily available today all over the United States. During the past five years, a traveling team of RCA Service Company training personnel has conducted free "color clinics" from coast to coast. These clinics have attracted 124,000 service technicians, a significant indication of the TV serviceman's interest in learning more about efficient installation and maintenance of color sets.

The cost of color TV service contracts has been reduced markedly. When the first 15-inch set was

The magic of color television was shown in the familiar fairy tale, "Cinderella," recreated by the British Royal Ballet.

introduced five years ago, the price of a complete one-year contract (for installation and service) was $249.50. By last year, the price for this contract had been reduced to $99.50 for a 21-inch receiver. Then, last June, it was brought down to $89.50. This month there was a further reduction — to $69.50. This is a full 30 per cent below the cost a year ago and comparable to the cost of a year's contract on a monochrome set.

"This progressive reduction," said Mr. Odorizzi, "is the most convincing evidence yet offered, outside of the set itself, of the great engineering advancement RCA has made in color television."

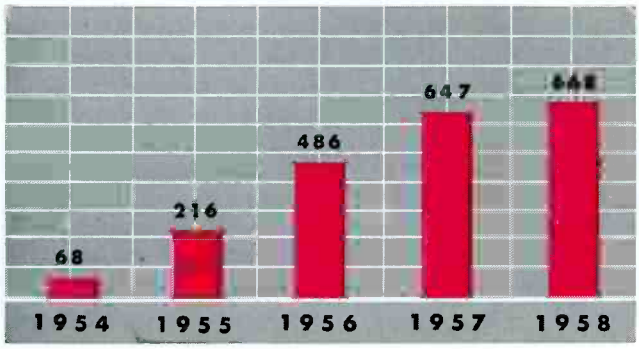
3. Advances in Programming

Television viewers are now offered more color than ever before — more nighttime color, more color specials, more color shows for Sunday family viewing. NBC is colorizing all but four of its regularly scheduled "live" programs in the 7:30-to-11 p.m. time slot.

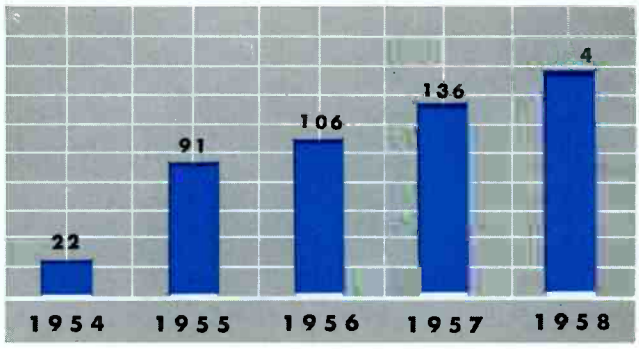
This season the network is carrying ten times the volume of color broadcast in 1954. In fact, the 668 hours of color programming in the single year of 1958 far exceeded the 500 hours of color contained in all the color movies distributed in the United States during 1956 and 1957.

This network programming is being supplemented by local stations. More than 100 local outlets are equipped to originate color shows, either live or on film. Areas like Boston, Chicago, Cincinnati, Philadelphia, Milwaukee, Omaha and Fort Worth enjoy a heavy schedule of local colorcasts. All told, some 300 stations — well over half of all U. S. stations — are equipped to handle network color programs.

INCREASE IN COLOR PROGRAMMING
(Total hours of color on NBC)



INCREASE IN COLOR STATIONS
(NBC color-equipped affiliates)



The network color schedule covers the entire spectrum of entertainment — musical shows like those of Perry Como and Dinah Shore, variety series like the Steve Allen Show and the Ford Show, audience participation programs like Truth Or Consequences and The Price Is Right, and adventure series like Northwest Passage. The schedule is also generously studded with such color specials as An Evening With Fred Astaire, and The Green Pastures, as well as sports events like the World Series and Big Ten football.

Since NBC opened the era of color TV, it has steadily and rapidly expanded its color programming. In 1954 it presented 68 hours of color; in 1955, 216 hours of color; in 1956, 486 hours; in 1957, 647 hours; in 1958, 668 hours. In the year ahead, NBC is planning a new phase of color expansion which will introduce a long list of exciting new specials.

The power of color television to attract and excite viewers has been recognized by the nation's advertisers. During the introductory year of color in 1954, the NBC network's color shows had six sponsors. Currently, there are seventy-three. One out of every three NBC advertisers is sponsoring a color show.

Sponsors turn to color TV for the prestige inherent in any color advertising, the distinction of being first in a new medium, and the glamour and realism of color commercials. "When there is color in every home," said Kraft's John Platt, "we will send out bibs to the viewers to use when watching our commercials."

4. Growth of Interest in Color

The improvement of color sets and the expansion of programming have stimulated increasing interest in color. The majority of those who see it like it (seven out of ten home demonstrations result in sales). The majority of those who buy color sets are well satisfied with their purchase.

Nine out of ten color set owners enjoy it "very much," according to the ColorTown study sponsored by NBC and the advertising firm of Batten, Barton, Durstine and Osborn, Inc.

Homes with color television sets are twice as likely to be watching a color program as their neighbors are to be watching the same program in black-and-white. This was one of the principal conclusions from a survey recently completed in Cincinnati by Burke Marketing Research for the Crosley Broadcasting Company. Seven out of eight families told the Crosley researchers that if they had it to do all over again, they would not hesitate to buy a color set.

The vast majority of the nation's 435,000 color TV families (according to latest industry estimates quoted in *Television Age*) wax lyrical when describing their reactions. "I think color TV is just out of this world," said a Midwest housewife. A New York broker declared: "It spoils you for black-and-white; I only watch programs in color now." TV columnist Terrence O'Flaherty confided to his readers in *The San Francisco Chronicle:* "There's no gadget in my house that has given me as much pleasure as my color TV set (and that includes skis and a sports car). My neighbor, Mrs. Pellachotti, feels the same way — and she includes her husband!"

The enthusiasm of color set owners and a growing number of TV dealers is reflected in the sales trends. Color sales kept rising through the 1958 recession.

Television dealers, at first concerned by the competition color was giving their black-and-white business, have come around, more and more, to the conclusion that color offers the brightest prospect for profit in the TV industry.

Typical of the new attitude of retailers toward color is that of Mort Farr, one of the Philadelphia area's largest appliance dealers and Chairman of the National Appliance and Radio-TV Dealers Association.

"Each set sold becomes a silent salesman and makes the next deal that much easier to close," he

said. "And performances of present sets are so good that customer 'radiation' will be good. Color's appeal is universal. We have sold a set to the president of a shipbuilding firm, and to a mill worker who pays $36 a month on the installment plan. Everybody who has a black-and-white set is a potential customer."

Across the country in Fresno, California, TV dealer Ray B. Denham reported that "we have felt an obligation as responsible merchants to determine the point at which color TV moved into the merchandising picture as a bona fide marketable product."

"In our opinion," he emphasized, "that time has now arrived."

The attitude of distributors toward color was summed up by Thomas F. Joyce, President of Raymond Rosen Company, Inc., Philadelphia:

"We now feel that color television is almost at the break-through point. We have throughout our trade area 20,000 color television receivers in homes. Each one of these is a selling station for color. . . . Our objective in 1959, which we believe we will accomplish, is the sale of 12,000 color television receivers."

5. Promise of The Future

The mounting interest in color, plus the elaborate color facilities that have been built and the new technical advances that are being made, assure a continued expansion of color schedules in the future.

RCA has demonstrated its own faith in the future of color by an investment of time (a quarter century of research and development) and money (more than $130 million) wholly unprecedented in the annals of American business. Today, because of this investment, an impressive reserve of color know-how and facilities has been built up.

NBC owned and operated stations in Los Angeles, Chicago, Philadelphia and Washington are fully equipped for color. The new $4 million Washington installation is the first station ever built from the ground up for color TV.

In New York, besides its color facilities in Radio City, NBC operates two huge color studios known as "Brooklyn I" and "Brooklyn II." Other major color centers in New York include two colorized theatres — the Ziegfeld and the Colonial — and two scenic production centers, one in Manhattan and the other in Brooklyn. On the West Coast, in addition to its studios at Sunset and Vine in Hollywood, NBC has constructed a color complex known as "Color City" in nearby Burbank. There the network has four large studios. Color City includes a technical center which houses film facilities, master control, and television tape equipment.

Television tape, combining the picture quality of live programs with the storage and rerun benefits of film, is the brightest of the new technical developments that promise to contribute importantly to color TV's future. Use of tape recorders can help achieve national schedule uniformity the year round, and effect substantial production economies (where color film adds 20-25 per cent to production costs, television tape adds only 5-10 per cent since no processing is required).

RCA recently unveiled an advanced television tape recorder that promises to be a boon to color programming. The new recorder makes it possible for the broadcaster to start with monochrome programming alone and include color at any time through the simple addition of a single rack of color-handling equipment. No modification of the original machine is necessary. A self-contained unit, the RCA recorder includes features designed to bring the art of TV tape recording to its most advanced state.

It is widely recognized that color represents a great opportunity not only for the television industry but for many others that would benefit indirectly. A full-scale color effort would put the set makers back in the high profit position they enjoyed a few years ago. Similarly, the full blossoming of color would bring new life and excitement to television broadcasting, as well as new profits from advertising.

A color boom would also benefit manufacturers who make glass for TV picture tubes and metal for TV chassis. It would aid retailers of colorful products such as clothing, home furnishings, jewelry and food by giving them a superior medium for advertising their wares. In short, it would have a chain reaction throughout the entire economy, providing more work for more people.

Market research studies show that, at current price levels, there exists a potential market for 750,000 to 1,000,000 color receivers.

The consensus is that "exposure" is the key to color TV's success. Even after five years of color, two out of three viewers still have not seen a color show. Once they have seen it, say the experts, they will "sell themselves." As Jack O'Brian, TV columnist of the Hearst newspapers, put it: "Color television is an amazing miracle. . . . Once you have seen it in its ideal state — and it has truly advanced to a perfection which startles eyes accustomed to black-and-white TV reception — to go back to the dullness of monochrome TV would be like trying to appreciate a Renoir, a rainbow, or a Ringling Circus in the sad, gray monotony of the absolutely color blind. It is beautiful; there is no one other word for it." ■

PUTTING THE RAINBOW

Backstage it's work, talent and inspiration that go into color TV's spectacular shows

A PROPERTY MAN rubs shoe polish on a trumpet. . . . Workmen paint a studio floor weekly for an hour's use, then scrub the paint off. . . . A musical comedy star makes an unscheduled costume change in mid-show. . . . An engineer's eyes bug as a famed master of ceremonies begins to turn purple on the studio monitor. . . .

These are some of the strange events of the backstage world of color television, though not all of them still happen now that the medium has come of age. From the time NBC began blueprinting it, the complex domain where the rainbow begins has bristled with new challenges, new opportunities, new techniques. For five years before the NBC Opera Company's "Carmen" became the medium's first major production in October, 1953, NBC conducted color research in scenery, costuming, make-up and lighting, trained its operating personnel in the findings and even held "clinics" on color commercials for sponsors and advertising agencies. A special group of color experts was formed to coordinate the engineering and creative efforts on every color show.

