

RADIO AGE

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OCTOBER 1956

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
RCA "HEAR-SEE" TV TAPE PLAYER



Overseas

Teleprinter
Exchange
Service

Pioneered and Developed by **RCA**

RCA COMMUNICATIONS, INC. • A SERVICE OF 

Radio Age

RESEARCH • MANUFACTURING • COMMUNICATIONS
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COVER

Brig. General David Sarnoff and Dr. Harry F. Olson, of RCA Laboratories, with the new RCA "hear-see" tape player of television programs for the home. (See story on page 8.)

NOTICE

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

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RADIO CORPORATION OF AMERICA

RCA Building, New York 20, N. Y.

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

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



Inside the world's first electronically air conditioned room, at RCA's David Sarnoff Research Center. Cooling or heating are provided noiselessly by wall panels behind decorative grills shown here.

Fifty Years in Radio

General Sarnoff is Honored at Anniversary Dinner; Lists Twenty Developments He Foresees in Next 20 Years; RCA Scientists Present Electronic Gifts

COLLAPSE OF SOVIET COMMUNISM, outlawing of war, vastly increased use of nuclear and solar energy, the "farming" of oceans, control of weather, world-wide color television and person-to-person TV, guided missiles carrying mail and freight, were among twenty major developments in the next twenty years predicted on September 30 by Brig. General David Sarnoff, Chairman of the Board of RCA.

General Sarnoff's look into the future highlighted a Golden Anniversary Dinner in his honor at the Waldorf-Astoria Hotel in New York, where hundreds of his friends and associates gathered to pay tribute upon his completion of fifty years of service in radio, television and electronics. It was on September 30, 1906, that he began his career in radio as a messenger boy with the Marconi Wireless Telegraph Company of America, later acquired by RCA.

President Eisenhower sent the following message of congratulation to General Sarnoff:

"The Golden Anniversary, marking your fifty years in the field of radio, television and electronics, is made brilliant by your leadership and great contributions in the science, art and industry of communications. You have established an outstanding record of service to the American people and to the Nation. You have helped greatly to bulwark the pre-eminence of the United States in electronics and world-wide communications.

With all who know you I join in congratulations on your splendid record of achievements made possible by hard work and steady adherence to high ideals and American traditions.

I hope that the years to come will bring you the best of health and happiness — as well as some time for golf!"

Governor Averell Harriman of New York wrote: "You are one of the great Americans of our day. Yours has been a fabulous career in which you can take great pride. Blessed with vision, a brilliant mind, and bold imagination you have blazed a path for others to follow in so many fields — in radio, in television, in electronics, and in the field of nuclear energy. . . ."

From Adlai E. Stevenson, Democratic Presidential candidate, came a letter saluting General Sarnoff on his anniversary and stating in part:

"In the last half century developments in radio, television and electronics have revolutionized the world of communication. Indeed, they have profoundly changed our civilization and we stand indebted to you for the significant contributions you have made to these great scientific advances."

Sir Winston Churchill sent "warm good wishes and my congratulations on the 50th anniversary of your work in the field of wireless and television to which you have contributed so much."

Dr. Lee DeForest said: "I join with your host of admiring friends in deep appreciation of the grand things you have achieved for radio communications and in the electronics industry during these fifty years. And further, as a profound civic philosopher the entire Nation is deeply indebted to your extraordinary thinking and keen foresight. . . ."

Tributes and awards were presented to General Sarnoff by the Radio Pioneers, citing his leadership in pioneering, and from the National Appliance & Radio-TV Dealers Association, in recognition of his contributions to the radio-television business.

"Presents" from RCA Scientists

Dr. Elmer W. Engstrom, Senior Executive Vice-President of RCA, recalled that five years ago, on the occasion of General Sarnoff's forty-fifth anniversary of service in radio, he asked for three "presents" from RCA scientists for his fiftieth anniversary.

Dr. Engstrom announced that the gifts, representing major advances in electronics, were ready for presentation and would be "unwrapped" for demonstration publicly on October 1 at the David Sarnoff Research Center, Princeton, N. J. The "presents," which were shown on color slides at the dinner, included a magnetic tape recorder of both color and black-and-white television for broadcast use, a home magnetic tape player for television, an electronic amplifier of light and an application of it to industrial X-ray use, an electronic air conditioner and in addition an electronic refrigerator.



The gold medallion and plaque presented to General Sarnoff at the Golden Anniversary Dinner.

Congratulating the scientists, research men and engineers for their pioneering courage, perseverance and competence, General Sarnoff expressed his grateful thanks and accepted "the amazing gifts on behalf of our company." He said that in time they would find their way to the market place, serve the public, benefit industry and open immense fields for further exploration and development.

Predicts Twenty Major Developments

"However impressive the events that have filled the last fifty years, or even the last century," continued General Sarnoff, "I am convinced that they will be eclipsed by the events of the next twenty years. Let us consider twenty major developments likely to affect all of us within that time."

With that preface General Sarnoff proceeded to make the following twenty predictions for the twenty years ahead, explaining that he had not attempted to list them in the order of their appearance or their relative importance:

Nuclear Energy: "We will have learned to extract atomic fuel from relatively inexpensive materials, thus

making this power both plentiful and economical. Nuclear energy will be brought to a practical state of peace-time usefulness, not only for industry but for planes, ships, trains and automobiles. *Direct* conversion of atomic energy into electricity — a principle already demonstrated experimentally by RCA — will be a fact. Atomic batteries, based on low-cost waste products from nuclear reactors and operating for many years without recharging, will supply energy for industry and for the home."

Solar Energy: "The energy of sun rays will be effectively harnessed and in worldwide use. It will prove of special value to tropical and semi-tropical parts of the globe where the sun's energy is immense but where underdeveloped nations cannot afford fully to utilize present-day fuels and power sources."

Communications: "Television, in full colors, will be completely global, so that man will be able not only to speak and hear all around this planet but to see the entire world in natural colors. Individuals will be able to hold private two-way conversations, and see each other as they talk, regardless of the distances separating them. Moreover, the beginnings will have been made in the automatic and instantaneous translation of languages, enabling people to understand one another at once across the barriers of Babel."

Transportation: "Jet-propulsion and rocket-type vehicles, using nuclear fuels, will travel at speeds as high as 5,000 miles an hour with greater safety and comfort than today's aircraft. The world's leading cities will be only hours apart, many of them virtually within commuting distance. Inexpensive personal planes, flivvers of the skies, will fill the air. Automatically piloted aircraft for passenger service will be far advanced; guided missiles will transport mail and other freight over vast distances, including oceans."

Automation: "Already well launched, automation will reach a crescendo under the impact of cheap and abundant power. It will increase production, decrease costs, and make more goods and services available to more people. The transition will create problems of adjustment but ultimately it will free millions of people from arduous and hazardous work. It will increase employment, reduce hours of labor and increase leisure."

Materials: "Chemistry will make spectacular strides in providing ever new materials tailored to meet almost any specifications man can imagine. A tremendous array of new plastics, ceramics, lubricants and categories of substances that as yet have no name will become available for personal and industrial uses."

Electronic Light: "Electroluminescence or 'cold light,' now emerging from the research laboratories, will bring into being startling new types of illumination. It will change the appearance of our factories, streets, stores, highways and homes. Providing light without heat and almost without shadow, its flow will be subject to easy control for volume and color nuances to suit any taste or decor. Being light without glare, it will eliminate many of the perils of night driving and flying. It will also give us brighter and bigger TV pictures, and ultimately replace the TV tube altogether with a thin, flat-surface screen that will be hung like a picture on the wall."

Computers: "The era of electronic computers, already begun, will reach fruition. Recording and accounting will be taken over by robots, freeing for other work the great majority of the nine million Americans now engaged in clerical tasks. Business procedures, industrial operations and fiscal data will be gathered and analyzed automatically. New products will, for the most part, have their performance predicted by computers, removing the need for building actual working models. High-speed writing and reading will be as familiar as high-speed arithmetic is today."

Food: "Striking developments in irrigation and flood control, more efficient use of solar energy, the electronic

acceleration of germination and growth, as well as new chemical and biological discoveries will greatly expand mankind's food resources. At the same time, the oceans will be efficiently 'farmed' for nutritive products. Thus all the food needed by all the people of the world will become available, despite the fact that the population will continue to grow. These developments will enable famine to be eliminated in all parts of the world."

Health: "The close ties now developing between biology, chemistry and physics, applying the new tools of electronics and atomics, will bring an avalanche of improvements in preventive medicine, diagnosis and treatment of human ills. Biochemistry will furnish disease-controlling and health-sustaining drugs at an accelerated rate, especially in meeting the physical problems of old age. Man's life span will be further extended, probably within hailing distance of the century mark."

The Home: "The housewife's dream of an all-automatic home will be realized. The day's chores in the home will be pre-scheduled, with each of the tasks performed electronically. The temperature, humidity and velocity of the air in each part of the home will be automatically kept at the desired levels day and night, and the air will be purged of bacteria and other contaminating matter. Electronic appliances will do the cooking and

Among prominent guests at the dinner was Bernard M. Baruch, shown here being greeted by Robert W. Sarnoff, President of NBC.

Frank M. Folsom, right, President of RCA, and Dr. E. W. Engstrom, Senior Executive Vice-President, at the Golden Anniversary Dinner.





General Sarnoff is shown here with special RCA research report on his three "presents," a glass bowl presented on behalf of the RCA family, and the gold medallion — all presented at the dinner.

the dishwashing, and will dispose of waste. Fortunately, we shall continue to do our own eating."

Climate: "Not only will the prediction of weather for months and even years ahead be perfected, but major steps will have been taken to make and control weather as desired. Ports now icebound will be unfrozen and icebergs rapidly melted. Progress will have been made in dissipating storms even of hurricane intensity, or in diverting them from a destructive course."

At this point, General Sarnoff pointed out that thus far he had dealt mainly with technological progress, "an area where we can tread with some assurance."

"I wish I had the same degree of assurance with respect to developments in the social and political areas, where the most unpredictable force of all — human conduct — tells the story," he continued. "But social

sciences are deeply affected by changes in physical environment which greatly influences human conduct."

General Sarnoff's list of forecasts continues:

Communism: "Within the next twenty years Soviet Communism will collapse under the weight of its economic fallacies, its political follies, and the pressures of a restive, discontented population. These pressures will increase with the rise and spread of education amongst their own people."

"Practical ways and means will be found by the free world to pierce the Iron Curtain and bring home to the Russian people the facts and the truth. The Soviet empire will fall apart as one satellite after another attains its own liberation. The Communist hierarchy will destroy itself by internal struggles for power and will be displaced by a military dictatorship which in turn will give way to representative government."

People's Capitalism: "The prestige of the Marxist solution of social problems will decline as its limitations and errors become increasingly apparent in a rapidly developing world of technology. It will be more generally realized that centralized state economy is incompatible with human freedom. As Socialism is stripped of its popular appeals, the dynamics of a people's capitalism within a democratic framework will be intensified."

Living Standards: "The equation of the technical developments already listed will usher in an era of relative economic abundance. Slowly but surely the waters of wretchedness now covering so much of the earth will recede, and levels of well-being without past parallel will be attained all over the world. The most pressing problems will not be the use of labor but the intelligent and beneficent use of leisure."

Education: "As a by-product of economic progress and expanding leisure, man will enter upon a period of universal education. Not only will general levels of knowledge rise, but the intellectual climate will be favorable to development of special talents and individual genius. Highly-g geared technology will put a premium on brains: ever more skilled scientists, engineers, designers, technicians, and others. This mounting demand for mental competence will tend to enlarge educational facilities and promote the arts and sciences."