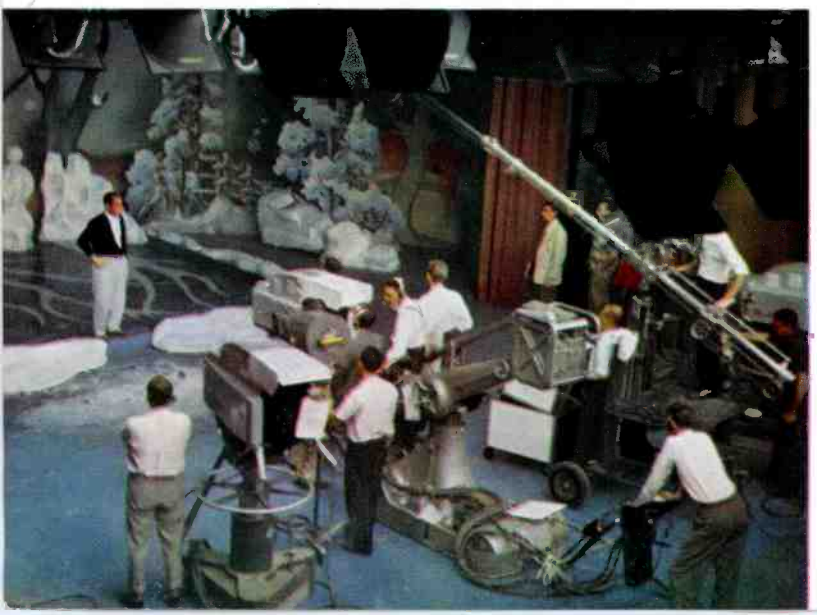
They soon found that color TV demanded bigger studios — $28,000,000 worth so far, counting the equipment installed. It also took four times as much lighting as black and white (though it was five times at first); a more finicky standard for costumes and sets; more technicians and, as a rule, more rehearsal time. Unlike black-and-white TV production, where the scenic artist and the costume designer often need no more than a phone call to keep in tandem, scenery and costumes had to be carefully harmonized with a critical eye — and so, along with them, did the titles drawn by graphic artists.

Wider Spectrum with Greater Fidelity

Early in the years of experimental transmission, when NBC pioneers regularly turned a camera on a vase of flowers, a bowl of fruit and a blue-eyed redhead, a prankish engineer once created consternation on the receiving end by painting a banana in the fruit bowl blue. But the system's color proved remarkably true. Indeed, the experts found that color television reproduces a wider spectrum with greater fidelity than any other system, either on film or in print. It also sees color more objectively than the untrained eye, and that posed some problems.

The brain often compensates for the eye. For example, a white tablecloth by candlelight would be identified by most people as white, though its actual color at the time is yellow. Under the bright lights on a color set, the camera sensitively records the red pigmentation in the skin, especially ears, noses and necks, and makes faces seem blotchy and unnatural by comparison with their appearance to the discreetly compensating human eye.

To correct this effect, NBC make-up artists worked with Max Factor cosmeticians to develop a special make-up palette for color TV. They devised a system with dozens of shades for men and women of varying complexions. They even developed a full range of shades for Negro performers, whose skin often needs



Perry Como will do sixty-six hour-long color shows over NBC in next 2 years.

Grand Opera is brought to the color screen in all its original brilliance, as in this scene from an NBC network colorcast of Moussorgsky's "Boris Godunov."

the addition of warmer tones to offset the greying effect of the bright lights.

Flesh tones were vitally important because they serve as the basic tuning guide for the viewer, but NBC researchers discovered that even these were subject to the shifting variables that affect any system of color rendition. They learned that "normal" flesh tone was rather pale in the East compared to a reddish coloration in the South and a tan one in California. They found that they could strike a compromise to solve this problem, but "Haggis Baggis" Bert Parks presented a poser when his exertions on the air turned him steadily magenta as his show progressed. The technicians dubbed the energetic star "Purple" Parks and started coping with his chameleon tendency in the same way they handle the changing color of daylight during an outdoor colorcast — by "painting" with their control panel knobs to compensate for the change.

Three-Dimensional Scenery

The color camera is quick to spot any flaws or wear in sets and costumes even when they might pass unnoticed in black and white. Moreover, color adds such a striking sense of depth to the television picture that the flat scenery often used effectively in black-and-white production is made to seem artificial and inadequate. To meet this challenge, experts developed a machine that reproduces three-dimensional plastic facsimiles ranging from brick walls and wooden fences to the most elaborately fluted marble pillar. The network has two of these machines turning out props and scenery for all NBC shows; thus a development prompted by color is benefiting black-and-white production as well.

Shoe Polish and Grey Paint

NBC's color coordinators learned that they could improve the picture by using the studio floor as a source of reflected light. It is usually painted in warm pastels and often also adds a decorative effect to musical shows. The stage of Manhattan's Ziegfeld Theater is painted weekly for the Perry Como Show and then promptly scrubbed for use by other programs. In NBC's big Brooklyn studios, a plastic layer is spread on the floor as a base; after about 15 different coats have been painted on it, the layer is stripped off the floor and replaced with another.

Like any photographic system, color television functions within a limited contrast range of brightness and darkness. In the early days, the cameras were sometimes dazzled momentarily by a glare of reflected light. The first solutions were to avoid bright surfaces or dull them with a flattening agent. Once a property

man hastily took the sheen off highly polished trumpets and trombones on a jazz show by smudging them with shoe polish. On a variety show, a great star turned up minutes before air time wearing a gold lame gown; the color coordinator promptly sprayed it with grey paint. On another occasion, Ethel Merman was whisked to the dressing room for a quick change after a jeweled gown sent spark-like flecks darting across the screen.

But the production staffs have learned to use lighting and camera angles so adroitly that they can shoot glittering objects as large as a 1959 station wagon without a dazzle or "bloom" on the screen. White was once taboo on color TV because it seemed to exceed the medium's contrast range, but experts found that it can be used to good effect if the whole scene is colored in a high key. Black was once considered impossible for similar reasons; yet black velvet, punctuated with flashlight bulbs, makes a perfect night sky in the annual "Amahl and the Night Visitors." Says Reid Davis, a veteran color coordinator: "There's nothing you can't do with color if you present it in the right surroundings."

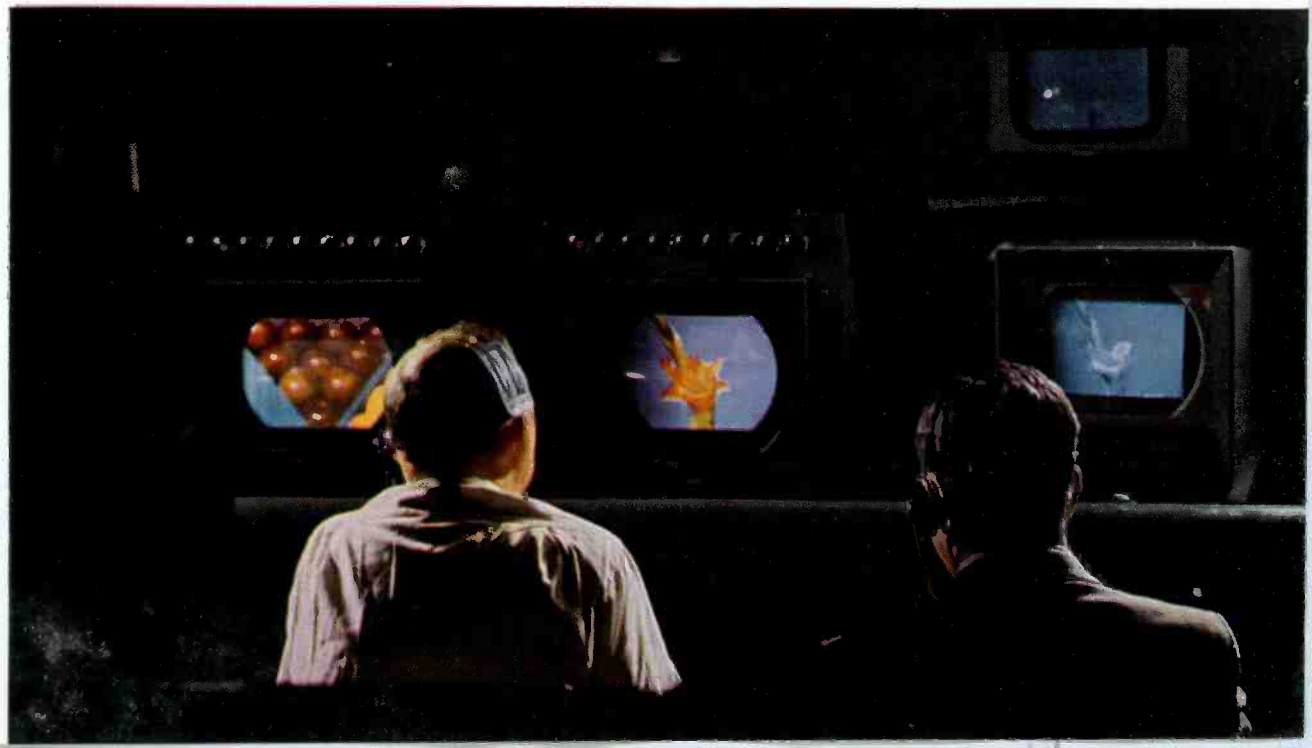
Color TV's Premiums

Color has presented dramatic premiums along with its problems. It is possible, for example, to create the illusion of the passage of time by using different colored lighting on backgrounds. Light blue for daylight, reds and yellows for sunset and dark blue for night create effects that cannot be achieved with shades of grey. Color also helps to create mood. On a recent Perry Como Show, a jazz sequence was lighted with "hot" reds and oranges, while a waltz number was washed with cool blues. Another color use is to create a sense of action in an otherwise static scene, as when the background during a vocal is lighted with a whirling spectrum. And a dance floor can be covered with pools of colored light so that the costumes change color as the dancers move across the floor.

Still another color advance is afforded by the electronic magic of Chroma Key, a special NBC process that permits the image from one camera to be inset accurately into the picture from another. Thus, with the use of a film, photograph or painting — or another live TV shot — the performers in a Manhattan studio can appear in any setting from a California mountain top to a Paris boulevard. Chroma Key has provided a production tool of such flexibility that new uses are still being discovered. The possibilities added by the development of color television tape have made the color studio as versatile a production center as a Hollywood movie lot.

Overcoming the Problems

Ingenuity, hard work and technical progress have licked every problem yet encountered in color production while giving an affirmative answer to the question that, ironically, still dominates the new medium: will it make a good picture in black and white for the tens of millions of viewers who still see it that way? The risk is that some shades of color that contrast well together may translate into the same shades of grey in the monochrome version. Against that risk, RCA developed an electronic meter to give grey-scale readings of every color shade, and NBC experts have learned to make the same readings by eye. The result is not only vivid color but a monochrome picture of subtle gradations and nuances unequaled in black-and-white television. ■



Pictures in both color and black-and-white appear on monitor screens before technicians in control room of NBC studios in New York City.

"WHAT 50 TOP CRITICS SAY ABOUT COLOR"




Nation-wide survey finds TV columnists overwhelmingly enthusiastic about living color

Electronic Age polled the nation's top television critics on their reactions to color TV. The poll showed that 96 per cent of the critics are favorably impressed with color as a medium of entertainment and information. The replies follow.

EAST

ALDINE BIRD – *Baltimore News-Post:* "Color on television is that medium which transforms a picture into reality – gives it life, warmth, depth, nearness, viewing impact. . . . It turns night into day. If your heart is in the right place, it can make even a so-so quality show a good show to have seen. Your eyes love color—and the eyes have it!"