Entertainment: "Every form of art and every type of entertainment will be readily accessible in the home. Talent — both live and recorded — will be available by television, radio, the phonograph and electronic photography. The opportunities for creative and interpretative



Opera stars Jan Peerce and Rise Stevens performed selections at the Golden Anniversary dinner.

talents will be greater than ever before. The range and variety of programs will embrace everything created by the human mind."

Government: "Because of unprecedented access to information, public opinion will be a more decisive element in the political life of nations. Prevailing sentiment on any issue will be quickly and accurately registered by electronic means. Government and people will thus be brought into closer correlation, so that popular government and democratic processes will tend to become more and more effective."

War: "Universal communications and speedy transportation will shrink the world to a neighborhood. Technological developments in weapons of mass destruction will leave no doubt that the alternative is between survival or annihilation. All nations will find it imperative to develop and adopt practical means for disarmament based on effective inspection, control and enforcement. War as an instrument of international policy will be outlawed."

Science and Religion: "As a reaction against current cynicism and materialism, there will be an upsurge of spiritual vitality. The gradual elimination of physical hungers will depend the more elemental hunger for faith

and salvation, for age-old values beyond the material and temporal that gnaw at the heart of man."

"Science begets humility. Its every discovery reveals more clearly the Divine Design in nature, the remarkable harmony in all things, from the infinitesimal to the infinite, that surpasses mortal understanding. The physical processes and laws of the universe are logical, all-embracing and wholly dependable. They imply a Supreme Architect, and the beauty and symmetry of His handiwork inspire reverence."

It may be that the imperfection of man, too, is a part of that creative symphony. The seed of moral perfection has been planted in man, but it has been left to him to nurture it to full flower in the harsh soil of mortal existence. Thus man is given a positive role in carrying out a phase of the blueprint of the Supreme Architect.

In conclusion, General Sarnoff said, "A man who has survived half a century of labor in any field will, I hope, be forgiven for an excursion to the heights where not only the past, but a bit of the future seem spread out before his eyes. The world, as I see it, that awaits us over the horizon of the next twenty years, is challenging — exciting — and promising."

This special key to the world's first electronically air-conditioned room, was presented to General Sarnoff on behalf of RCA Laboratories.



Electronic "Gifts" from RCA Research

Electronic Air Conditioner, Home "Hear-See" Tape Player, and Electronic Light Amplifier are Displayed for First Time at RCA Laboratories

THREE MAJOR developments in electronics requested five years ago by Brig. General David Sarnoff, Chairman of the Board of the Radio Corporation of America — an electronic air conditioner with no moving parts, a magnetic tape recording system for television, and an electronic amplifier of light—were presented and demonstrated to him on October 1 at the David Sarnoff Research Center by RCA scientists as gifts to mark his 50th anniversary of service in the fields of radio, television, and electronics.

The new developments, and several unique applications of them, include:

A room cooled or heated by electronic panels, operating in complete silence and with no moving parts. Also a noiseless electronic refrigerator with no moving parts.

A home "hear-see" magnetic tape player which reproduces television programs through standard television receivers.

An electronic amplifier of light which amplifies by up to 1,000 times the brightness of projected light; and an application of it in the form of an amplifying fluoroscope for industrial X-ray use.

General Sarnoff made his request in September, 1951, and expressed his hope that the new devices would be invented by the time of his 50th anniversary.

Three years later, the RCA scientists produced and publicly demonstrated the first of these devices — a magnetic tape recording system for color and black-and-white television. Designed for broadcast use, this system was later installed at the studios of the National Broadcasting Company, where it has since undergone extensive field tests preparatory to commercial use. It was used in May, 1955, in transmitting the first long-distance tape-recorded color television program, sent over a closed circuit from New York to St. Paul, Minnesota.

Progress Toward the Market and the Home

Next, the RCA scientists produced and demonstrated publicly a small refrigerator operating by purely electronic means. A little later, they produced and demonstrated an electronic light amplifier panel capable of increasing the brightness of projected light.

On October 1, the RCA scientists showed that they



The world's first electronically air-conditioned room, at the David Sarnoff Research Center, is opened by Brig. General David Sarnoff. Looking on are Dr. E. W. Engstrom, left, Senior Executive Vice-President of RCA, and Nils E. Lindenblad, of the RCA Laboratories research staff, who headed development work.

have made further progress and are bringing these inventions nearer to the market and the home:

The principles employed in the television tape recording system have been applied in development of a home television sight-and-sound tape player;

An electronic room air conditioning system and a new, larger electronic refrigerator have been developed from the earlier small refrigerator;

From the original light amplifier, the scientists have developed the new amplifier capable of increasing by 1,000 times the brightness of projected light, and have also devised a practical application for such a system in industrial X-ray functions.

The presentation to General Sarnoff was made by Dr. E. W. Engstrom, Senior Executive Vice-President of RCA, who said:

"The RCA Laboratories organization is especially proud to present you, General Sarnoff, with this fulfillment of your request of five years ago. It is most fitting that these evidences of truly remarkable progress in electronics should be disclosed at this time — on the fiftieth anniversary of one whose faith in electronic science has been unlimited, and whose encouragement of research has been responsible for so many outstanding achievements in radio, television, and electronics."

In his acceptance of the new developments, General Sarnoff paid tribute to the pioneering work of RCA scientists and engineers, saying:

"My request of five years ago was not made lightly, but in full awareness of the ingenuity, vision and persistence which characterize the research people of RCA. These radical developments represent modern science at its best, concentrating its formidable talents upon the constructive task of providing a wealth of devices and techniques for man's well-being. It is most gratifying to me that all these new developments are related to peace-time use."

Main Features Are Summarized

The new devices shown at the David Sarnoff Research Center were developed by teams of scientists, engineers and technicians of RCA Laboratories working under the supervision of Dr. Douglas H. Ewing, Vice-President, RCA Laboratories, and Dr. Irving Wolff, Vice-President, Research, of RCA.

They were described in the following terms by Dr. Engstrom and the RCA scientists:

Checking temperature of fins at the rear of the electronic air-conditioning panels are Nils E. Lindenblad, left, and Charles J. Busanovich, of the research team which developed the unique system.



The noiseless electronic air conditioning system comprises large wall panels which become cold under the influence of direct electric current. With a reversal of the electric current, the same panels produce a heating effect. Employing new materials developed at RCA Laboratories, the system uses no motors, fans, pumps or other moving parts, but achieves room cooling or heating by both radiation and convection — the gentle circulation of air caused by differences in the air temperature. In the small demonstration room used for the October 1 display, the system is capable of maintaining a room temperature as much as 25 degrees cooler than the temperature outside. Used in reverse for room heating, the system is capable of maintaining a room temperature considerably more than 25 degrees warmer than the temperature outside, according to the RCA scientists.

The new electronic refrigerator, a larger and more efficient successor to the experimental RCA electronic refrigerator announced by General Sarnoff in January, 1955, operates on principles identical to those of the electronic air conditioning system. The refrigerator has a food compartment of 4 cubic feet, in which a temperature of 40 to 45 degrees is maintained, plus a 30-cubic-inch ice tray in which ice cubes can be produced. Like the air conditioner, the refrigerator is noiseless and has no moving parts.

The "bear-see" home magnetic tape player for television, housed in a cabinet no larger than a high-quality magnetic tape sound reproducer, can play over a standard television set the pictures and sound of television selections pre-recorded on magnetic tape. Employing reels of various sizes, the player reproduces on the TV set black-and-white TV selections equivalent in

This is the world's first electronically air-conditioned room, at the David Sarnoff Research Center of RCA. Panels for cooling or heating are seen in room walls behind decorative grillwork.





The new, improved electronic refrigerator is demonstrated by models at RCA's David Sarnoff Research Center. Food compartment has capacity of 4 cubic feet; ice tray, at bottom, measures 30 cubic inches.

running time to phonograph records, from tape only ¼-inch wide. The tape selections are recorded on the previously-developed RCA magnetic tape recording system for black-and-white and color television. Already under way is the next step — reproduction of pre-recorded "hear-see" tape selections in color.

The electronic light amplifier, in the form of a thin, flat panel, can increase by 1,000 times the visual brightness of a projected light image. A further development of the light amplifier announced by RCA in December, 1954, the new device has potential application in large, high-brightness radar display and certain types of communication. The new amplifier, incorporating improved materials and a new structure, is capable not only of increasing the brightness of visible images, but of converting invisible X-rays and infra-red images to bright visible form.

The amplifying fluoroscope for industrial X-ray use, is an application of the light amplifier with potential uses in a wide range of industrial inspection functions. It displays X-ray images 100 times brighter in greater contrast, and consequently with marked improvement in perceptibility of detail in comparison with

present-day fluoroscopic screens. Consisting of a thin panel which can be substituted readily for the conventional fluoroscopic screen, the new device permits viewing of X-ray images in normally lighted surroundings rather than in the darkness needed for viewing by present techniques. Dr. Engstrom pointed out that use of the amplifying fluoroscope also makes it possible to reduce X-ray intensity by as much as ten times and still achieve images of satisfactory brightness and contrast for direct viewing in the darkened surroundings now customary for this type of industrial inspection.

Details of the New Developments

Following the presentation to General Sarnoff, the new developments were demonstrated to the press and described in detail by Dr. Engstrom and the RCA scientists and engineers concerned in their development.

RCA ELECTRONIC AIR CONDITIONING SYSTEM

Demonstrated in a specially constructed room, the RCA electronic air conditioner was described by Dr. Engstrom as "a truly revolutionary development — an air conditioning system which for the first time operates in complete silence, contains no moving parts, produces no heavy drafts, and can be used either to cool or to heat a room by the simple expedient of reversing the flow of direct electric current."

The demonstration system comprises two large wall panels — one measuring 5 x 5 feet, and the other 5 x 6 feet — with surfaces consisting of an array of 2-inch metal squares. To the back of each square is attached a small cylinder of thermoelectric material developed at RCA Laboratories. Dr. Engstrom explained that such materials produce either cold or heat under the influence of direct electric current, depending upon the direction of flow of the current.

The new thermoelectric materials and the panels themselves were developed by a research group under the direction of Nils E. Lindenblad, veteran RCA scientist and engineer who was responsible for the first electronic refrigerator shown by RCA early last year, and for the improved and larger refrigerator.

Based on 120-Year-Old Principle

Mr. Lindenblad explained that the air conditioning system and the refrigerators operate on a principle discovered more than 120 years ago by the French physicist Jean Charles Peltier. In the so-called "Peltier Effect," the passage of a direct current through a junction of two dissimilar materials creates a cooling effect at the junction when the current moves in one direction, and a heating effect when the direction of current is reversed.

"Starting with this experiment, which has remained largely a scientific curiosity for more than a century, we have taken a new approach based on our recently-acquired knowledge of the behavior of electrons inside various solid materials," said Mr. Lindenblad. "As a result, we have been able to create for the first time new materials which achieve cooling and heating by this means on a practical scale."

As described by Mr. Lindenblad, the Peltier effect has been applied in the following fashion to achieve the RCA room air conditioning system:

The passage of direct current through the thermoelectric junctions behind each of the small square plates on the wall panels causes heat to be carried away from the squares. At the other end of each junction is a set of small cooling fins which dissipate the heat. When the system is used for heating, the current is reversed, and the heat is "pumped" electronically into the plates from the air outside the room.

Mr. Lindenblad pointed out that the panels replace a complete section of wall, so that the cooling or heating surface is in the room while the fins are exposed to outdoor air. He explained that since the fins are only 4 inches long, they might normally be adapted to any architectural design by shielding behind a decorative panel suiting the exterior appearance of a house.

Associated with Mr. Lindenblad in development of the system were C. J. Busanovich, R. H. Fisher, and other members of the staff of RCA Laboratories.

The new RCA "hear-see" tape player, shown here in a home setting at the David Sarnoff Research Center, plays pre-recorded TV programs from magnetic tape over a standard television receiver.



NEW ELECTRONIC REFRIGERATOR

The new RCA electronic refrigerator, according to Dr. Engstrom, represents "another major step toward practical refrigeration in a form which may supplement and diversify the art of refrigeration as we know it today."

Pointing out that the new refrigerator operates on the principles employed in the electronic air conditioning system and the earlier RCA developmental electronic refrigerator, Dr. Engstrom said:

"This type of cooling and freezing, accomplished electronically through panels which may be varied in size and arrangement, may be expected to lead to development of specialized refrigerators and coolers for the home, to portable refrigerators, and to novel cooling or freezing devices for many uses in science, medicine, industry, and defense."

Discussing the new refrigerator, Mr. Lindenblad explained its various features this way:

Cooling in the 4-cubic-foot food storage compartment is achieved with an array of the thermojunctions similar to those used in the air conditioning system. These are mounted directly on the outside wall of the aluminum cooling compartment, and they dissipate through air-cooled fins the heat drawn from inside the compartment. In the earlier RCA electronic refrigerator, the heat was removed by circulating water.

The ice tray, of 30 cubic inches, rests on a slab of copper, to the underside of which are attached several thermojunctions. Larger cooling fins are arrayed around the ice compartment assembly for removing heat.

In contrast to the earlier electronic refrigerator, the larger improved type employs new thermoelectric materials that achieve a temperature drop almost double that in the previous model. At the same time, the capacity of the new refrigerator represents a substantial gain over the one-cubic-foot cooling compartment and 8-cubic-inch ice maker in the earlier model. Because of the improvement in thermoelectric materials, the new refrigerator requires less direct current power for operation than did its small predecessor.

"HEAR-SEE" MAGNETIC TAPE PLAYER FOR TELEVISION

An outgrowth of the research program which developed the RCA tape recorder for color television broadcast use, the new "hear-see" home magnetic tape player for black-and-white television was described by Dr. Engstrom as "a development of major significance in the field of home entertainment."

"Adding sight to the sound of recorded selections, this new device heralds the approach of a new era in the recording art," said Dr. Engstrom. "In its present

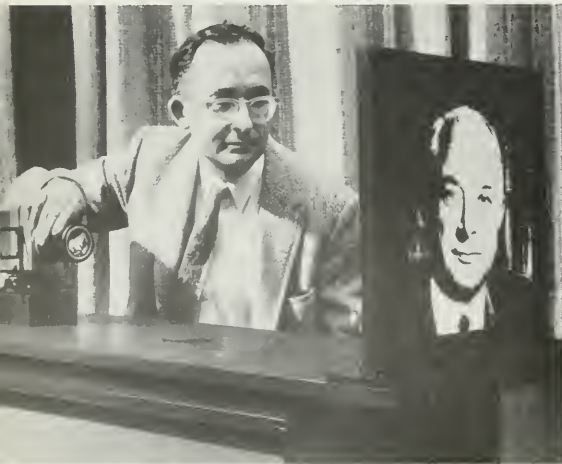
experimental form, the player presents on a standard home television set, selections comparable in length to those on phonograph records."

Dr. Engstrom added that research already is in progress on development of a simple recording attachment for the tape player. Such a system, he said, would permit the home user to record his favorite incoming TV programs for repeated viewing, and to make original tape recordings at home for immediate or later playback on the TV set.

"Small transistorized television cameras that could be used with such a system of electronic photography already have been developed at RCA Laboratories," he said. "A recording system of this type also may be expected to bring about new and more effective techniques of television news coverage, as well as new visual techniques of importance in industry and defense."

Developed by a team of scientists and engineers under the direction of Dr. Harry F. Olson, Director of the Acoustical and Electromechanical Research Laboratory, RCA Laboratories, the novel tape player embodies techniques learned in the development of the earlier and larger RCA color TV tape recorder for broadcast use. The research team responsible for the new development included William D. Houghton, Maurice Artzt, J. T. Fischer, A. R. Morgan, J. O. Woodward, and Joseph Zenel, all of whom contributed also to development of the earlier system.

The new RCA light amplifier, which increases visible brightness of a projected image up to 1,000 times, is demonstrated here by Benjamin Kazan, RCA scientist responsible for its development.



In the press demonstration, three pre-recorded tapes were played by the new device through a standard RCA television set. They included a special 4-minute recording by Vaughn Monroe, recorded at the David Sarnoff Research Center on September 19; and two 4-minute selections tape-recorded by picking up from the air regular television broadcasts on September 22 — one featuring a song by Eddie Fisher, and the other including portions of baseball and football games.

Discussing the various features of the home tape player, Dr. Olson said:

"This home system has been designed with an eye to simplicity in both production and operation. The magnetic tape employed is only ¼-inch in width, and techniques which we are now developing will permit the use of two tracks arranged side-by-side on the tape so that the playing time will be doubled. The tape speed is 10 feet per second, and reels of various diameters may be used.

"Pre-recorded tapes for the television tape player can be easily produced by techniques already proven in the RCA television tape system for broadcast use, and they can be marketed in the same fashion as standard phonograph records and sound tapes. As television itself has shown, the artistic possibilities of combining pictures with sound are limitless."

NEW ELECTRONIC LIGHT AMPLIFIER

The new RCA electronic light amplifier, which can increase by up to 1,000 times the brightness of projected light images, was described by Dr. Engstrom as "a development of major potential importance in the field of electronic display techniques."

The main features of the device were discussed by Dr. D. W. Epstein, of the RCA Laboratories technical staff, and Benjamin Kazan, RCA scientist who developed both the new light amplifier and its application in the amplifying fluoroscope.

"An amplifier of this type," said Dr. Epstein, "may find wide application in a number of areas. An example is radar viewing, where the observer frequently must cope with dim images, and where persistence as well as brightness are desired. Since the amplifier also converts invisible X-rays and infra-red images to bright visible images, other possible important uses lie in the military field and in astronomy, where analysis of infrared radiation from dim sources plays an important role."

Consists of Thin Screen

Mr. Kazan described the light amplifier in these terms:

Developed from the electronic light amplifier originally developed by Mr. Kazan and Dr. F. H. Nicoll, of the RCA Laboratories technical staff, the new device

consists of a thin screen formed by two closely-spaced layers, one of photoconductive material and the other of electroluminescent phosphor. Between these is a very thin layer of opaque material to prevent feeding back of light. The layers are sandwiched between the two transparent electrodes, and a voltage is applied across the entire assembly.

In operation, an extremely dim light image falls directly on the photoconductive layer, permitting a corresponding pattern of electric current to flow through to the electroluminescent layer. Under the influence of this current pattern, the electroluminescent phosphor emits light, forming a high-brightness image of the original picture. This process occurs because the photoconductive material acts as an insulator in the absence of light, but conducts current under the influence of light. The electroluminescent material remains dark until it is excited by an electric current, which causes it to emit light.

In the press demonstration, an image too dim to be seen clearly by the human eye was projected against the photoconductive layer of the panel from a slide projector. On the other side of the panel, the image appeared as an extremely bright picture of television quality, formed by the light emitted by the electroluminescent phosphor.

Mr. Kazan pointed out that the far greater brightness achieved with the new light amplifier in comparison with the earlier type has resulted from the availability of improved materials produced by RCA research, and from a new type of construction in the light amplifier panel itself.

AMPLIFYING FLUOROSCOPE FOR INDUSTRIAL X-RAY USE

Adjacent to the new electronic light amplifier at the October 1 demonstration was an application of the device as an amplifying fluoroscope for industrial X-ray use—an application which was described by Dr. Engstrom as opening the way to "far greater speed, efficiency and accuracy in the vital field of industrial inspection techniques."

"Producing an X-ray image about 100 times brighter than that obtained with the conventional fluoroscopic screen, the RCA amplifier panel at the same time provides far more contrast than can be obtained with the present type of fluoroscopic equipment," said Dr. Engstrom. "This far greater brightness and increased contrast in turn provide marked improvement in perceptibility of detail. In addition, the X-ray image can be viewed in normally lighted surroundings, rather than in an unlighted enclosure where the eye must become dark-adapted."

Mr. Kazan pointed out that the ability of the light amplifier panel to convert X-rays to visible light made possible the development of the amplifying fluoroscope. In this application, X-ray shadow pictures falling on the photoconductive layer permit a corresponding pattern of electric current to flow through to the electroluminescent layer, which emits light corresponding to the original X-ray shadow picture.

In the demonstration, the amplifying fluoroscope was shown in operation adjacent to a standard industrial fluoroscope screen of the type in general use. Even in a darkened room, the fluoroscopic image on the conventional screen remained almost invisible until the eyes of the observers had become dark-adapted, and the visible image even then remained difficult for the eye to observe in detail. The same image appearing on the new amplifying fluoroscope, however, could be seen clearly and in detail even when the room lights were turned on. The sample examined with both screens was an electron tube.

According to Dr. Engstrom, further research is expected to produce a photoconductive material which will respond with sufficient speed to changes in X-ray or light emission, making possible the development of an electronic amplifying fluoroscope for medical uses. The present device, he explained, emits its light for a few seconds after the X-rays have been cut off.

The new amplifying fluoroscope is demonstrated by Mr. Kazan in comparison with standard fluoroscopic screen. In the window of the demonstration unit, the amplifying fluoroscope at left and conventional fluoroscope at right are operated simultaneously. The specimen, an electron tube, appears brightly only on the amplifying fluoroscope, which increases image brightness 100 times.



Color TV Sales Go Upward

COLOR TELEVISION'S soaring popularity in the Philadelphia area and in other major cities across the country — as evidenced by the excellent sales record of recent weeks — means that color television is running well ahead of earlier expectations, Brig. General David Sarnoff, Chairman of the Board of the Radio Corporation of America, declared on October 15.

General Sarnoff spoke at a ceremony at Gimbel's Department Store at which he received a scroll presented on behalf of more than 200 dealers in greater Philadelphia who participated in a sales-shattering performance during "General Sarnoff Color Television Week."

The scroll stated: "To General David Sarnoff, on the occasion of your Fiftieth Anniversary in the wireless, radio, phonograph and television industry — we, the undersigned dealers in the territories served by Raymond Rosen & Co., Inc., as an expression of our confidence in your newest baby — color television — have in the week ending September 29, taken delivery of more than 1,000 RCA Victor color television receivers."

The scroll was presented to General Sarnoff by T. F. Joyce, President of Raymond Rosen & Co., RCA Victor distributor in the greater Philadelphia area. The occasion also marked the opening at Gimbel's in Philadelphia of a new traveling RCA exposition which features color television and the latest RCA developments in electronics.

General Sarnoff, who on September 30 commemorated his Fiftieth Anniversary of service to radio, television and electronics, said he was very optimistic over the present outlook for color television.

Comments on Readiness of Color

Asked if he had any comment on a recent statement by the President of a large electrical manufacturing company that color television is not ready yet, he said:

"I yield to no man in my enthusiasm for color television. Anyone who wants to wait until the wagon is rolling and then get on for a free ride should have the courtesy to remain silent. Television started in 1946. The company represented by the man who said that color is not here did not realize that black-and-white television was here for ten years. That company did not get going in television until 1956."

Asked how many color television sets RCA would produce and sell in 1956, General Sarnoff said, "We expect to manufacture and sell 200,000 color television sets in 1956, as we originally estimated, and it is a conservative estimate that RCA alone will produce and sell 500,000 color television sets in 1957."

"We are particularly encouraged," he said, "by the mounting sales of RCA Victor's Big Color TV receivers, since our new line, which broke the \$500 cost-barrier, was introduced in mid-July. Sales to dealers are increasing week by week.