JOHN CRICHTON – *Advertising Age:* "Color television represents one of the brightest frontiers available to advertisers. The undeniable impact of color – proved in newspapers, magazines and supplements – should enhance television's commercial utility. What color television can do for food, fashions and furnishings is astonishing. The only question is when audiences will reach proportions large enough to justify greater advertiser interest."

JOHN CROSBY – *N. Y. Herald Tribune Syndicate:* "You folks who haven't got color television are sure missing it on shows like this (Shirley MacLaine Chevy Show). Miss MacLaine in a white flower-studded kimona, the gay red and blue curtains were so eye-filling that it's as if we are seeing another show entirely. The designers of the Chevy productions have been doing a superb job and it must be heartbreaking that so few color set owners can see them, particularly their lovely openings (this one was shown in the reflection of a pool) which are marvelously ingenious and colorful. I might add that I don't own a nickel's worth of RCA stock but I do wish more people would buy color sets because then we'd have more color TV productions."

JACK ELLIOTT – *Newark Star-Ledger:* "The only real way to get an idea of what a difference color makes is to watch a show on color and black-and-white at the same time. . . . I recently watched a rehearsal of the Perry Como show with monitors in both color and black-and-white, and the difference is something that would be hard to describe. Color is actually a new dimension. Next to it black-and-white looks flat and drab."

Early color TV landmark was Mary Martin's "Peter Pan."

WIN FANNING — *Pittsburgh Post-Gazette:* "Color is near and dear to my heart, as it probably is to anyone who has seen it during major studio-controlled productions. In July, 1957, I wrote, 'Color is here. Why miss all the fun?' . . . It was further suggested at the time that anyone who could afford a higher-priced black-and-white set should consider color before making a large investment in a monochrome receiver. Despite NBC's determined effort to undermine color by public demonstrations of outdoor sporting events — to which color adds little and cannot be properly controlled — I find no reason to take back my previous statement. I might even add that the color on such programs as The Dinah Shore Show, The Steve Allen Show and on the spectaculars — fine example: the Fred Astaire Show — meets Technicolor standards in all respects."

ARTHUR FETRIDGE — *Boston Herald:* "Color has done for television the same thing that it has done for motion pictures. It has brought to life the figures and the background that we see as we watch color shows. . . . I have a feeling that color has improved tremendously in the past year because producers have learned to soften their shades and by so doing, have made the picture more beautiful. It is a crying shame that more people don't have color receivers so that they can enjoy the beauty of color television. I am particularly incensed because other networks have not been broadcasting in color as has NBC and some of our local stations."

HY GARDNER — *New York Herald Tribune:* "Color makes the players live and breathe, it gives their words and music a lilt and lift, it makes the screen a part of the decor of your room instead of an animated black-and-white photograph. If the show is good in black-and-white, it's great in color. . . . Color perfection is here, ready to be welcomed into every home, ready to be enjoyed."

NORMAN GLENN — *Sponsor:* "The remarkable sales impact of television will be multiplied for many advertisers when color TV really comes into its own. When this happens I believe we can look forward to an intensified use of the TV medium by advertisers who rely on color for further expression of their products."

JACK GOULD — *New York Times:* "The ninety minutes (of The Green Pastures) were a total joy. . . . The staging was brilliant. In color especially some of the scenes had a stark simplicity that suggested a religious painting."

ABEL GREEN — *Variety:* "Color TV, if it is not already overdue, should really 'get off the ground' in 1959. Anybody who has seen or been exposed to color TV fully appreciates the significant plus-values of spectrum telecasting — what it does to enhance programming and in selling the merchandise. Main fault has been, I'm afraid, that not enough people have been exposed to color. Remember how everybody saw TV in any given pub or club, saloon or tavern? . . . Unfortunately, color TV hasn't had that sort of exposure."

TED GREEN — *Radio-TV Daily:* "Color — that breath of life that enhances everything it encounters — has proven a decided asset in practically every medium in which it's used, such as clothing, cars, printing and TV, to mention just a few. . . . In the clothing field, were it not for color, our females would all appear alike. In cars, many a time it's the paint job that wraps up a sale. Printing in color has been with us a very long time and has established its appeal in both attention and satisfaction. Color in TV, while slow in getting off the ground, will prove the future big boom in television."

BEN GROSS — *New York Daily News:* "Without question, color does bring an extra dimension of enjoyment to any program. Those who have experienced it would not do without it. Certainly, the rainbow hues added immeasurably to the appeal of such shows this season as Kiss Me Kate, starring Alfred Drake, Patricia Morison and Julie Wilson, and to the Tchaikowsky Nutcracker ballet, which was seen during the Christmas holidays."

HARRY HARRIS — *Philadelphia Inquirer:* "Color adds whee to TV. It dramatically enhances programs' beauty and over-all impact. In many instances, it has meant the difference between grading a show fair or good, good or excellent."

BERNIE HARRISON — *Washington Star:* "Color is an exciting TV plus, a fact that can be proved every time a black-and-white viewer sees a good show (Dinah Shore, Hall of Fame, etc.) in tint for the first time. Sets also are reliable, require adjustment only about as much as black-and-white. So why no breakthrough? Cost of color sets must yet come down within, say, $50-to-$100 of comparable black-and-white. . . . Better programming is a must. When that happens, breakthrough."

STURGIS HEDRICK — *Buffalo Evening News:* "Color television is its own best salesman. You see it, thrill to it and buy it. You enter a very special land of enchantment when you first see color television. And the viewer response follows an invariable pattern: First, interest; then, excitement and — finally, a purchase."

DICK KLEINER — *NEA Service:* "Color TV has successfully passed through the 'toy stage' of development. In the beginning, scenic designers, costume designers and their gaudy associates played with color like a kid with a new paint set. They splashed the sets with blindingly bright colors. Lately, they've begun to realize there's beauty in muted tones, pastels and even monotones."

FRED KUGEL — *Television Magazine:* "There is no doubt in my mind that color is the future of the TV medium. This conviction is shared by many advertisers and broadcasters. . . . It is based on reports from advertisers who have used color over the past few years and their agencies, our own investigations and our own personal experience as home viewers. I myself have been amazed, and pleased, at the excellent service my own color set has given me and my family for several years, and at the virtual lack of servicing it has required."

ROLAND E. LINDBLOOM — *Newark News:* "Color is magnificent. . . . I have a black-and-white set adjacent to the color set, and I frequently turn on both sets for comparison purposes. The difference between the chromatic and B & W versions is so startling that friends enviously accuse me of having a sweet racket, just sitting around looking at pretty pictures. That, of course, just isn't so, but the color shows make the viewing and critical tasks so much more rosy."

CHARLES MERCER — *Associated Press:* "Color adds a new dimension to television viewing. Performers, costumes and settings, seen as the producers envisioned them, take on a liveliness not realized on black and white sets."

JACK O'BRIAN — *New York Journal-American:* "Color television is an amazing miracle. . . . Once you have seen it in its ideal state — and it has truly advanced to a perfection which startles eyes accustomed to black-and-white TV reception — to go back to the dullness of monochrome TV would be like trying to appreciate a Renoir, a rainbow, or a Ringling Circus in the sad, gray monotony of the absolutely color blind. It is beautiful; there is no one other word for it."

MERRILL PANITT — *Television Digest:* "Color is temporarily on the double horns of a dilemma: the 435,000 color sets in

use throughout the country are insufficient to attract advertisers, and the volume of color programming is not enough to stimulate customers to buy in volume. Nevertheless, our enthusiasm for color TV has not waned. To see it is an exciting new experience – an obvious and inevitable progression. Color TV as a major force is not yet here, but we are confident it will some day be the source of a great new surge of business for the broadcast industry and manufacturers alike."

S. J. Paul – *Television Age:* "Although many people feel that color has reached a plateau we, at Television Age, believe that television is about to move into its greatest area of expansion. . . . The advertiser and the agency anticipate color with great enthusiasm. . . . Color can be a boon to the manufacturer since it will mean the movement of more sets, especially at this time when the sales of black-and-white sets have tapered off. . . . To television station owners color means that the value of his facilities is considerably enhanced. It also means eventually higher rates and, therefore, increased revenue. All the networks will gain by color since the networks – as well as the individual stations – will be able to land categories of accounts such as textiles and soft goods, currently using four-color ads in magazines."

Dinah Shore is one of critics' favorites.

Fred Remington – *Pittsburgh Press:* "While nothing can make a poor show good, it is my observation that color strongly tends to bring a quality of excitement and distinction to programming that might otherwise be quite routine. And TV content that is outstanding in black-and-white, such as the Christmas night 'Nutcracker,' takes on an added dimension of significance in color. After all, the human consciousness is accustomed to color as one of the many sensations of experience; subsconsciously, I think, there is a sense of incompleteness in a visual experience that lacks it."

Robert Sokolsky – *Syracuse Herald-Journal:* "Color certainly adds to the impact of the program and any show benefits from it. Particularly amazing are the remarkable strides that have been made in this process during the past few years. But, as effective as color is becoming, it is still not worth the prices being asked for current sets – not in this day of inflation, taxes, etc."

Sol Taishoff – *Broadcasting Magazine:* "Color television, all too long, has been the sleeping giant of the entertainment and advertising media. Although RCA-NBC have gone all-out in developing and promoting colorcasting, the lethargy of other set manufacturers – evidently interested only in the immediate profit dollar – has impeded normal progress. Nevertheless, we feel that these artificial barriers cannot be unduly prolonged and that public demand, stimulated by the high quality color programming on NBC and on more and more stations equipped for color originations, will force the long overdue breakthrough in the months ahead."

Marie Torre – *New York Herald Tribune:* "A *Television Age* magazine survey points out that homes with color TV sets watch television twice as much as homes with black-and-white receivers. As a color set owner, we can attest to that. The effectiveness of color television is such that often we select a 'fair' color show over a 'good' black-and-white show."

Harriet Van Horne – *New York World-Telegram and Sun:* "In color *(The Green Pastures)* was a feast of glory. The celestial fish fry, with a winged Gabriel crying 'Gangway for De Lawd God Jehovah!' was exquisitely staged. . . . In sum, it was a distinguished 90 minutes of television."

MIDWEST

Jim Frankel – *Cleveland Press:* "Technically, color is usually a pleasure to tune. The only distraction is to find a blue face being shone upon by a blue light . . . then watching the face move on to a red light and turn red. Although tuning is simple, maintenance is troublesome – due to the more complex nature of a color instrument – and if one is without guarantees, expensive. Programwise, I find not enough to lure viewers into buying color. Save for Perry Como and Dinah Shore, the most popular TV programs are not color shows. . . . With more color adventure film programming and even a minimum of support from the other two networks, viewers should start to consider seriously the purchase of color TV."

Herschell Hart – *Detroit News:* "Color television is like looking through a picture window at all life's beauty. . . . To those who have asked this department whether color television is worth the price, we have answered – it is indeed."

Robert J. Hoyland – *Kansas City Star:* "In my case, seeing a show in color just about doubles the enjoyment. Color gives a dimension to TV that is lacking in black-and-white. It gives depth and sharpness of detail. Color TV has been perfected to a point, both in transmission and reception, where the viewer sees the tints just as they would appear to the naked eye. My 1958 RCA set is as trouble-free as any black-and-white set I ever owned."