"Already, we are in short supply of our three lower-priced models — those nationally advertised at \$495.00, \$550.00 and \$595.00 — and we have stepped up production on those models to the extent that we have authorized premium overtime production by the supplier of the cabinets of the low priced sets. In addition, we are currently selling our \$650.00 and \$695.00 sets at about the planned sales rate.

"Our new color merchandise met with an exceptionally enthusiastic response from the public. Even during the month of August, when the sale of TV sets is traditionally at a low level and before NBC expanded its evening color programming by more than 500 per cent, customer installations were far ahead of any schedule we had in mind. This information was based on the installation records of our own RCA Service Company.

Rate of Sales to Dealers Triples

"From the first week in September — the start of the traditional Fall selling season — to last week our rate of sales to dealers has tripled. For example in one of our best markets, more than 1,100 color sets were sold to dealers last week."

In a statement on the success of color in the Philadelphia market, Mr. Joyce said:

"During the first week in October, the RCA Victor dealers in the Philadelphia wholesale market accepted delivery on 1107 RCA Victor color television receivers. This was a tribute by 205 participating RCA Victor retailers to General David Sarnoff, Chairman of the Board of RCA, on the beginning of his second half century of service to the radio, phonograph and television industry.

"Much more significant than the fact that our company has shipped more than 1100 RCA Victor color television receivers in one week is the fact that Raymond Rosen & Company's billings on RCA Victor color television receivers for the month of October will be close to two million dollars in retail prices; that the value of the sales of RCA Victor color television receivers now exceeds that of black-and-white television receivers in the Philadelphia market and that our company looks forward with confidence to selling more than 50,000 RCA Victor color television receivers in 1957."



Ziegfeld Theatre Becomes a Color Studio



New York's famed Ziegfeld Theatre — now a color TV studio.

NEW YORK'S historic Ziegfeld Theatre, world-famous for many years as the home of spectacular stage presentations, has been converted by the National Broadcasting Company into a unique color television studio in which the tradition of the famed theatre will be carried on in the electronic era.

Conversion of the Ziegfeld is a highlight of the extensive NBC program of growth in color television, as announced recently by NBC President Robert W. Sarnoff. Acquired as part of a \$12,000,000 building program undertaken by the company within the past year to double its color facilities for a major increase in programming this fall, the Ziegfeld represents part of an increase in studio facilities which also includes "Brooklyn Two," massive new color studio adjoining the previously converted Warner Brothers sound stage in Brooklyn, and "Color City Four," a new studio to be built at NBC's "Color City" in Burbank, California.

Its acquisition came, too, on the heels of an announcement by NBC that it would build, in Washington, D. C., the nation's first complete television station designed and constructed from the ground up specifically for local and network color telecasting.

Retaining the ornate splendor that has led it to be called "the most opulent theatre in the United States," the converted Ziegfeld is a combination of show business atmosphere and technical proficiency. As a new departure in theatres converted to color studios, the television facilities have been built into the theatre without disturbing its traditional aura. Thus the Ziegfeld makes an ideal studio for colorcasting big entertainment events that call for a theatrical setting.

Innovations at the Ziegfeld

Designers have concealed the studio control booth by installing it in the basement of the theatre, where production personnel can view the stage action through two Vidicon cameras. For the convenience of directors during rehearsals, the studio is equipped with a small portable control console which can be set up temporarily on the stage floor. The device, first of its kind, was developed by NBC.

Another new development installed in the studio is a remote control camera which can move the full width of the theatre, since it is attached to a rail running along the front of the balcony.

For production activities requiring a "workshop" rather than a theatre, the Ziegfeld uses a fore-stage floor and fore-stage lighting which can be added quickly to the existing stage. For audience viewing, the studio has a large-screen monochrome monitor as well as regular color monitors. The lighting system has a capacity of 900,000 watts of current and has 450 outlets.

With conversion of the famous theatre channelling communication of Broadway splendor to home viewers, so will the proposed Washington station, in the words of Mr. Sarnoff, "make it possible to show to the whole nation, in living colors, the events, personalities and scenes of our Capital." Cost of the new two-story broadcast center will be approximately \$4,000,000. Its antenna will make it the highest structure in Washington.

Another new development in the expansion program is a color recording system which makes NBC

the first network to present color programs on the same time-delay basis which is standard for black-and-white programs. The new lenticular film system, developed jointly by NBC, the Radio Corporation of America and the Eastman Kodak Company, will permit NBC to delay color programs for the West Coast so that they can be seen at the most convenient hours.

Highspots of this season's schedule of color programming, which has been increased by more than 500 per cent, are NBC's 90-minute "spectacular" productions. These include "Born Yesterday," starring Mary Martin and Paul Douglas; the Old Vic production of "Romeo and Juliet," starring Claire Bloom; Alfred Lunt and Lynn Fontanne in "The Great Sebastians"; the Esther Williams Aqua Spectacle; the Sonja Henie ice show; the world-renowned Sadler's Wells Ballet performing "Cinderella"; the Anatole Litvak production of "Mayerling," starring Audrey Hepburn and Mel Ferrer; George Bernard Shaw's "Man and Superman"; the William Wyler production of "The Letter"; Sol Hurok's "Festival of Music"; the TV Emmy Awards; an original musical "Jack and the Beanstalk"; and "High Button Shoes."

Announcement of New Color Schedule

The complete programming schedule was outlined by Mr. Sarnoff during a special 50-minute closed circuit colorcast which originated "live" Sept. 10 from the Ziegfeld Theatre, marking initial use of the theatre

The interior of the Ziegfeld, adapted to the color television era. NBC has maintained much of the original appearance of the theatre in making the conversion from conventional stage to color TV studio.



16 RADIO AGE

after its conversion. One of the largest closed circuits in broadcasting history, the program was beamed to audiences assembled at NBC stations in more than 120 cities across the country. Participating in the show, in addition to Mr. Sarnoff, who presided, were Frank M. Folsom, President of RCA; Andrew Heiskell, publisher of Life Magazine; singers Dinah Shore and Vaughn Monroe, and Billie Burke, widow of the late Florenz Ziegfeld.

Included in the audience were newsmen, advertising and station executives and distributors of RCA and RCA-Whirlpool, who will co-sponsor the "Saturday Night Spectacular" and "Producers' Showcase" presentations on the NBC network this season.

Fifty Originating Stations

In increasing its color television coverage of the country, NBC has announced that a total of 50 NBC-TV affiliates, serving areas which include more than 60 per cent of all television homes in the country, will be equipped to originate their own live or filmed color programs by the end of the year. The new total represents an increase of 60 per cent over the number of NBC affiliates similarly equipped a year ago.

Concurrently, the number of affiliates equipped to rebroadcast network color will increase to 134 by the end of the year, an increase of about 30 per cent from one year ago. Rebroadcasting facilities will serve areas that include 36,700,000 television homes—or about 95 per cent of television homes in the country.

The Ziegfeld's career as a color TV center was launched on September 22 with the Perry Como Show, whose star is shown here on the stage where some of the theatre's great spectacles appeared.





Monitors placed strategically on the convention floor provided extra view of proceedings at Chicago.

TV and Radio at the Conventions

ELECTRONIC journalism reached a new peak in August when the National Broadcasting Company brought the political conventions to a nation-wide audience with a speed, flexibility and thoroughness unmarshaled in the history of television.

Combining the skill and experience of a seasoned news staff and electronic advances engineered by RCA and NBC technicians, the NBC coverage was singled out by leading TV critics as the outstanding job among the three networks.

NBC presented the Democratic and Republican conventions over both radio and television for a total of 111 hours and five minutes. Television coverage of the two conventions ran 56 hours and 35 minutes, and radio coverage for 54 hours and 30 minutes. In addition, there were special programs such as "Outlook," "Cross-Country Caucus" and "Convention Special," as well as various press conferences, including that held by President Eisenhower.

Coverage was under the direction of Davidson Taylor, Vice President in charge of Public Affairs for NBC; William R. McAndrew, Director of News; Barry Wood, Director of Special Events (in charge of con-

vention production); and George McElrath, Manager of Technical Operations.

The team of commentators in "TV-One"—Chet Huntley, David Brinkley, Bill Henry and H. V. Kaltenborn—emerged from the conventions as household favorites. They received about 500 telegrams and letters congratulating them for their "impartiality," "imagination" and "ability to interpret the complicated political doings." Pauline Frederick and Ned Brooks drew similar compliments for their radio coverage.

23 Correspondents on the Scene

A total of 23 correspondents, plus 12 regional reporters drawn from New York, Washington, Chicago, Los Angeles, San Francisco, Kansas City, Bonn and Rome, covered the conventions from the floor, from caucus rooms and from the key hotels in the two cities. Fifty technicians manning cameras and audio equipment were on duty at all times.

And all of these people brought the news in through ultra-portable cameras, purse-sized transceivers, beer-mug transmitters, a 60-foot, hi-reach camera lift, in addition to standard television cameras.

Major accomplishments for NBC News included the record-breaking assemblage of live TV equipment in 20 minutes for the President's press conference, the exclusive mobile radio and TV coverage of the President's trip from the San Francisco airport to the St. Francis Hotel, and exclusive pictures of Vice-President Nixon leaving San Francisco in the early morning when he learned of his father's illness.

A number of new electronic effects were successfully accomplished to add effectiveness to the convention coverage in both cities. Among them were the five-way split screen, never before attempted, in which the viewing screen was split into five segments with individual pictures in each; and the electronic spotlight technique, which permitted cameramen to spotlight electronically

any group or area on the convention floor. Instantaneous tabulation and visualization of balloting figures were accomplished by Teleregister.

NBC created a constantly smooth flow of information within the News Department by the use of its own news wire. News and assignments alike traveled over six teleprinter machines, so that all information was instantly available to all key executives. This news was augmented by wire service reports.

During the hectic weekend between the two conventions, NBC flew 100 persons and 18,000 pounds of equipment from Chicago to San Francisco. The traveling mobile unit went by train in its own private car, leaving Chicago at midnight on Thursday and arriving in San Francisco in time to provide pictures on Sunday for a special pre-convention "Outlook" program.

Trailers Serve as Press Headquarters

At the Democratic convention in Chicago, seven giant air-conditioned trailers of luxury design served as an RCA-NBC working press headquarters. Equipped with telephones, typewriters, television sets, tape recorders and other tools of the trade, the trailers were open to all accredited newsmen covering the sessions.

The trailers were located inside Chicago's International Amphitheatre, immediately adjacent to the working press area. In addition to work space, the facilities also included relaxation facilities, hot food, refreshments, and soft music.

Convention coverage and hospitality: At left are NBC commentators Bill Henry, Dave Brinkley and Chet Huntley at Convention Central in Chicago during Democratic Convention. Below is a general view of the hospitality center of seven giant trailers maintained by RCA and NBC for the press.





The new RCA transistorized TV camera-transmitter unit features detachable electronic view-finder which enables cameraman to hold camera above eye level and still see the picture he is getting.



With transmitting range of more than a mile, the portable unit can pick up and send TV signals to base station for network broadcast to provide coverage of outdoor events as shown in this picture.

The Smallest TV "Station"

THE world's smallest complete television station — a 19-pound assembly including a transistorized portable camera and back-pack transmitter unit that can send television pictures to a base station more than a mile away — has been developed by RCA scientists for spot news telecasting and other field pickup functions.

The miniature system, described by the scientists as perhaps the most compact complete equipment yet designed for its purpose, received its baptism of fire in the hands of NBC cameramen at the national political conventions in Chicago and San Francisco. More than once, the small developmental unit permitted exclusive and candid coverage by NBC of convention news and features which were not accessible to larger conventional equipment.

Developed at RCA's David Sarnoff Research Center in Princeton, N. J., the radical new system includes a 4-pound camera with a novel electronic view-finder, and a 15-pound back-pack unit housing the transmitter, the battery power supply, and a synchronizing generator required for the transmission of standard broadcast signals.

Described by Dr. V. K. Zworykin, Honorary Vice-President of RCA, as "a major achievement in broadening the flexibility of television," the new equipment is

entirely transistorized, with the exception of the transmitting tube and the camera pickup tube. Seventy transistors are employed throughout the system. Dr. Zworykin pointed out that a major contribution to the development has been made by RCA's program of transistor development, particularly in the field of high-frequency transistors. He called attention, too, to the fact that the use of portable cameras and transmitters for news coverage was pioneered by RCA and NBC at the national political conventions in 1952, with equipment far less advanced technically than the new transistorized system.

Uses New Vidicon Tube

The RCA research team responsible for the development of the miniature camera and transmitter includes L. E. Flory, J. M. Morgan, John Dille, W. S. Pike, G. W. Gray, and Lawrence Boyer, working under the guidance of Dr. Zworykin.

Among the many novel features of the developmental system, Mr. Flory has called particular attention to these:

—The transistorized camera is built around a new RCA-developed Vidicon television camera tube only ½-inch in diameter and no longer than a king-size



At heart of RCA's new transistorized TV camera is this RCA-developed 1/2-inch Vidicon tube, shown here in comparison with a king-size cigarette. Tube is now being produced in sample quantities.

cigarette, and employing any standard 8-mm motion picture camera lens. According to Mr. Flory, the miniature tube, in spite of its small size, has a sensitivity greater than that of the standard 1-inch Vidicon pickup tube commonly used in portable TV camera. The tube, employing an improved light-sensitive surface, was developed by A. D. Cope, of the research staff at the David Sarnoff Research Center.

—The camera is equipped with a novel electronic view-finder which can be detached from the camera

and hung around the cameraman's neck. Since it is electronically synchronized with the camera, the finder displays a scene as viewed by the camera lens even when the two elements are separated in this fashion. As an example of the usefulness of this feature in TV news coverage, Mr. Flory points out that the cameraman can look down into the viewfinder to observe a scene as picked up by the camera, while the camera is held overhead to see beyond a crowd or other obstacle.

—Exclusive of the view-finder, the developmental camera is only 2½ inches high, 3 inches wide, and 8¼ inches long. All necessary circuitry and controls are contained within this compact unit, which feeds directly into the back-pack transmitter.

—The back-pack unit weighs only 15 pounds, complete with batteries, as against approximately 50 pounds for previous portable transmitter equipment employing electron tubes. The pack itself is 12 inches wide, 13 inches high, and 3 inches deep. The silver cell batteries employed with the unit can operate the camera and transmitter for about 5 hours, according to Mr. Flory, in contrast to the 2-hour life of batteries employed with tube-operated equipment.

Following announcement of the new equipment, the RCA Tube Division disclosed that developmental samples of the 1/2-inch Vidicon camera tube are being made available to TV camera manufacturers. The Tube Division announcement pointed out that the tube has been designed with a heater that minimizes battery drain in order to meet the requirements of small experimental transistorized TV cameras.

"Compatible Colors to See and Wear"

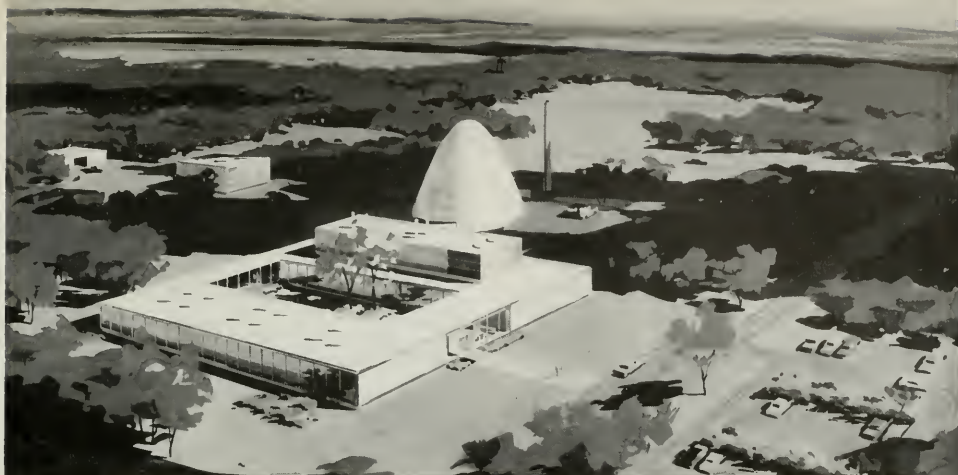
A NATIONWIDE campaign based on the theme "Compatible colors to see and wear" has been launched by eleven major companies and some 150 key stores in every part of the country, in cooperation with RCA, it was announced on September 17 by Frank M. Folsom, President of RCA.

Declaring that color television is having a tremendous impact on the styling and merchandising plans of a growing number of designers and manufacturers, Mr. Folsom told members of the Philadelphia Fashion Group that a prominent part of the campaign is a coast-to-coast color caravan sponsored by RCA, DuPont, the Allied Stores Corporation and other progressive stores.

"It will travel to 40 different cities and will stay one week in each city, televising four one-hour shows each day over a closed-circuit system," he said. "The

programs will be performed 'live' before an RCA color TV camera and will be seen throughout the participating stores. The programs will consist of a series of well-integrated merchandise demonstrations, featuring children's and adult wear, home furnishings, cosmetics and other merchandise of interest to women."

Mr. Folsom emphasized the importance of color presentation in merchandising, saying: "If I were in your business today, I would be certain that I used color television to its fullest to help promote and merchandise every product I have. For one thing is certain: nothing will help sell any product, any style, any fashion more efficiently than visual demonstration — and color television, next to in-person viewing, is the most effective form of visual demonstration ever developed."



Industrial Reactor Laboratories, Inc. — an architects' sketch of the projected center at Plainsboro, N. J.

A New Center for Nuclear Research

THE RADIO CORPORATION OF AMERICA has joined nine other companies in sponsoring construction and operation of a multi-million dollar nuclear reactor for industrial research in atomic energy at Plainsboro, N. J., only a few miles from Princeton. The facilities for the new organization, known as Industrial Reactor Laboratories, will include the largest swimming pool reactor so far in operation.

Incorporation of the new company was officially announced on September 26. In addition to RCA, the participating companies include:

AMF Atomics Inc. (a subsidiary of American Machine and Foundry Co.), American Tobacco Company, Atlas Powder Company, Continental Can Company, Corning Glass Works, National Distillers Corporation, National Lead Company, Socony Mobil Oil Company, and United States Rubber Company.

Each participant is represented on the new company's board of directors, which will be headed by General Walter Bedell Smith, President, and H. I. Hilyard, Vice-President. The RCA member of the board is Dr. Douglas H. Ewing, Vice-President, RCA Laboratories. H. W. Leverenz, Director of the Physical and Chemical Research Laboratory, RCA Laboratories, has been named to represent RCA on the new company's Operating Committee.

Aims Described by Dr. Engstrom

Dr. E. W. Engstrom, Senior Executive Vice-President of RCA, made this statement in explaining RCA's

plans as a participant in Industrial Reactor Laboratories:

"The establishment of Industrial Reactor Laboratories, Inc., provides the Radio Corporation of America, as a participating company, with the opportunity to employ the newest and most powerful tool of research—the atomic reactor—for fundamental studies into the close relationship between nuclear and electronic phenomena.

"The new knowledge resulting from this research 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 effect of radiation on the various types of electronic equipment for communication, navigation, control, and other commercial and military functions in which electronics play a vital role.

"It is the expectation of RCA that the results of its continuing research through these new facilities will benefit not only RCA, but the entire electronics industry as well."

The new facility will be operated by Columbia University, which will hire a permanent staff of about 25 to supply nuclear radiation from the reactor to the experimental scientists of the different companies. Each of the participating companies and the University will have laboratory space in the modern building adjoining the reactor unit. The 300-acre site of the new establishment is now being prepared for construction, which is expected to be completed in late 1957 or early 1958.

Ten Years of TV in the Home

THE TELEVISION INDUSTRY, which has had its hands full with one of the most phenomenal expansions of a commercial service in American history, devoted some of its time last month to stocktaking on the occasion of its tenth anniversary of service in the home.

It was in September, 1946, that the introduction of television home receivers by RCA Victor launched a period of unprecedented growth for the new TV art. The historic first mass-produced home receiver was the now famous RCA Victor Model 630TS. With a 10-inch picture tube and a retail price of \$375, the Model 630TS established the early performance standards for the industry. Many other manufacturers used its chassis as a model for their own products. Today, after 10 years, many 630TS sets are still in use and giving excellent service.

Competition sprang into being, following the action of RCA in inviting all of its licensed competitors to the Camden, N. J., plant of RCA Victor and providing them with blueprints of the Model 630TS. The infant television industry then began the swift progress that has since raised it to a major industry and service.

Another important contribution to the spectacular growth of television in its first decade was the extensive preparation by RCA to meet the need for an increasing number of kinescopes, the picture tubes which are a vital component of all home receivers. From the early stages of TV expansion, RCA has served as a substantial source of the kinescopes used by the industry.

Early in 1949, RCA introduced the first line of TV receivers using its newly developed 16-inch metal-cone tube for large direct-view television pictures. This was followed by succeeding models incorporating metal-shell picture tubes of constantly larger screen size. First came the 17-inch tube, then the 19-inch, and, in 1951, the 21-inch kinescope which has become the most popular size.

Development of Color TV

It was also only 10 years ago, on October 30, 1946, that RCA demonstrated an all-electronic color television system. Although it was still in a laboratory stage, the new RCA method of color transmission established a principle that had long been a dream of radio scientists.

Symbolizing 10 years of television in the home: The famed RCA 630TS of 1946 is shown here in comparison with the latest in high-quality RCA television — the Aldrich Big Color receiver.

Slightly less than three years later, in August, 1949, RCA announced the successful development of an all-electronic color TV system completely compatible with the existing black-and-white service. The fruit of years of research and development at RCA Laboratories, the new system offered a color service which meant that color programs could be received in black-and-white on all black-and-white home sets without any modifications or added contraptions, and at the same time that the color sets to be built and produced would be able to receive in black-and-white any non-color broadcasts.

The new system, operating within the 6-megacycle channel of black-and-white telecasting, meant also that transmitting stations would be able to change either from color to black-and-white or vice versa without disturbing viewers of either color or black-and-white sets. By March, 1954, commercial production of color TV receivers with a 15-inch picture tube had started at the RCA plant in Bloomington, Indiana.

These early color sets were nationally advertised at a price of \$1,000. Today, only a little over two years later, big-screen RCA Victor color TV is available at nationally advertised prices as low as \$495 — a price reduction of more than 50 percent.



"The President's Favorite Music"



President Eisenhower accepts the new RCA Victor album from Arthur Fiedler, conductor of the Boston Pops Orchestra. Looking on at left is Howard Hanson, President of the National Music Council.

THE FIRST pressing of a new record album called "The President's Favorite Music" was presented to President Eisenhower at the White House on September 10 by Arthur Fiedler, conductor of the Boston Pops Orchestra, on behalf of the RCA Victor Record Division.

The nine selections in the album, one of them played by the Boston Pops under Mr. Fiedler's direction, represent many of the President's musical favorites. The album cover carries a picture of the President and Mrs. Eisenhower and, on its back, a tribute to the influence of good music, written and signed by the President. The tribute says:

"I wish to salute musicians and the important part they play in the life of our people. American music has brought us pleasurable distinction at home and abroad.

"Millions of Americans are engaged in the creation, performance and active appreciation of music. Indeed it is a rare day when any one of us does not hear some form of music; it is hard to imagine our lives without it.