Janet Kern – *Chicago American:* "Color adds to TV a dimension which is always a decided asset and, in the case of 'spectaculars,' etc. is indispensable. A color set is the only economically sensible TV purchase today. In my long experience as the owner of two color sets, I have encountered considerably *less* technical trouble and need for service than has been the case with my five black-and-white sets.

"It is (and has been) my sincere, and often expressed, conviction that a color TV set is a safe, sane, and highly desirable set for anyone to own – but that it *must* be installed *by* the manufacturer (not the retailer) at a time when there is a colorcast by which to tune; that it *must* be serviced only by factory servicemen trained in color set repair – not by independent or dealer servicemen (nor even by manufacturer's servicemen trained only in black-and-white set handling).

"Personally, I'd hate to be without a color set and I find many shows (especially 'spectaculars') exceedingly dull and grey without benefit of color reception."

Paul Molloy – *Chicago Sun-Times:* "Good television is plainly possible without color. At the same time, it is redundantly obvious that good television becomes better television with the beauty and excitement provided by color. As one who is closely in touch with the public's video tastes, I find the situation resolves itself simply to this: The average viewer would prefer to receive color television in his home, and there is sufficient tinted fare to warrant that preference. Two obstacles remain in the way: The initial cost of the set, and the fear that maintenance of such a set would be much beyond today's budget (a fear which may be exaggerated)."

Brainard Platt – *Dayton Journal Herald:* "Color adds a magnitude and depth to television that makes the conventional black-and-white version seem drab and lifeless, especially on scenic shows. In fact, many commercials, the thorn in the side of most viewers, pick up meaning and gain viewers just by presentation in color. We have a hunch that when color sets become more common, viewers forced to watch a black and white show

will find it as disappointing as a movie travel show without color."

ADRIAN SLIFKA — *Youngstown Vindicator:* "For me, there is no entertainment treat which can duplicate the viewing of a fine musical or a stimulating drama in color. . . . Color adds a dramatic, exciting, new dimension to television. A program viewed in color has impact. Color gives TV an amazing depth and realism. It's my prediction that color television is getting poised to really 'bloom' this fall. This fall and winter will see thousands more viewers bringing the 'magic color box' into their homes."

MAURICE VAN METRE — *Cleveland News:* "When my set is working good, color TV is unbeatable. Can it be the fault of the cameramen when the color suddenly fades? It seems this often happens when one scene suddenly follows another. The big thing holding color TV in its present groove is lack of sufficient color programs."

LARRY WOLTERS — *Chicago Tribune:* "Recently I watched the Shirley MacLaine Chevy show in both color and black-and-white. I had two sets sitting alongside each other. In this Japanese show, color TV gave the Nipponese performers added scope and dimension, excitement and enchantment. I'm not one to argue that color TV does wonders for everything. . . . I feel that most adventure and action shows, including Westerns and even the World Series, don't get much added fillys from color TV. But when the show itself relies so heavily on color and hues as the MacLaine show, color TV seemed almost a must. Certainly it looked pale and drab by comparison in monochrome."

SOUTH

JACK E. ANDERSON — *Miami Herald:* "Until the home set can break out of its present 21-inch limit in screen size, color television offers the viewers the only new visual dimension since the medium was invented. There is no question at all but what with improving quality and particularly a cheaper set cost, programming in nothing but black-and-white will become as out-moded as the silent movie."

BOB BROCK — *Dallas Times Herald:* "We are no mechanical whiz (a zipper is about the most complicated thing with which we will tangle) and we find tuning our color TV a snap. We feel that we are a discriminating viewer, since TV is our business, and the reception that we get in color and black-and-white is perfect."

ROBERT JOHNSON — *Memphis Press-Scimitar:* "Color adds a dimension to and enhances almost any program, but there are certain occasions when it adds with stunning impact to the enjoyment of TV entertainment. Color is as necessary to certain scenes and situations as is music, if one is to realize completely the pleasure which can be had. Inevitably, full color is part of the future of TV, and the only reason I can think of why everyone who can afford it doesn't already have color is that they just don't know what they're missing. I wish I could share my own pleasure."

PAUL JONES — *Atlanta Constitution:* "If you could have seen the Como production you would know full well that color television *IS* perfected. The true-to-life reproduction of the skin tones, the variety of tones and hues which were achieved in the ever-changing color pattern were something to behold. Had there not been any sound at all, the settings and costumes would have been so inspiring that you could have enjoyed just looking — and looking — and looking."

RED O'DONNELL — *Nashville Banner:* "Color, even in its incubation stage, is a visual joy. All I hope is that ere I tune into the heavenly (or??) channel, color TV sets will be in fiscal reach of us hired hands, and all networks — plus local shows — will be in compatible tint."

WARNER TWYFORD — *Norfolk Virginian-Pilot:* "Color television is a good thing. It makes for more complete enjoyment of the program, and its impact on the viewer is nearly always a favorable one. However, it has not attained the popularity it should have for two reasons. First, the continuing high cost of receivers restricts its audience to a very small minority of the TV whole; second, it is being indifferently promoted by local stations and dealers."

WEST

HAL HUMPHREY — *Los Angeles Mirror News:* "Color TV probably is the most undersold and under-rated element of television. Reception, both 'live' and on color tape, now is as good as or better than anything seen in movie theaters. The television industry should sell color as hard as it is trying to sell some of its programming."

BILL JAHN — *Seattle Post-Intelligencer:* "I think that color television adds so much to television enjoyment that every viewer should seriously consider it. Color TV is just great."

FRANCIS MURPHY — *Portland Oregonian:* "It seems to me it's only a question of time before the public will demand that all programs be telecast in color. In choosing between a color and a black-and-white program, I'll choose the color every time unless the black-and-white program is markedly superior—something of Playhouse 90 quality. I would imagine that color doubles my enjoyment of Hall of Fame or Lowell Thomas' High Adventure. The impact of color on certain commercials — Kraft, Hallmark, Delco — is tremendous."

DWIGHT NEWTON — *San Francisco Examiner:* "This has been TV's most colorful winter, so much so that when we have visitors these nights I must practically fight with them to view black-and-white shows. Time was when non-color set owners would come to the house, gawk at the set and grunt, 'I never knew Milton Berle had green hair.' Time is when they gasp at the rainbow hues and even want to watch Ellery Queen, as bad as it is, because it is in color."

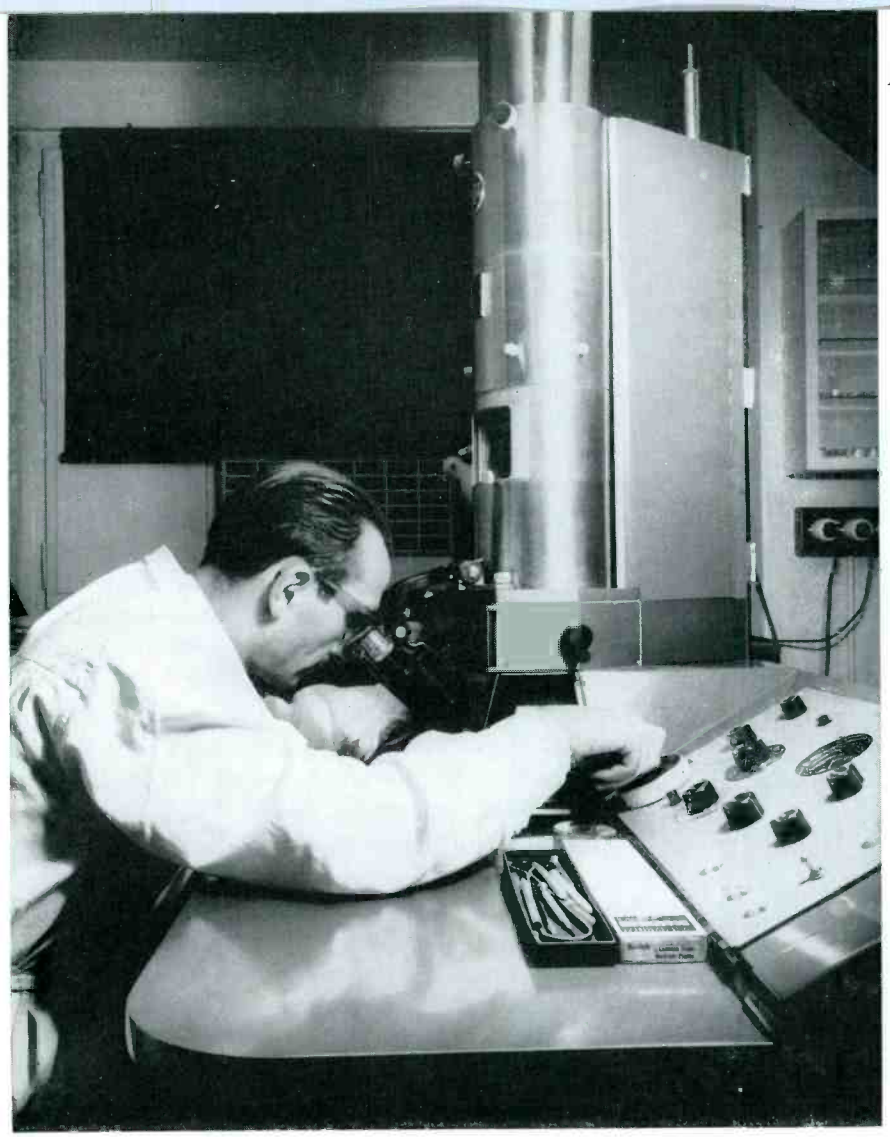
TERRENCE O'FLAHERTY — *San Francisco Chronicle:* There's no gadget in my house that has given me as much pleasure as my color TV set (and that includes skis and a sports car). My neighbor, Mrs. Pellachotti, feels the same way — and she includes her husband! Color is a delight if only for regulars like Como, Dinah, Steve Allen and the Arthur Murray Party. But when color is added to such 'specials' as Kiss Me Kate, Amahl and the Night Visitors and the Fred Astaire Show, the result is absolutely magic."

ZUMA PALMER — *Hollywood Citizen-News:* "Color reception is far superior to what it was two years ago. The color is more natural and the sets are easily regulated. Color materially enhances the enjoyment of a variety show, such as Dinah Shore's and Perry Como's, a dramatic program or a special. Gowns, costumes, props and scenery take on new meaning. An outstanding color event was the Pasadena Tournament of Roses."

HOWARD PEARSON — *Deseret News and Telegram, Salt Lake City:* "The multi-hued telecast increased enjoyment of the (Tournament of Roses) festival considerably because the Rose Parade is something that was made for color and the other way around . . . Color made Chevy Show Sunday as it does every week, but a viewer doesn't get the depth in black-and-white that color gives this program. Ditto with the Perry Como hour and Steve Allen's 60 minutes of variety."

PAUL SPEEGLE — *San Francisco Call-Bulletin:* "My one all-consuming regret about color TV is that it's made me almost wholly disdainful of black-and-white. . . . I'll never understand why a sponsor buys time on a colorcast and then proceeds to run a commercial in black-and-white. This is like filling a bottle of Cutty Sark with weak tea." ■

Baseball comes to life as the color TV camera scans World Series at Yankee Stadium.