"The enjoyment of music — speaking for myself, at least — has a moral and spiritual value which is unique and powerful. It reaches easily and quickly

across lingual, racial and national barriers. The development of American music, like the native development of any art, is therefore the development of a national treasure."

The idea for the album originated with George R. Marek, Vice-President and Manager of RCA Victor's Album Department. He and Alan Kayes, Manager of Classical Artists and Repertoire for RCA Victor, worked closely with the Committee of Arts and Sciences for Eisenhower in production of the work.

The new album, available either on one 33 $\frac{1}{3}$ or two 45-rpm extended play records, includes the following selections:

SIDE 1

Band 1—Bach-Stokowski: "Sheep May Safely Graze" (from "Birthday" Cantata); Leopold Stokowski and his Symphony Orchestra

Band 2—Beethoven: "Coriolan Overture", Op. 62; Boston Symphony Orchestra, Charles Munch, Conductor

Band 3—Verdi: "La Traviata" Act II, "Di Provenza il Mar" in Italian; Leonard Warren, Baritone, Rome Opera House Orchestra, Pierre Monteaux, Conductor (Recorded in Italy)

Band 4—Johann Strauss, Jr.: "The Bat: Overture"; Fritz Reiner conducting the RCA Victor Orchestra

SIDE 2

Band 1—Gershwin: "Porgy and Bess" (A symphonic synthesis); Boston Pops Orchestra, Arthur Fiedler, Conductor

Band 2—Spiritual: "He's Got the Whole World in His Hands" (Arr. Hamilton Forrester); Marian Anderson, Contralto, with Franz Rupp at the piano

Band 3—Tiomkin-Washington: "High Noon" ("Do Not Forsake Me"), from the Stanley Kramer production "High Noon"; Al Goodman and his Orchestra

Band 4—Mendelssohn: "Fingal's Cave Overture," Op. 26; Chicago Symphony Orchestra, Fritz Reiner, Conductor

Band 5—Bach-Stokowski: "We All Believe in One God" ("Giant Fugue"); Leopold Stokowski and his Symphony Orchestra

Worker Safety Wins Honor for RCA



A RECORD of outstanding company-wide safety performance at RCA manufacturing plants during 1955 has brought RCA the National Safety Council's Award of Honor—the council's highest safety tribute.

Presentation of the award was made on September 27 to Brig. General David Sarnoff at Governor Averell Harriman's Dinner at the Sheraton-Ten Eyck Hotel in Albany, N. Y. The dinner was given for participants in the Governor's Worker Safety Conference, convening for the first time at Albany. David L. Arm, Director of Industrial Safety of the National Safety Council, in presenting the Award of Honor to General Sarnoff, declared:

"I am pleased to present this Award of Honor to you, General Sarnoff, in your capacity as Chairman of the Board of the Radio Corporation of America. This Award is granted for an outstanding safety performance by your company during the calendar year 1955.

"I bring to you the sincere congratulations of the Board of Directors and the Staff of the National Safety Council and hope that you will express our gratification for this outstanding performance to all the workers in all your plants.

"It is particularly significant that this Award is being presented to you, General Sarnoff, on the occasion of this first meeting of the Governor's Worker Safety Conference. It is proof that you not only are interested in talking about safety, but that you actually encourage your people to put it into practice."

Acceptance by General Sarnoff

General Sarnoff, presiding at the dinner as Chairman of the Governor's Industrial Safety Advisory Committee, declared in accepting the award:

"On behalf of Management of the Radio Corporation of America and our 80,000 employees, I accept with profound gratitude the Award of Honor of the National Safety Council for outstanding safety performance at RCA manufacturing plants in 1955.

"I have been advised that simultaneously with notification to us of this Award, information reached us that eleven individual RCA manufacturing locations had earned separate awards from the National Safety Council.



National Safety Council Award of Honor is presented to Brig. General David Sarnoff by New York's Governor Averell Harriman in tribute to RCA's outstanding record of industrial safety.

"These high tributes to our safety record will, I am sure, be regarded with appreciation and pride by all members of the RCA family, and serve as a further inspiration in our continuous program to reduce on-the-job accidents. I may point out, also, that we have enlarged this program to include off-job safety practices that are proving equally beneficial in safeguarding against accidents that mean loss of time and human suffering."

The National Safety Council notification of the Award of Honor to RCA stated that the tribute was earned by RCA by reduction in accident frequency by 51 percent in 1955, as compared with the RCA average during the previous three years. It also was stated that RCA had succeeded in reducing accident severity by 52 percent in 1955, as compared with the previous three years.

Of the eleven awards presented separately to individual RCA manufacturing locations, five were the Award of Honor and the remaining six received the Award of Merit. It was revealed that in selecting RCA plants for these awards, the National Safety Council had studied the safety records based on the 1955 performance of a total of 9,315 industrial manufacturing plants.

RCA-NBC Views on UHF Broadcasting

ANY move to shift all television broadcasting to the Ultra High Frequency (UHF) band would be "most injurious to the public interest" and could "jeopardize the whole future of television broadcasting in the United States," the Radio Corporation of America and the National Broadcasting Company, declared on October 1.

In comments filed with the Federal Communications Commission, RCA and NBC said the twelve Very High Frequency (VHF) channels are needed in conjunction with the seventy UHF channels "in order that television may continue to have room in which to grow and expand."

The comments were submitted in connection with the FCC's inquiry into the feasibility of transferring television broadcasting to the UHF band. In a report and order last June 25, the Commission said it was convinced it should undertake an analysis of the possibility of improving and expanding the nationwide television system through the use of the UHF band without the concomitant use of VHF channels.

Shift To UHF Called "Unwarranted"

"We believe," said RCA and NBC, "that any determination at this time by the Commission to move all television broadcasting to the UHF would be unwarranted, would jeopardize television broadcasting as a service to the public and would not be in the public interest.

"Natural propagation characteristics of the UHF band make it impossible for the 70 UHF television channels 'to render service to the public at least as good as or better than the service that can be provided to the public under the present system,' which includes 12 VHF channels as well as 70 UHF channels. But preservation and expansion of UHF broadcasting are essential to the public interest and attainment of the full potential of television broadcasting.

"It is of greatest importance to the future of television broadcasting that UHF television be encouraged now; that it not be left exposed to the possibility of withering in a state of suspended animation pending resolution at some future time of additional technical aspects of its operation.

Differences In UHF And VHF Performance

"The present obstacles to fully effective utilization of the UHF channels do not lie primarily in failure to solve technical problems. These obstacles have arisen principally from problems of economics and circulation."

In their comments, RCA and NBC noted that there

are basic differences in the performance of television in the VHF and UHF channels.

"These differences," they said, "arise primarily from conditions of nature. The differences are such that the service provided by VHF television in areas of mountainous terrain and cities with large man-made structures will normally continue to be superior to that provided by UHF. UHF can furnish a highly satisfactory service to the public, provided allocations are made to take these factors into account. But VHF should continue to be assigned to areas where use of the UHF band would impair service to the public."

RCA reported that on the basis of recent experiments with UHF equipment, it believes it can design and manufacture commercial UHF transmitting equipment to operate at an effective radiated power of 5,000 kilowatts. The highest power now used by any UHF station is 1,500 kilowatts. RCA also believes that if it were to receive a firm order for a 5,000-kilowatt UHF transmitter, it could set a delivery target date of approximately a year-and-a-half to two years from the receipt of the order.

TV's Growth Based On Use Of 12 VHF Channels

Discussing the past and future growth of television, the RCA and NBC comments said:

"Since World War II television has become one of the fastest growing industries in the United States. This phenomenal growth and development have been based principally upon utilization of 12 VHF channels.

"The 12 VHF channels are needed in conjunction with the 70 UHF channels in order that television may continue to have room in which to grow and expand. Even when only existing television stations are taken into account, there is real doubt as to whether it would be feasible to prepare an allocation of channels in heavily populated areas of the country on the basis of 70 UHF channels alone. The AM broadcast band is crowded with stations although there are 107 channels available for assignment to standard broadcasting. When television, both commercial and educational, expands to full stature even the existing 82 channel system may be severely taxed."

Suggestions For Encouraging UHF

RCA and NBC recalled the suggestions they made to the Commission last December for preserving and fostering UHF. These included the following:

"Urge the Congress to repeal the excise tax on all-channel receivers and thus make such receivers

competitive in price with VHF-only receivers. Urge the executive branch of the Government to support such repeal.

"De-intermix on a sufficiently broad basis to create a nucleus of predominantly UHF service areas from which UHF may grow and expand.

"Encourage multiple owners with resources and know-how to undertake the operation of UHF stations in intermixed markets. Encourage other qualified persons to undertake UHF operation in intermixed markets.

"Permit UHF stations to use directional antennas.

"Permit UHF stations to use on-channel boosters."

RCA and NBC noted that some action has been taken on the proposals. They said:

"The Commission already has authorized higher power and translator-type stations. In addition, the Commission has indicated it looks with favor upon the

principle of de-intermixture. We regret that the Commission's recommendation for the removal of the excise tax on all-channel receivers has not been accepted by the Congress or the Treasury Department.

"We believe these actions by the Commission are constructive but more is needed without delay. We again urge the Commission to take action with respect to the suggestions we have made."

RCA and NBC concluded by saying:

"We know of no existing technical or other factor which would justify transferring all television broadcasting to the UHF band. In our opinion, for the Commission now to consider such action would be most injurious to the public interest and can jeopardize the whole future of television broadcasting in the United States.

"We believe the 82 existing television channels are required for the achievement of a full and adequate television service to the public."

Fellowships for Employees

Ten employees of RCA have been named to receive David Sarnoff Fellowships during the current academic year, according to an announcement on September 18 by Dr. C. B. Jolliffe, Vice-President and Technical Director of RCA.

Dr. Jolliffe, who is Chairman of the RCA Education Committee, explained that the fellowships were established in honor of the Chairman of the Board of RCA. Each fellowship is valued at approximately \$3,500 and includes full tuition fees, \$2,100 for living expenses, and \$750 as an unrestricted gift to the university. Although appointments are for one academic year, each fellow is eligible for reappointment.

The David Sarnoff Fellows are selected on the basis of academic aptitude, promise of professional achievement, and character. They will pursue graduate studies in electrical and mechanical engineering, physics, applied mathematics, business administration, and dramatic arts. Recipients of the awards are currently employed by various RCA divisions and subsidiaries. During their year of study, they are on a leave of absence from RCA.

The ten recipients will undertake studies at Harvard, the University of Pennsylvania, Yale, the University of Michigan, Princeton, Massachusetts Institute of Technology, and the Polytechnic Institute of Brooklyn. Five of them will be working toward a doctorate in their selected sciences.

New Weather Radar

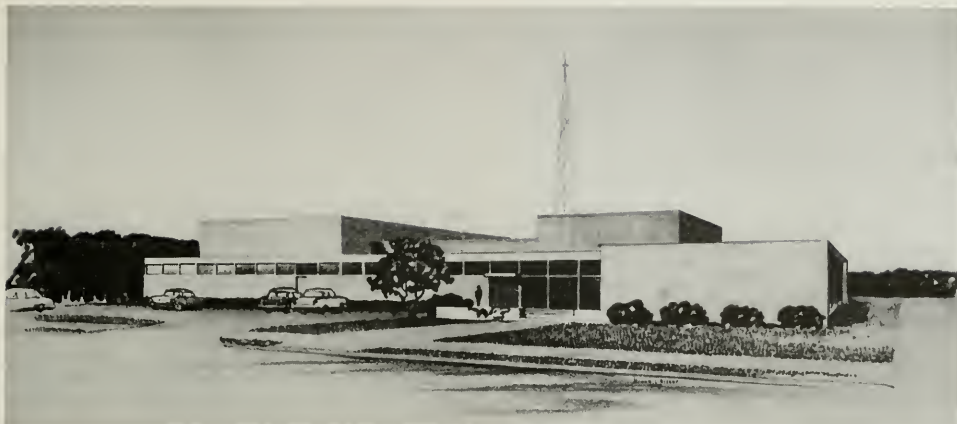
A new light-weight weather-avoidance radar system designed to the "flyweight" requirements of business and private aircraft has been developed by RCA engineers to help pilots of small planes in avoiding storms and turbulent air.