Electron microscope is used in basic research

ELECTRONIC AIDS TO MEDICINE

The electronics engineer now works with the biologist and physician to devise new tools for medical research, training and treatment

ELECTRONICS is opening a new front in the war on disease. Just as electronic devices have enabled man to conquer outer space, so are they now being used to probe the human body, assist in the diagnosis and treatment of illness and aid immensely in medical research and teaching.

Electronics offers the physician a multitude of new tools—many of them familiar but many more still under development. Electronic instruments extend his vision to places he could not otherwise see. They react to physical changes with unmatched sensitivity and speed. They collect, measure, store and sort out vast amounts of information. Therefore they can provide the doctor with revolutionary new methods of observation, control and experimentation.

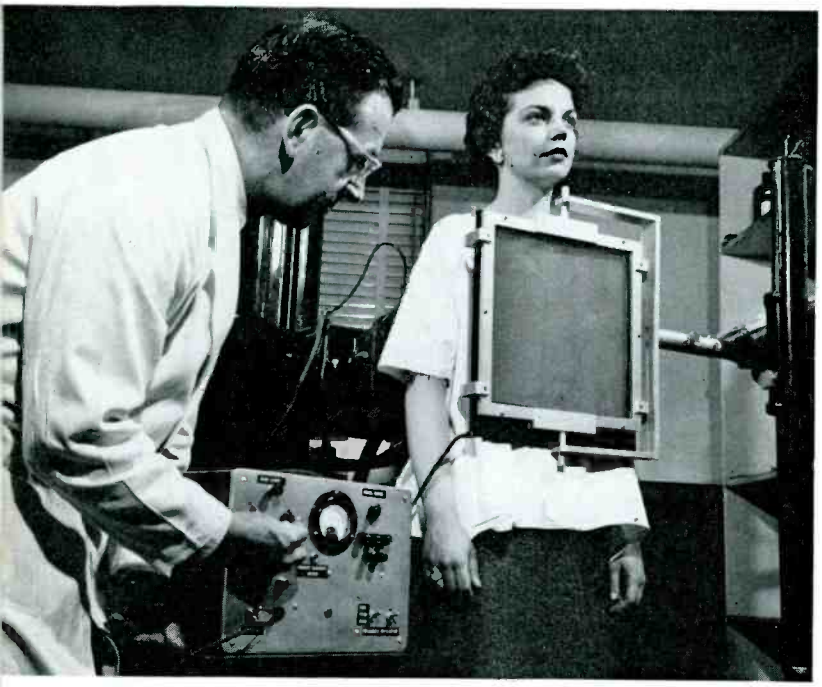
Today electronics engineers are working closely with the medical profession to produce better X-ray equipment, improved electron microscopes, better clinical and laboratory aids to measure heart, brain and digestive functions, make blood cell counts and perform many other functions in research, diagnosis and therapy.

As an industry, medical electronics is still in an early phase of development. Tremendous strides have been made since World War II, and today it is estimated that more than $200 million of electronic equipment for medical uses is sold annually. The total could be further increased by including television installations in hospitals and medical schools, computers used for medical record-keeping and electron microscopes applied to basic biological research.

One of the newest electronic aids to medicine is a radically new tube called the "ultrascope." Developed by the Radio Corporation of America, this tube is the "eye" of a unique attachement which allows direct viewing of a microscope specimen under ultraviolet light. It is expected to be especially useful in basic cell studies essential to understanding such diseases as cancer, arteriosclerosis and viral infections.

The ultrascope is only one of a host of new and improved devices coming from electronic laboratories. Authorities in electronics and medicine accept the fact that their two sciences must move forward together. Professor J. W. Buchta, Chairman of the Physics Department at the University of Minnesota, says, "The general practitioner today must know something about electronics. For the research man in medical and biological fields, electronics has become indispensable."

Thin-screen X-ray panel gives the doctor a brighter image



Electronics in medical education

In the field of medical education, television is causing a revolution in teaching methods. Since 1947, when the first surgical operation was telecast at Johns Hopkins University, nearly fifty hospitals and schools of medicine, dentistry and veterinary medicine have installed closed-circuit TV systems.

Closed-circuit color television has proved especially effective in medical education, as demonstrated by a pioneering project of the pharmaceutical firm of Smith, Kline and French. For nine years the company has operated a complete mobile television studio for showing "live" surgical and clinical procedures. Their newest unit is a 28-foot truck equipped with two RCA color studio cameras, two surgical color cameras, two large-screen color TV picture projectors, and all necessary controls and accessories.

The surgical color camera, designed especially for operating and autopsy rooms, is installed in a ceiling mount well above the heads of the operating doctor and focused downward by means of a mirror that reflects through an opening in the medical lighting fixture.

The color TV picture projector and viewing screen are installed in any convenient meeting place. For example, at a conference of the Kansas City Southwest Clinical Society, the originating point was the Kansas City General Hospital. The viewing doctors sat in the Municipal Auditorium several miles away. Hospital and auditorium were not connected, in this case, by the usual cable, but by a temporary microwave radio link set up by the telephone company. It was possible for the surgeon in the operating room to answer questions from members of the audience.

The Smith, Kline and French mobile unit has presented more than 100 programs. Every major type of surgery has been televised, and sixteen babies have been delivered "on camera."

Closed-circuit television also makes possible diagnosis and consultation among specialists in different parts of the country. This unique value was demonstrated some time ago in a telecast originating in Boston. Specialists of the Harvard Medical School held a consultation and examined a patient with heart trouble. His X-rays and cardiograms were displayed and discussed, his heart was heard, and his diagnosis was explained. The operation that followed was watched by an audience of 18,000 doctors in fifty cities.

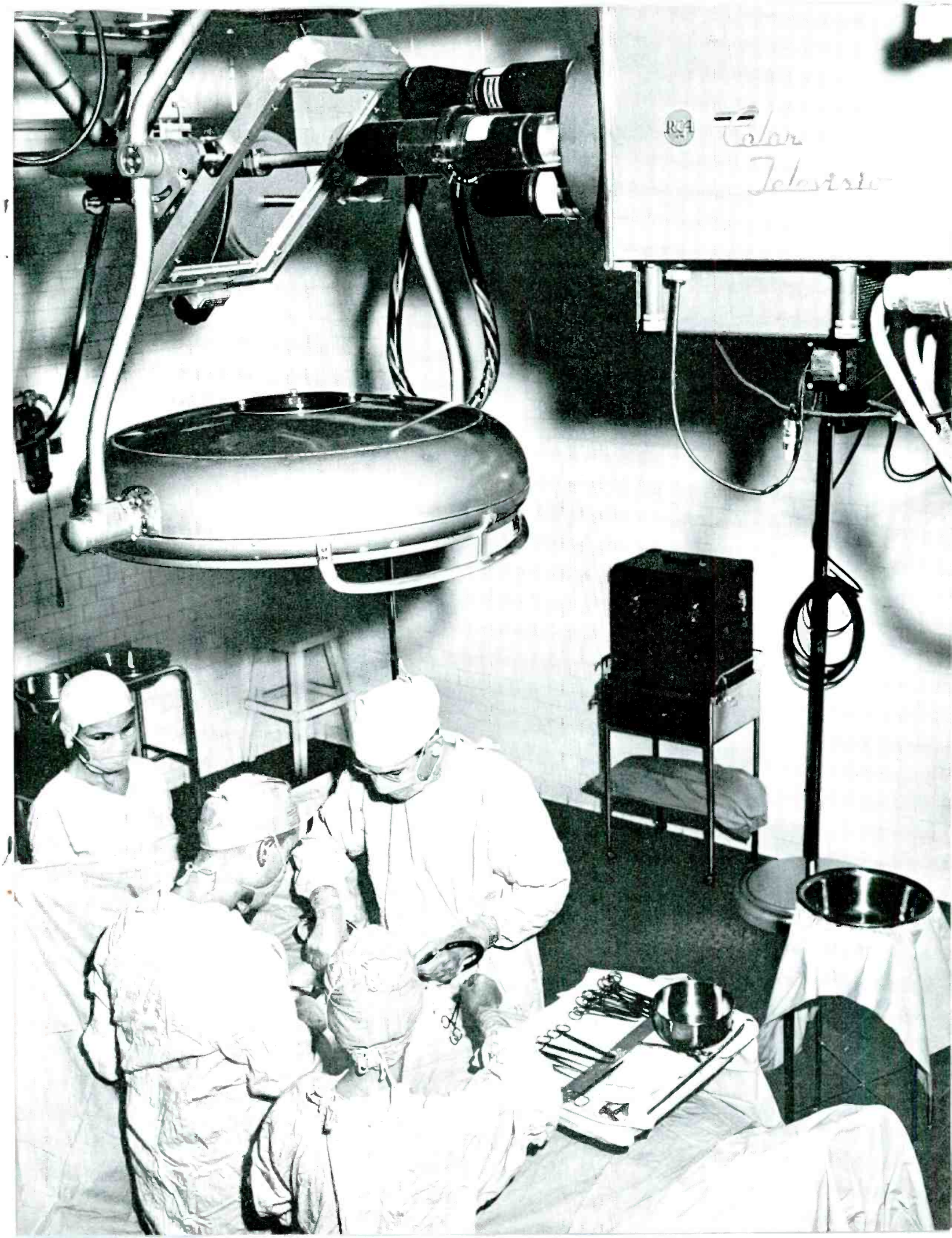
The most extensive medical television system in existence has been installed by RCA at Walter Reed Army Medical Center, Washington, D. C. The television division has its headquarters in the Armed Forces Institute of Pathology, where the main control room can coordinate programs from five color cameras in various locations.

Electronics in medical research

One of the most important tools in biological and medical research is the electron microscope. By focusing a beam of electrons on a fluorescent screen, the microscope paints pictures of an unseen universe of cells, molecules, colloids and crystals—the basic building blocks of organic and inorganic matter. Many discoveries in chemistry and biology have resulted. For example, studies of viruses now being carried on at such centers as the Rockefeller Institute and the University of California are expected to throw new light on heredity and mutation. They are also leading to new knowledge of the causes of leukemia and other types of cancer.

In the United States the first electron microscopes were produced commercially by RCA in 1940. These

Color television in the operating room at Walter Reed Army Hospital, Washington, D. C.


RCA
Color
Television

early models gave useful magnification of 50,000 to 100,000 diameters, as compared to the ordinary optical microscope's maximum of about 2,000 diameters. RCA recently developed an "ultra-magnifier" which boosts direct electronic magnification of the instrument to 200,000 diameters and extends photo-enlargement capabilities to 300,000 times actual size. The shape and structure of particles less than 1/12,000,000th of an inch in diameter can by clearly photographed.

Electronics is expected to help solve a different medical problem with the "cytoanalyzer," which has the ability to count and identify microscopic particles in biological specimens. It consists of four parts: a scanning microscope, an electronic computer and analyzer, and a recorder. Together they can analyze and distinguish normal from diseased cells in a specimen. Now undergoing tests at the National Cancer Institute, in Bethesda, Md., the machine may ultimately detect the early presence of uterine cancer in women.

Other electronic devices are being designed which —like robot laboratory assistants—will make automatic blood counts, measure metabolism, and perform many other tasks more rapidly and efficiently than human technicians.

One of the most interesting electronic medical aids is the so-called "radio pill," designed to explore the human digestive system. Developed jointly by the Rockefeller Institute, the Veterans Administration Hospital and RCA, the pill is actually a complete FM broadcasting transmitter with a battery, enclosed in a plastic capsule measuring one and one-eighth inches long by two-fifths of an inch in diameter. When swallowed it transmits information relating to internal pressure changes. It is expected to be valuable in the diagnosis of intestinal and stomach ailments.