Announced as the first such radar system designed specifically for small planes, the new equipment is to go into commercial production later this year. For some time, RCA has been producing a weather-penetration radar system for larger and faster aircraft, and has provided such equipment to many American and foreign commercial airlines and to the Royal Australian Air Force.

The new light-weight system will enable pilots of small planes to "see" and avoid storms and turbulence up to 50 miles ahead. Weighing only 50 pounds, it is similar in general operation to the larger airline equipment. Like the larger system, the light-weight equipment employs a nose-mounted antenna to pick up storm formations ahead, and projects a picture on a radarscope mounted in the plane's cockpit or cabin.

The small-aircraft system also features circuitry which enables the pilot to switch-in a closeup view of a given weather area ahead, and provides a special antenna tilt control to permit use of the radar for terrain mapping.

The equipment highlighted an RCA display at the National Business Aircraft Association show in Miami on October 23-25.



WBUF, Buffalo, New York, shown above, is NBC's new UHF station. In connection with its opening, Miss Peggy McCutcheon, shown at right, was chosen "Miss Channel 17" from among hundreds of contestants.

New UHF Station in Buffalo

THE first ultra-high frequency television station to be purchased by the National Broadcasting Company, WBUF in Buffalo, N. Y., was dedicated on October 11.

The \$1,500,000 new home of the station was dedicated in ceremonies on NBC's "Today" show by Charles R. Denny, Executive Vice-President, Operations, of NBC. William B. Lawless, Jr., President of the Buffalo Common Council, and Charles C. Bevis, Jr., General Manager of WBUF, joined Mr. Denny in the ceremony.

In a statement on the dedication, Robert W. Sarnoff, President of NBC, said the occasion was "a milestone" for NBC and RCA, and added:

"WBUF's modern studio is a striking symbol of our faith in the future of UHF broadcasting. It has always been NBC's conviction that television must make full use of the UHF band of 70 channels to complement the original quota of only 12 channels available to the VHF band. It is through UHF channels that television can achieve its full potential of growth. It is through the UHF channels that all parts of our nation will have their full choice of television programs presented under our competitive system of broadcasting."

Upon moving to the new studio, Station WBUF increased its power output from 148,000 watts to a power of 500,000 watts. A further power increase is contemplated.



The station recently launched a full-scale campaign to make every home television set in the Niagara Frontier Area capable of receiving the ultra-high frequency signal. In plans announced by Mr. Bevis, it is carrying the full NBC Television Network schedule exclusively in the Buffalo area.

Operating under the title "Project 17", the campaign "will be conducted with the mobility and speed of a military action," according to Mr. Bevis.

Prior to full organization of the effort, the number of homes in the Buffalo metropolitan area equipped to receive ultra-high frequency television broadcasts increased 54 per cent in the first six months of operation of the station. Goal of the new project is 100 per cent conversion.

As a part of the expanded NBC programming transmitted by the station, NBC television coverage of the Democratic National Convention was carried in full and exclusively on Channel 17, the station's outlet.

Electronics in Latin America



BY ALBERT F. WATTERS

Vice-President and Operations Manager,
RCA International Division

LATIN AMERICA today is a vast proving ground for uses of electronics.

One of the world's most powerful radio transmitters, an RCA 250 kw broadcast transmitter, is now rising on the Mexican border.

At Puente Arenas, southernmost tip of the South American continent, an RCA 1-kw broadcast transmitter speaks the language of Terra del Fuego, "Land of Fire".

One of the longest hops for microwave radio in the world carries telephone messages over Colombia's towering Andes.

Electron microscopes seek biological, agricultural and other secrets at record reaching altitudes in Mexico and Venezuela.

In Venezuela, the world's first microwave-operated, RCA-equipped railroad helps to run trainloads of iron ore down to the Orinoco River.



All over this vast and vital area, new TV stations are bringing nearer the era of a hemispheric network. Puerto Rico is building the first complete TV educational system in the world. A recently built TV center at Televilla, near Havana, Cuba, will house three TV transmitters operating on three different channels. This is the first such center outside of the United States.

New microwave communication facilities, among the most modern around the globe, are functioning in Cuba, Colombia, the Dominican Republic.

In Panama, the votes in the National Congress are recorded electronically, a Mexican National Bank operates its 70 branch systems by radio. And over Latin cities where ancient Spanish bells once pealed, new electronic carillons now sound.

Electronics by RCA

These are indeed the electronic Americas, with electronics by RCA. The scientific magic of RCA electronics in the form of VHF communications systems, microwave, two-way radio, broadcasting and television has made possible many economic, cultural and social advantages.

Mexico, the Caribbean countries, Central American and South American nations have proven leaders in the pursuit of social and economic advancement through electronics. RCA International Division finds it a privilege to cooperate with them.

These electronic achievements of Latin America are made possible by the vision of government and commercial executives, by national researchers, engineers, production workers, administrators, creative artists in many fields, construction and maintenance experts, as well as specialists from RCA distributor or company organizations and from RCA International headquarters and regional offices.

Each of the countries has embraced at least one branch of electronics which brightens its economic outlook, encourages cultural activity and entertainment, and stimulates government and private enterprise.

One of the most far-reaching uses of electronics in Latin America is in the field of telecommunications.

An outstanding example of modern microwave radio relay equipment linking all major cities of a country is the VHF communications system delivered by RCA International Division to the government of the Dominican Republic. Completion of this system, which

RCA microwave station at Santiago de los Caballeros, Dominican Republic, is one of 20 stations making up a nation-wide telecommunications system.

was begun in November, 1953, coincided with the four-day holiday commemorating the 25th anniversary of the government of Generalísimo Doctor Rafael Leonidas Trujillo Molina.

This RCA microwave system radiates from the capital city, Ciudad Trujillo, into three main regions. Dominican Republic engineers, especially trained for the job, are in charge of the stations. These technical men also cooperated in installing the equipment under the guidance of engineers from the RCA International Division. The system, credited by the Government of the Republic with aiding in its economic development, is now due for expansion. Its tall microwave towers have already stood off four hurricanes, including "Hurricane Katie's" winds of 150 miles an hour. Wire lines went down but the RCA towers withstood the blasts.

Colombian VHF Systems

New microwave-carried telephone and telegraph service between Bogotá and Barranquilla, Colombia was inaugurated on June 13, 1956. This is the latest link of an expanding nationwide microwave radio relay communications system being completed by RCA International Division.

Microwave communications systems are ideal for the Colombian terrain, where maintenance of wire lines is both difficult and costly. One of the RCA microwave antennas is on top of El Campanario, a rain drenched peak 12,000 feet high.

Plans have already been made for another addition to the system during 1957 and 1958 which will bring it to its full circuit capacity. Basic service to all principal cities is provided. When completed, 27 cities will be linked by 328 telephone circuits and 146 new telegraph circuits.

This extensive microwave system was planned by Empresa Nacional de Telecomunicaciones, a government telecommunications agency under the Ministry of Communications. The L. M. Ericsson Company of Sweden provided the carrier and the telephone switching equipment, and RCA International Division supplied the radio equipment.

Cuba Has Vast Program

Cuba is another country which is modernizing its communications. Special inaugural ceremonies marked the opening of the first link connecting Campo Batista and Ciudad Militar in the vast national microwave chain being installed by RCA International Division for the government of Cuba. Major General Fulgencio Batista, President of the Republic of Cuba, personally put this initial link into operation. He made the first telephone call and sent the first teletype message from Campo Batista to Ciudad Militar. Campo Batista, an



The late President Anatasio Somaza appeared on initial telecast last July 15 at RCA TV demonstration in Managua, Nicaragua. Left to right are Rafael Huezco, Minister of Finance; President Somaza; Leonard Ferri, Manager of Regional Sales, Caribbean and Central America, RCA International Division, and Luis Felipe Hidalgo, Manager of Radio Managua.

important Air Base located near San Antonio de los Banos in the province of Havana, is also the home of the RCA International Division school established in April, 1955, to train Cuban technicians in the operation and maintenance of the system. Ciudad Militar, located in the city of Havana, is the headquarters of the Cuban General Staff.

The author accompanied President Batista on a detailed inspection tour of all aspects of the RCA VHF communications installation, including warehousing facilities, school activities, mobile microwave and mobile radar equipment. The President expressed himself as well pleased with RCA's contribution to the continuing expansion of Cuban communications.

Geography, once a barrier to progress, is now an ally. Mexico's rugged state of Tabasco is the site of an RCA VHF system which will help develop the country's natural resources. The system, first of its kind in Mexico, will connect all the principal cities of the state. It is being installed by RCA Victor Mexicana, S.A. de C.V., RCA associated company in Mexico.

General Miguel do los Llanos, Governor of Tabasco, said that this was the first important step his state government was making to reach a previously inaccessible region of the state. It will provide the people with opportunity to develop natural resources so that through their own effort and work they may open new horizons in the state of Tabasco.

The world's first micro-wave operated railroad is part of an electronic network of communications expanded by RCA International Division for U.S. Steel's Orinoco Mining Company in Venezuela. Ships of the

National Shipping and Trading Company are equipped with "Fleettone" communications equipment to receive tide and weather information to help them navigate the Orinoco River. These ships carry iron ore from the famous Orinoco Mining Company mines to smelting plants in England and the United States. RCA two-way radio communications equipment ties in with the RCA VHF communications system in use by the Orinoco Mining Company and helps schedule arrivals and loadings at Puerto Ordaz on the Orinoco.

In Colombia RCA's single sideband, two-way radio equipment, the SSB-1, has provided outstanding service in experiments conducted in cooperation with the Ministry of Public Works, the Colombian Army, and Ca-Ra-Col, a leading Colombian broadcasting company. The excellent performance of the demonstration circuits has resulted in plans by these organizations to expand their communications requirements with the SSB-1.

The Colombian Army placed a substantial order after the single sideband circuits were demonstrated between Bogotá and Villa Vicencio, approximately 80 miles east; Bogotá and Buenaventuro, 350 miles west; and Bogotá and El Banco 300 miles to the north.

Radio Station Ca-Ra-Col is presently conducting an interesting experiment using fixed station units and mobile units for transmitting program material from along the highways of Colombia back to the studio.

Another firm which is switching to RCA single sideband radio in Explanicas, S.A., a road construction company, which followed with interest the SSB-1 activity at the Ministry of Public Works.

Expansion in Television

The Latin American family of RCA-equipped television stations is ever on the increase. Great strides have been made since Mexico became the first TV country in Latin America in 1950, with Brazil a close second by a matter of days. RCA TV equipment is now operating in Brazil, Colombia, Cuba, the Dominican Republic, Guatemala, Mexico, Nicaragua, Puerto Rico, and Venezuela, bringing ever closer the possibility of a hemispheric television network.

Nicaragua recently joined Guatemala and became the second country in Central America to acquire RCA television broadcasting equipment. The late President of Nicaragua, Anastasio Somoza, personally inaugurated the country's first TV station by appearing on the initial telecast, demonstrating the government's interest in the project.

Network television in Venezuela got a substantial boost when Radio Caracas pushed its TV coverage to Maracaibo. Radio Station Ondas del Lago in Maracaibo also acquired RCA transmitter equipment to receive video shows originating in the East.

With an outstanding community education program already to its credit, the Department of Education of the Government of Puerto Rico is preparing programs for the finest television station designed for exclusive educational use. Commercial television station WAPA-TV in San Juan, also is RCA equipped.