The X-ray—earliest electronic aid to medical diagnosis and treatment—is still the most widely used. These rays, however, can be dangerous as well as useful, and it is important to keep exposure to a minimum both in X-ray photography and in direct projection on the screen of a fluoroscope.

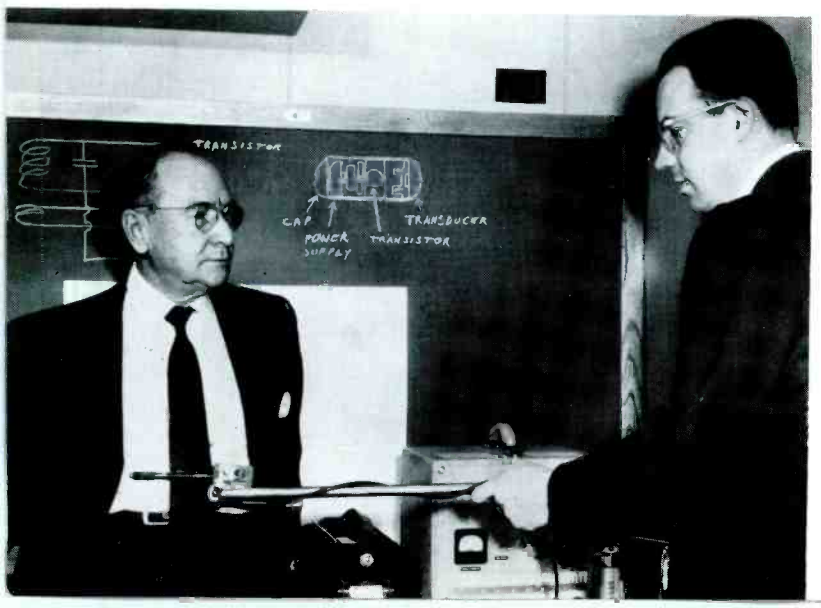
Electronics engineers have helped limit this danger with a device called the "image intensifier tube," which is extremely sensitive to light. It can take the shadowy picture from the fluoroscope in a doctor's office and increase its brightness several hundred times. The picture can be viewed directly or picked up by television and observed on a large TV screen.

Newest of all improvements in X-ray technology is the "intensifier panel" demonstrated recently by RCA Laboratories. Working without tubes, the panel is similar to the standard fluoroscope screen in appearance, yet it delivers a picture 100 times brighter. With further development the intensifier will give the surgeon visual aid in the operating room, and will do the job of the fluoroscope without danger.

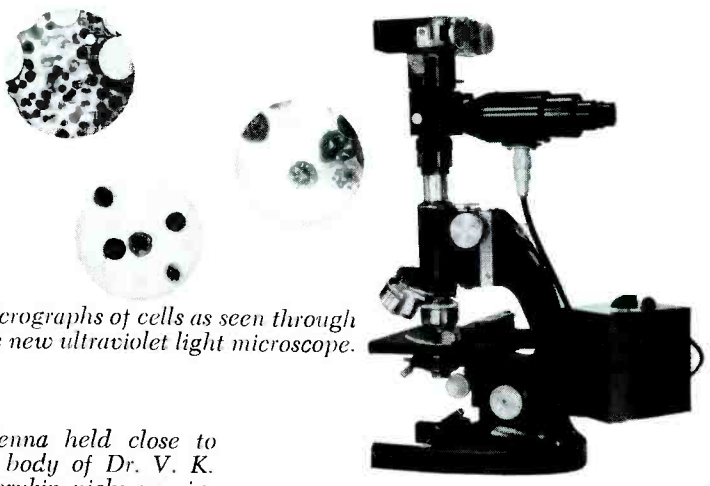
As Dr. Vladimir K. Zworykin, Honorary Vice President of the Radio Corporation of America, has pointed out, medical examination and diagnosis have become so complicated that making various tests and interpreting them demand a tremendous amount of the physician's time. He suggests that a whole series of measurements—electrocardiogram, temperature, blood pressure and so on—could be recorded simultaneously by an electronic computer. This data could be placed on punched cards to provide a permanent record.

Dr. Zworykin looks ahead to computers which will check a patient's symptoms against stored information about various diseases, and indicate whether or not there is need for further examination and treatment. Eventually the computer might supply a diagnosis.

No authority in the field expects that electronic devices will ever take the place of the physician. But they will aid the doctor by speeding examinations, correlating tests, and eliminating paper-work. Electronic aids can thus be expected to lower medical costs at the same time that they improve the theory and practice of medicine in the future. ■

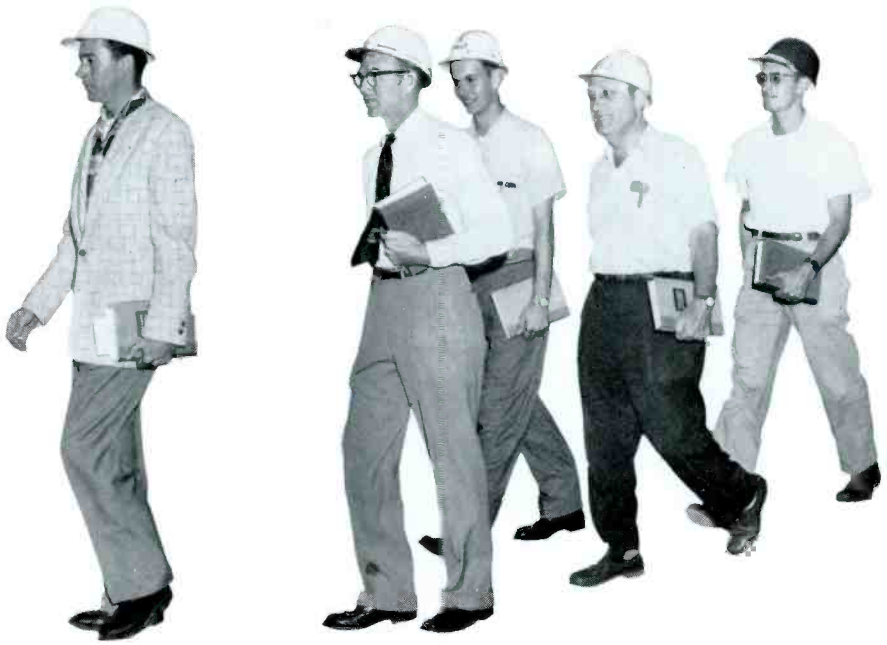


Antenna held close to the body of Dr. V. K. Zworykin picks up signals from "radio pill" in the stomach.



Micrographs of cells as seen through the new ultraviolet light microscope.

MASTERS OF SPACE TECHNOLOGY



Cape Canaveral missile men have founded their own college soon to offer the first advanced degree in the field of space exploration

A SCANT sixteen miles from the launching pads where America's missiles and satellites roar into space is a new school unique in the nation's educational system. It is Brevard Engineering College at Melbourne, Fla., founded by two Radio Corporation of America scientists. Its purpose: To train missile men for the space age.

Brevard, named for the Florida county in which Patrick Air Force Base and Cape Canaveral are situated, will wind up its first term this summer. And next September, when it resumes evening classes, it will make educational history by conducting courses leading toward a new degree offered in no other college — Master of Science in Space Technology.

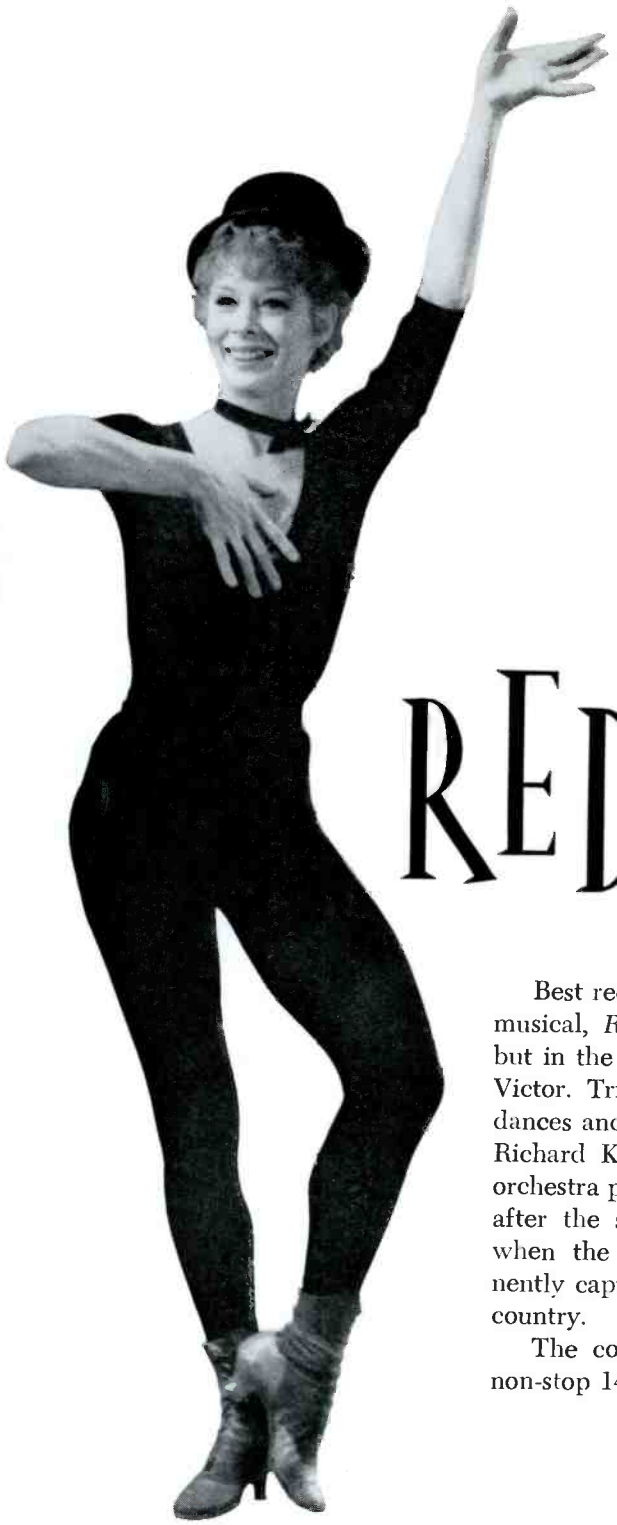
Brevard Engineering College was established as a result of the constant demand for technical courses from personnel of the RCA Service Company, which has more than 3,000 men in its Missile Test Project, tracking the missiles fired on the Atlantic Missile Range and processing the collected data. Two RCA men who had previously taught in colleges—Dr. Jerome P. Keuper and Dr. Harold I. Dibble—launched the venture, with a faculty of 25 scientists and engineers from RCA and other contractors engaged in range work. The college offers a three-year course leading to an associate degree in engineering. Brevard's courses are recognized for credits by Massachusetts Institute of Technology and other leading engineering colleges. Next fall a program toward a Bachelor of Science degree will be added.

In its first term, Brevard has had 200 students—the limit that its quarters in the Eau Gallee Junior High School will permit. Of these, eighty-seven are graduate students who already hold engineering degrees. Many of them have been hard at work preparing for the Space Technology courses when they are introduced this fall.