There are now nine RCA TV transmitters operating in Cuba. In addition to CMQ-TV's three at Televilla, CMQ-TV has one other RCA transmitter in its network. The remaining stations are links in the Television National chain and the RCA-equipped Channel 2.

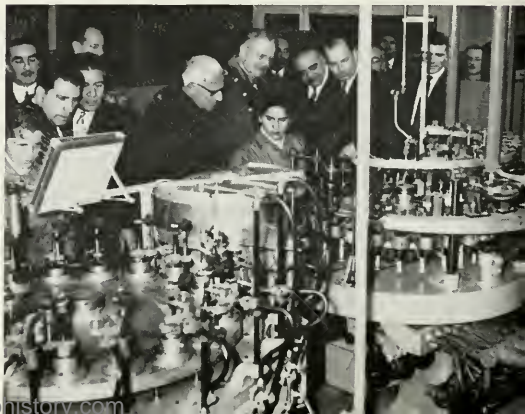
In Brazil, Emissoras Associadas operates RCA-equipped television stations in São Paulo and Belo Horizonte, and another in Rio de Janeiro. The company also owns one of South America's most extensive radio networks. Brazil is on its way to nation-wide TV coverage.

In support of electronic activity in their countries, RCA-associated companies are expanding their facilities. A new electron tube plant is under construction in Brazil which is also providing additional manufacturing space for the production-line assembly of radios and television sets and the manufacture of records. A tube plant went into operation in Chile in June. In Mexico, plans are being studied for a tube factory adjoining the present record, radio, and TV plant in Mexico City. Caracas, Venezuela, is the home of RCA's newest associated company, RCA de Venezuela, C.V.

New or expanded broadcast facilities are operating in Mexico, Cuba, Peru, Chile, and elsewhere, and radio in all countries is an active enterprise. An Ecuadorian importing firm has acquired RCA equipment to enter the radio broadcasting field to advertise its products.

Great sports stadia in Argentina, Brazil, Mexico and Venezuela use RCA sound equipment. Public welfare organizations rely on modern RCA communications. Progressive countries are on the march in electronic Latin America.

Chile's President Ibañez, with leaders of government, banking and commerce, inspects tube manufacturing operations in the new RCA tube plant in Santiago.





RCA equipment helps to guide the F-104 Starfighter, shown in flight in this U. S. Air Force photo.

Radar for the Starfighter

RCA HAS developed and is producing a compact, lightweight electronic fire-control radar system for the world's fastest combat plane, the F-104 Starfighter of the United States Air Force.

The development was disclosed by Theodore A. Smith, Executive Vice-President, RCA Defense Electronic Products, in an announcement stating that "the RCA system will enable Starfighter pilots to find and destroy enemy aircraft."

A major feature of the system, according to Mr. Smith, is a bright radar display which, for the first time, will enable a pilot to view the radar picture in full daylight without the encumbrance of a light-shielding hood. Before the development of the new RCA system, a pilot was required to use a hood to obtain daytime observations of the radarscope, an operation which obscured his vision of flight controls and surrounding sky.

The development of the Starfighter itself was announced only a short time previously by the Air Force and the Lockheed Aircraft Corporation, California Division, the manufacturer. It has been described by General Nathan F. Twining, Air Force Chief of Staff, as "the fastest and highest-flying fighter anywhere in the sky . . . the most advanced plane of its type ever developed." A day and night fighter with a climbing speed equal to its speed in level flight, the Starfighter has wings so thin and keen that a felt covering is used on the leading edge when the plane is on the ground in order to protect crewmen.

"RCA, under contract with the Lockheed Corporation, is producing to Lockheed requirements electronic

fire-control radar systems designed to meet the special requirements of the Starfighter's tremendous speed and operational altitude, which extends into the upper stratosphere," Mr. Smith said.

The new RCA radar equipment, according to Mr. Smith, is "a notable achievement" in simplification and design, and in the systematizing of a minimum number of components. Mounted in the Starfighter, it will enable a pilot to detect an enemy plane while it is still beyond the range of human eyesight, and to obtain a continuous flow of information about its movements.

RCA System for Canadian Fighter

A further RCA contribution to continental defense was announced on September 27 by the U. S. Air Force with the disclosure that RCA has been awarded a multi-million dollar contract under which RCA and the Minneapolis-Honeywell Regulator Company will design and develop a complete and integrated electronic weapon system for the new CF-105 jet fighter of the Royal Canadian Air Force. The plane is under development by Avro Aircraft, Ltd., of Canada.

According to Mr. Smith, the USAF contract, on behalf of the Canadian Department of Defense Production, assigns to RCA full responsibility for the development of a complete electronic system for fire control, navigation and communication, and an integrated flight control system. Honeywell's Aeronautical Division is working with RCA on an associate basis, with responsibility for development of the automatic flight control.

RCA news in brief



Radar for India . . .

Air India International, which recently acquired a fleet of U. S.-built planes, is going to equip them with RCA's airborne weather radar. The Indian line thus joins six major American airlines and four foreign operators in installing the recently-developed system, which detects storms up to 150 miles ahead of the aircraft to provide the pilot with early warning of turbulent areas to be avoided. The Air India installation involves eight planes, including five "Super G" Constellations.

Long Time . . .

The RCA Service Company recently looked at its watch and calculated that it has provided more than 50,000 hours of closed circuit field engineering services since it started this activity just under two years ago. The total covers 33 major telecasts supervised by RCA field engineers, including such closed-circuit features as the program heralding successful discovery of the Salk anti-polio vaccine and the dedication of the General Motors Technical Center in Warren, Mich. As the Service Company sees it, this total demonstrates that large-screen closed-circuit TV is now an accepted medium of business communications.

Another Book . . .

The RCA Tube Division presses have run again — this time it's a new, comprehensive 256-page manual containing technical data on 112 types of power tubes and 13 types of associated rectifier tubes. The new work covers basic theory of power tubes and their application in an easily understandable style, as well as full information on parts and materials, installation, interpretation of tube data, and a number of other features of interest. The title of the opus is "RCA Transmitting Tube," (Technical Manual TT-4), and it can be obtained either from RCA distributors or by sending \$1 to Commercial Engineering, RCA, Harrison, N. J.



Fast Workers . . .

RCA is helping to speed things up in the canning and bottling industries with a couple of weird and wonderful items — a high-speed uncaser-sorter of cans, and an electronic high-speed crown detector for bottles. The uncaser-sorter unpacks food and beverage cans from their cases, sorts them to align the open ends, and lines them up precisely in single file for delivery to filling machines — all at the rate of 800 cans a minute. Two major brewers already have purchased four of the machines. The new crown detector is a compact device for inspecting practically all sizes and types of bottled products at a rate of 410 bottles a minute to make sure that each bottle has been properly capped.



More Educational TV . . .

Puerto Rico has just purchased RCA equipment for the island's first television station designed for exclusively educational use. According to Puerto Rican Department of Education officials, the new station marks the start of a plan for educational TV facilities which will cover the entire island, with initial plans calling for two TV studios, three microwave units, and one mobile TV unit. The transaction recently announced involves an RCA 25-kw transmitter, studio equipment, microwave links, and a mobile TV unit. The new transmitter is to be located at the top of a mountain 15 miles from San Juan.

Economy Size . . .

A compact, low-cost single-channel control consolette for school and industrial sound systems has been engineered by RCA's Theatre and Sound Products Division, with an eye to the budget and coverage requirements of schools, factories, etc., needing an economical intercommunication system that can also be used for program distribution. The economy size unit measures only 22 inches wide and can be mounted on a desk. The unit is a self-contained proposition with facilities for communicating with up to 16 rooms not only with two-way conversation, but with such fare as entertainment and educational programs from radio, tape recordings, and phonograph records.

YOU CAN SELECT AT RCA!

FIELDS OF ENGINEERING ACTIVITY		MANAGERS	TYPE OF DEGREE AND YEARS OF EXPERIENCE PREFERRED															
			Electrical Engineers			Mechanical Engineers			Physical Science			Ceramics Glass Technology Metallurgy						
			0-2	2-3	4-15	0-2	2-3	4-15	1-2	2-3	4-15	1-2	2-3	4-15				
• SYSTEMS <i>(Integration of theory, equipments and environment to create and optimize major electronic concepts.)</i>	AVIATION ELECTRONICS • CONTROLS		W	W	W	C	W	W	W	W	W	W	W	W	W			
	DIGITAL DATA HANDLING DEVICES	M				C	C						C	C				
	MISSILE ELECTRONICS • RADAR	M	W	W	W	X	W	W	W	W	W	W	M	M	M	W	W	W
	INERTIAL NAVIGATION					W	W			W	W					W	W	
	COMMUNICATIONS					C	C									C	N	
• DESIGN • DEVELOPMENT																		
MISSILE WEAPONS SYSTEMS —Planning and Design—Radar—Fire Control—Servo Mechanisms—Computers	M	M	M	M	M	M	M	M	M	M	M	M	M	M	X	X	X	
AVIATION ELECTRONICS —Radar—Computers—Servo Mechanisms—Shock and Vibration—Circuitry—Remote Control—Heat Transfer—Sub-Miniaturization—Automatic Flight—Automation—Transistorization	W	C	W	W	W	W	W	W	C	C	C	C	C	C	C	C	C	
RADAR —Circuitry—Antenna Design—Servo Systems—Gear Trains—Intricate Mechanisms—Fire Control—Information Handling—Displays	M	C	M	M	M	M	M	M	M	M	M	M	M	M	X	X	X	
COMPUTERS —Systems—Advanced Development—Circuitry—Assembly Design—Mechanisms—Programming—Digital Data Handling Devices		C	C	M	C	C	C	M	C	C	C	C	C	C				
KINESCOPIES (B & W and Color), OSCILLOSCOPES —Electron Optics—Instrumental Analysis—Solid States (Phosphors, High Temperature Phenomena, Photosensitive Materials and Glass to Metal Sealing)	L	L	Y	Y	L	L	Y	Y	L	L	Y	Y	Y	Y	L	L	Y	
RECEIVING TUBES —Tube Design—Test and Application Engineering—Chemical and Physical Development—Methods and Process Engineering—Advanced Development	H	H	H		H	H			H	H		H	H		H	H		
SEMICONDUCTORS —Transistors—Semiconductor Devices—Materials	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
MICROWAVE TUBES —Tube Development and Manufacture (Traveling Wave—Backward Wave—Magnetron)	H	H	H		H	H			H	H		H	H		H	H		
GAS, POWER AND PHOTO TUBES —Photosensitive Devices—Glass to Metal Sealing—UHF and VHF—Power	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	
COMMUNICATIONS —Specialized Systems—Microwave—Mobile—Aviation—Audio—Propagation Studies—Acoustics—Transducers	C	N	C	N	C	C	C	N	C	C	C	C	C	C	N	N	N	
BROADCAST AND TV —Monochrome and Color Studio Equipment—Cameras—Monitors—High Power Transmitters	C	C	C	C	C	C	C	C	C	C	C	C	C	C				
• SYSTEMS APPLICATION <i>(Evaluation and Planning—Design and Development—Modification—Specification)</i>																		
MISSILE TEST INSTRUMENTATION (Data Acquisition and Processing)—Radar—Telemetry—Timing—Communications—Optics—Computers	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	
RADAR —Airborne—Surface—Shipboard—Sonar—Fire Control	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	
COMMUNICATIONS —Radio—HF—VHF—UHF—Microwave—Telephone—Teletype—Telegraph Terminal Equipment—Wave Propagation	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	
• MACHINE DESIGN Mechanical and Electrical—Automatic or Semi-Automatic Machines		L	L		L	L	H	Y	C	H	Y	L	L					

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