Dr. Keuper is president of the college and Dr. Dibble is dean. They had to devise their own Space Technology curriculum, for nowhere else in the country did one exist. The course list reads like something that once could have been found only in science fiction—such subjects as radio guidance of missiles, inertial guidance of ballistic missiles, space medicine, space communications, human activity in space, and recovery dynamics.

Regular courses at Brevard are taught three nights a week from 7 to 10 o'clock. By day, the students are engaged in a wide range of technical endeavors. Some are from RCA, some from other companies, some from the Air Force. Their average age is 33, but there is one class in advanced algebra—mostly graduate students preparing for the new Master's degree—whose average age is 50. ■

Gwen Verdon finds love in a waxworks museum with co-star Richard Kiley



REDHEAD

Best recent performance of the Broadway hit musical, *Redhead*, did not take place on-stage but in the Manhattan recording studios of RCA Victor. Triple-talented Gwen Verdon, who sings, dances and acts with equal mastery, plus co-star Richard Kiley and the entire cast, chorus and orchestra put *Redhead* on records just three days after the show opened. The magic that ends when the curtain falls has now been permanently captured for home audiences all over the country.

The complete show was taped in a nearly non-stop 14½-hour session — a stunning demon-

Hardworking Gwen pauses between takes to confer with a member of the show's production staff

Conductor Jay Blackton carefully balances sound between Gwen and orchestra for best stereo recording.

Gwen as she appears on-stage

ON RECORDS

Gwen Verdon, Broadway's geranium-haired satellite, goes into orbit on RCA Victor records

stration of endurance and virtuosity by everyone from Miss Verdon to the sound engineers.

Gwen couldn't help acting out her part before the mike, emoting and capering with the same dash and grace seen on-stage. In her role, she is a shy Victorian spinster who becomes involved with a theatrical troupe and a professional strong man.

Recorded in both monaural and stereo, *Redhead* is the first Broadway musical to be specially staged to achieve full three-dimensional stereophonic sound.

Ballet from show which won American Theater Wing's "Tony" award.

Miss Verdon runs through all the emotions of her gay and wistful role during long hours in RCA recording studio.

Employees' ideas cut costs for industry and pay off handsomely for workers in offices and on assembly lines

THE OLD SUGGESTION BOX TAKES ON A NEW LOOK

THE OLD SUGGESTION BOX, once a source of jokes for radio comics and cartoonists, is no laughing matter these days.

No longer are the receptacles on office and factory walls filled with proposals that the boss "drop dead" or "go soak your head."

In today's highly competitive market, suggestions that increase efficiency, step up production and cut costs are much in demand — and the rewards are correspondingly high. The suggestion box supplies companies with more than a million ideas a year, and workers with bonuses totaling seven figures. In the past decade, suggestion programs in major U. S. companies have more than doubled and more than 5,000 firms now use them.

Like many other corporations, RCA has intensified its efforts to encourage employees to tell the boss how to run his business more efficiently.

A sign in RCA plants and offices reads: "Your ideas don't have to set the world on fire . . . a simple suggestion often wins an award." This emphasizes one of the principal points of RCA's employee suggestion system — that every idea counts.

Last year RCA employees turned in 13,456 suggestions and 2,948 of these were adopted. Award winners received $112,251 for their ideas, an all-time record sum paid by RCA in any single year since the establishment of its system twenty-seven years ago.

Take the case of Florence Yuskanich, an assembler, who was the "top suggester" of 1958 at the Somerville, N. J., plant of RCA's Semiconductor and Materials Division. She suggested that instead of removing stem holders from her machine for filling in the transistor assembly process — an essential production phase — the required materials might be slid into the holders while still in the machine. This suggestion worked with only slight modification of the machine. A significant saving resulted, and Mrs. Yuskanich collected $1,624.

Josephine E. Wolff, a steno-clerk on the Camden plant staff, got so wrapped up in a scheme for cutting down paperwork that she skipped her weekend household chores to work out the details.

"My suggestion was born of necessity," she said. "Employees on approved leaves of absences or lay-offs could maintain their medical rates by making payments to the Personnel Insurance Section every three months while they were off. This caused a great deal of paperwork. In all, about three weeks' time each month was spent by people in our department on this one phase. My coupon book idea enabled these people to make payments simply and easily. No receipts were necessary and the payments were by the month."

RCA paid Josephine Wolff $554 for solving this problem.

Norman Shields, a group leader in the tool and

Mrs. Florence Yuskanich was "top suggester" at RCA's Somerville, N. J., plant.

model shop at RCA's Bloomington, Indiana, plant, is typical of repeat suggesters who are taking advantage of the suggestion system. Mr. Shields has submitted thirty-four suggestions since 1941 and collected $996 in awards — an average of $29 for each idea.

"The man on the job is better than we are at spotting deficiencies that can be remedied by a good idea," one foreman commented.

Nor does RCA underestimate the power of a woman. In 1958, five women employees earned "top suggester" awards.

Louise McFarland, a secretary at the Harrison plant, suggested a way of handling mailings and reducing paperwork that saved time and money. Four out of six of her ideas were adopted and she had a vacation in Mexico with her award of $303.

Betty Lou Stanton, a tube assembler in the Cincinnati plant, had two of her suggestions adopted for an award of $212. Her "top" idea was for a change in the welding sequence on an important tube.

Ralph DeLucas, a parts analyst in the Camden plant, got some valuable help from his wife in turning one of his gripes into gold.

"During my three years on the job," he said, "I found that maintaining accurate production records always was a big problem. We often had to work Saturdays for three months to bring our year-end data up to date. I devoted my spare time to finding a remedy and developed a system of numbering our file cards and wiring our machines to provide up-to-the-minute records quickly. My wife spent several hours typing up the information, and was delighted when the award came my way."

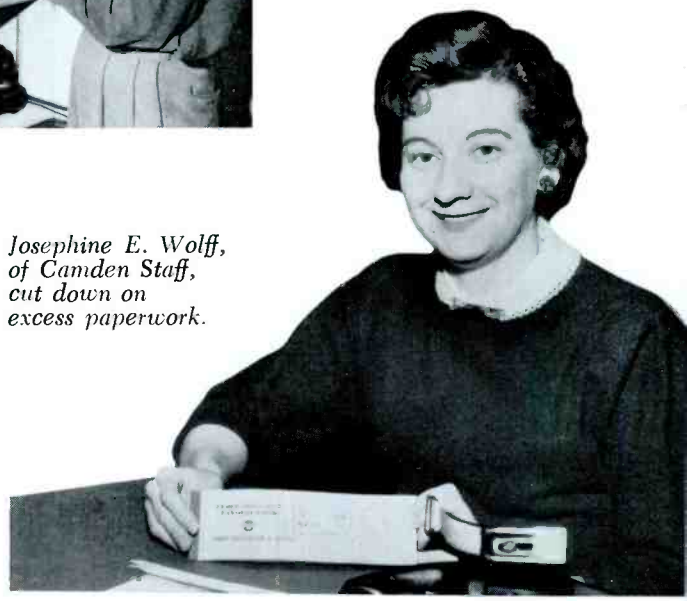
John H. Brown, a Camden plant repairman, was motivated both by patriotism and by personal reasons to offer his prize-winning idea.

"The same day that we started running a new Government job," he explained, "I found that repair work on one of the parts was taking 3½ hours. As far as I was concerned, this was far too long to hold up shipment, especially since my son in the armed forces was using this equipment. I submitted a suggestion that cut repair time to a matter of minutes."

In addition to a cash bonus, each RCA employee who earns a total of $500 in awards receives a gold pin with a diamond. A second diamond is added at the $1,000 level, a third at $1,500, and a fourth at $2,000 or more.

Many of the nation's leading corporations now offer similar rewards to workers with an alert and creative approach to their jobs. American industry is proving that you don't have to go on television to get paid for the right answer. ■

John H. Brown, Camden plant repairman, bought a radio with part of his award.



Josephine E. Wolff, of Camden Staff, cut down on excess paperwork.

Ralph DeLucas bought a color TV set with suggestion winnings.

Louise McFarland had a vacation in Mexico with her award money.

U. S. Department of Agriculture

COMING: *The Electronic Farm*

Rounding up the herd, heating the henhouse, grading and packing tomatoes—these and other tasks are gradually being taken over by electronics

By Dr. James Hillier, Vice President, RCA Laboratories

TOMORROW'S FARMER may direct his work by two-way personal radio, grade his fruits and vegetables automatically, use long-range weather forecasting from earth satellites in his crop planning, and run his farm machinery with solar and atomic energy, through the marvels of electronics.

Developments now in the electronics laboratories are likely to revolutionize the life of the American farmer. The picture of the farmer on the front porch conducting operations from an electronic control panel still belongs only in the world of science fiction. But the practical, everyday aspects of many recent and

impending electronic developments should lead to greater ease, productivity, and profit for the farmer in the future.

Agriculture has met the demands of a swiftly growing population. Farm productivity has been increased many times over by the use of remarkable machines for tilling, planting, cultivating and harvesting, as well as for more specialized functions. Advances in chemistry and biology have been applied to the improvement of plants and livestock, the development of more effective pest controls, and the production of superior fertilizers.

In agricultural research, the electron microscope and radioactive tracer techniques have resulted in new understanding of plant and animal growth, and the effects of varied environments, nutrition, and other factors affecting crop and livestock productivity.

In farming and food processing, electronic devices are widely used for inspection, measurement and control, and for regulating temperature and humidity in incubators, greenhouses and storage facilities. Electronic communications — radio and television — provide special data on weather and market conditions.

Farm automation foreseen

Far more sweeping changes are on the way. These will result from developments in four major areas: Increasing use of electronic communication techniques, widespread application of automatic devices and systems, better understanding and ultimate control of weather, and more economical and efficient power production for farm use.

In large-scale farming and stock-raising, pocket-size two-way radios will offer an effective means of directing operations over large areas. Carrying pulsed signals instead of voice, these radios will be used to control machine operations at a distance.

Closed-circuit television systems, smaller and more economical with the development of transistorized circuitry for cameras and receivers, already play an important and varied role in industry, medicine and defense. As a result of recent research and engineering at RCA Laboratories, we now have a complete portable camera unit weighing only four pounds which can be operated from batteries. In agriculture closed-circuit television will be used wherever it is desirable to extend sight over a distance for purposes of observation or control at scattered or inaccessible locations. Thus, a farmer might maintain a periodic check on his poultry operations, or a rancher might easily monitor a cattle round-up through closed-circuit TV.

Using principles of color closed-circuit TV in new ways, inspection and grading of fruits and vegetables according to color would be possible. It is now technically feasible to consider an automatic system in which tomatoes, for example, would pass before the eye of a color camera linked with a device capable of passing or rejecting each tomato according to its color.

Although it has long been possible to operate farm machines remotely by radio signals, it has not been particularly economical until now. Development of electronic data processing and control systems for industry point the way to economical control equipment for agriculture as well. Such systems, used in food processing plants and in packaging operations and other specialized applications on the farm itself, will free the farmer from routine, repetitive jobs.

In environmental control, electronics will make possible substantial improvement of methods in use today. Controlled environment has become a vital part of many agricultural processes, particularly in poultry farming, in greenhouses, and in the storage of perishable foods. Electronics research is now giving us new techniques of controlling light, temperature and humidity.

Accurate long range predictions of the weather — and even the control of the weather — seem on the way to solution by electronic means. Electronic measuring devices, electronic communications, and finally, large electronic computers are already improving our weather forecasting accuracy. Future artificial satellites in orbits around the earth will collect additional weather information and transmit it to the earth.

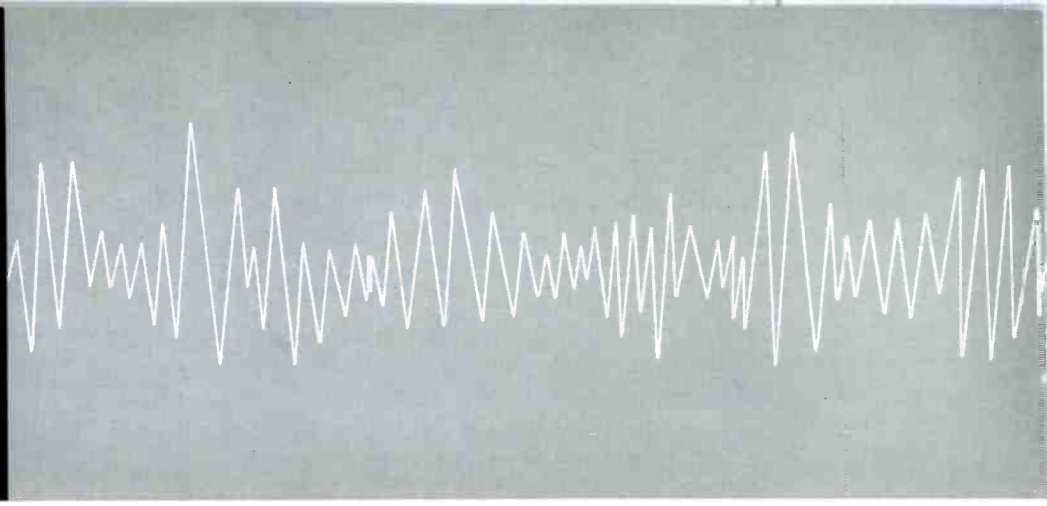
Handy power packages

New sources of power are being developed today through research in electronics. Headway has been made in the last few years in developing small power packages which can convert light and heat directly into electrical energy. Such units will find widespread applications in agriculture wherever there is a need for small and inexpensive power sources to operate separate and scattered pieces of electrical and mechanical equipment. We can look forward to farm buildings with solar heating, and electricity for farm machines supplied by small nuclear generators.

The possibilities of agricultural electronics are limited only by the imagination, for the implications of these new developments now in our laboratories go almost beyond our capabilities of projection. Electronics until now has played a minor part in the agricultural revolution, but the impact of electronics upon agriculture in the future will be great. ■

(Editor's Note: This article is based on a talk given by Dr. Hillier to the New Jersey Agricultural Society.)

ELECTRONICALLY SPEAKING



Color TV Goes to Moscow

The Russians, who say they have been experimenting with their own color system, will get their first look at American Color TV this summer when RCA stages a special demonstration at the Moscow Fair. A fully equipped studio will originate eight hours of live and filmed color programs daily. These will be carried by closed circuit to sixteen 21-inch color receivers placed about the fair grounds in Sokolniki Park.

A highlight of the program will be a "See-Yourself-on-Color-TV" feature. Russian spectators will be invited to parade before the camera and view their own image on a color TV monitor.

New City for Arizona

On ranch land twenty miles southeast of Tucson, Arizona, a brand-new industrial-residential city of 60,000 is rising. Blue-printed as one of the biggest community planning projects of the Southwest, the new city of Cielo del Lago will offer 2,000 acres of its 22 square miles to light industry which will provide its economic backbone but will not convert the pure desert air to smog.

RCA, the first company to integrate into the community, is now building quarters there for its Surface Communications Laboratory, which will move from Tucson in August. The lab works on advanced military communications systems with the U. S. Army Electronic Proving Ground at nearby Fort Huachuca. By the time the RCA plant is occupied the first homes will be built, and a shopping center will be under way.

Electronic Eye in the Sky

A television system that will enable astronomers on the ground to aim and focus a telescope hung from a balloon 15 miles high is being developed by RCA Laboratories for Princeton University star-gazers. The camera is carried aloft in a pressurized case. The system also includes an airborne transmitter and a receiver on the ground. TV controls and telemetering devices will make it possible for the astronomers to take clear pictures of the sun through a 12-inch reflecting telescope. The "stratascope" will be carried aloft this summer.

Radio in Antarctica

RCA Victor's all-transistor portable "Strato-World III" radio proved to be an invaluable companion to news correspondent Maurice Cutler of United Press International on his recent assignment to Antarctica as part of the International Geophysical Year. From the U. S. Navy Airbase station at McMurdo Sound, 750 miles from the South Pole, he and his fellow reporters were able to keep informed of world events through the major short wave stations — Voice of America, B.B.C. London, Radio Moscow, Radio Peking and the Canadian Broadcasting Corporation.

Mr. Cutler reports that the radio enabled the base to follow rescue operations of four Belgian explorers lost on the opposite side of the Antarctic continent. It also brought in blow-by-blow accounts of two world-championship fights in Los Angeles and Montreal.

TV Tape Recorder

One of the highlights of last month's Chicago convention of the National Association of Broadcasters was the dramatic demonstration of RCA's newest television tape recorder. TV tape makes possible the greatest flexibility in programming, including remote telecasts and many special effects. The fourteen-inch reels accommodate anything from a 10-second commercial to a 90-minute "special", in color or black-and-white.

Electronics on the Range

The RCA Service Company's vital role in U. S. defense is described in detail in a new book entitled *Spaceport, U. S. A.*, by Martin Caidin (E. P. Dutton & Co., New York). The book tells the story of the Air Force's Atlantic Missile Range at Cape Canaveral, Florida, major proving ground for U. S. satellites and space-age weapons. A tribute to the work of some 3,000 RCA men on mainland and island bases is found in the chapter, "Where the Electron Tube is King." ■

From the RCA 1958 Annual Report

TO THE SHAREHOLDERS:

Sales of products and services of the Radio Corporation of America were $1,176,094,000 in 1958. For the fourth successive year sales exceeded one billion dollars. During the latter months of the year both sales and earnings exceeded the corresponding period of the previous year, reflecting general improvement in the national economy, a higher volume of Government business and the introduction of new products and services....

RCA's adaptability to diversification and adjustment to change are symbolized by its continuing advance in the new fields of industrial electronics and in meeting the mounting requirements of the military establishments.

Expansion and realignment of RCA's organization and manufacturing facilities have prepared the Corporation to take advantage of new challenges and opportunities for growth and service in the years ahead. A total of twelve important new operational units has been created to accelerate progress in areas of great potential such as missiles, satellites and space vehicles, automation, electronic data processing and atomic energy.

The Space Age has inaugurated a new era in radio communications, and is dependent in many ways upon electronics. Intent upon a role of leadership commensurate with its reputation, RCA in May 1958 established an Astro-Electronics Products Division as the gateway into the realm of technological activity related to national security and explorations in space....

Paralleling the tremendous demands in defense and astro-electronics are those of industrial and nuclear electronics, a new area in which RCA scientists and engineers are actively engaged in developing thermonuclear fusion power for peace-time purposes....

A new products campaign conducted by RCA throughout 1958 led to a variety of new developments for use in business, industry and national defense as well as in schools and the home. The sustained upswing in the popularity of color television and enthusiastic public acceptance of stereophonic sound promise increased activity in these fields in 1959.

The Radio Corporation of America entered its 40th year in 1959. Its impressive record of leadership and achievements in communications, broadcasting and electronics demonstrates that steadfast pioneering and research provide new products and services for the public and industry, and open new fields for expansion of the Corporation's business and profits.

At its inception, RCA gave the United States preeminence in international communications, free of alien control. Since that time scientists and engineers of RCA have made numerous inventions and have developed completely new electronic systems such as compatible color television; they have discovered basic principles and new knowledge that have enlarged the Corporation's firm foundation for growth in service to national defense and to the American people.

In electronic entertainment the National Broadcasting Company—a service of RCA—has an outstanding record in all phases of radio and television broadcasting and is pre-eminent in color TV.

In manufacturing RCA has produced billions of electron tubes and transistors, and many millions of radio instruments, "Victrola" phonographs and records. Recently its 10-millionth TV set came off the line.

Forty years have established the RCA trademark as a world-renowned symbol of quality and dependability in craftsmanship and performance....

We are planning ahead in the ever-broadening field of electronics, which is now a $14 billion a year industry. We look forward to continued progress in all of our operations which, within the next ten years, should make RCA's Fiftieth Anniversary a memorable milestone in the history of industrial America.

David Sarnoff — CHAIRMAN OF THE BOARD

John L. Burns — PRESIDENT

February 27, 1959

FINANCIAL HIGHLIGHTS

	1958	1957
Products and Services Sold	$1,176,094,000	$1,176,277,000
Profit before Federal Taxes on Income	60,442,000	77,049,000
Per cent to products and services sold	5.1%	6.5%
Federal Taxes on Income	29,500,000	38,500,000
Per cent to profit before Federal taxes on income	49%	50%
Net Profit	30,942,000	38,549,000
Per cent to products and services sold	2.6%	3.2%
Per common share	2.01	2.55
Preferred Dividends Declared	3,153,000	3,153,000
Per share	3.50	3.50
Common Dividends Declared	20,733,000	20,756,000
Per share	1.50	1.50
Total Dividends Declared	23,886,000	23,909,000
Reinvested Earnings at Year End	243,783,000	236,727,000
Shareholders' Equity at Year End	295,439,000	288,382,000
Long Term Debt at Year End	249,995,000	249,995,000
Working Capital at Year End	307,983,000	305,583,000
Ratio of current assets to current liabilites	2.8 to 1	2.8 to 1
Additions to Plant and Equipment	24,817,000	35,593,000
Depreciation of Plant and Equipment	21,825,000	23,524,000
Net Plant and Equipment at Year End	196,609,000	199,581,000
Number of Employees at Close of Year	78,000	78,000

RADIO CORPORATION OF AMERICA

My second most prized possession

Mr. Charles Dillon "Casey" Stengel and his wife lead the colorful life.

The prize possession of Mr. Stengel, who is a banker and a linguist, is the sports *memorabilia* in his home. His second most prized possession: an RCA Victor *Townsend* Color TV set. Mr. Stengel explains:

"Now my wife could tell you that many years back, when I was working around Brooklyn, but we lived in New York—so there was quite a bit of commuting to work—but that was before I moved on to Boston, where I was only about 15 minutes away. Matter of fact, I guess I've been all over this country, and had a lot of fun, and seen most places. And they still remember us in a lot of them, from which I got Christmas cards that we enjoy every year, especially the fellas you work with on one thing or another. It's all been a lot of fun. Especially Color TV."

More and more, Color TV keeps making a place for itself with people who lead the colorful life. No wonder. It's the most exciting television to watch—the proudest to own. It's the best television there is. Ask your RCA Victor dealer for a demonstration. Prices from $495.

ON THE 5TH ANNIVERSARY OF COLOR TV—
SEE THE DIFFERENCE COLOR TV MAKES

For expert service and installation, RCA Factory Service is available in most TV areas. Nat'ly adv'd list price shown, optional with dealer. UHF opt., extra. Price, specifications subject to change without notice.

RCA VICTOR
Trade(s) RADIO CORPORATION OF AMERICA