RADIO AGE

RESEARCH • MANUFACTURING • COMMUNICATIONS • BROADCASTING • TELEVISION

APRIL 1955

"PETER PAN" ON COLOR TV

YOUR FRIENDS from breakfast to bedtime

From the moment you switch off your alarm clock each weekday morning, until you wind it again at night, TODAY, HOME and TONIGHT bring friends — exciting friends — into your home; and with them, news and entertainment.

TODAY begins your day right. Dave Garroway drops in at the crack of dawn with the night's news — and takes you to the morning's news by remote pickup. Then there's the weather, the time, sports news, important guests, amazing guests, amusing guests — and those intrepid simians, J. Fred Muggs and Phoebe B. Beebe.

HOME helps around your house. The disarming lady is Arlene Francis, hostess and editor-in-chief. HOME's staff and guests are the nation's experts on things vital to American women — fashions, work-savers, beauty hints, shopping news, and the latest and largest undertaking: "The House That HOME Built," from excavation to its completion on June 4.

TONIGHT is your evening's final visitor. Steve Allen transplants Broadway to your living room, and brings the glamour of New York nightlife with him, all tied together by his inimitable off-hand humor.

Why sleep?

NBC TELEVISION
a service of RCA

VOLUME 14 NUMBER 2

Radio Age

ARCH • MANUFACTURING • COMMUNICATIONS
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APRIL 1955

COVER

Peter Pan, played by Mary Martin, tells Wendy about Neverland in the NBC color TV presentation on March 7. (Story on Page 20).

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*

RCA Color cameras focus on a scene from "Naughty Marietta," produced as an NBC "spectacular."

RCA Sets All-Time Business Record With Total 1954 Sales of $940,950,000

Annual Report Discloses Largest Gross Income in RCA History; Sarnoff and Folsom Emphasize Reliance on Research to Maintain Leadership

THE Radio Corporation of America in 1954 did the largest volume of business in its 35-year history, with sales of products and services amounting to $940,950,000, it was announced in the RCA 35th Annual Report released on Feb. 26 by Brig. General David Sarnoff, Chairman of the Board. The Report has been mailed to RCA's 172,169 stockholders.

This record gross income bettered by 10 per cent the previous all-time high of $853,000,000 established by RCA in 1953, and was triple the business volume of the Corporation only seven years ago.

Net profit in 1954, before Federal income taxes, was $83,501,000, and after taxes, $40,525,000. The corresponding figures for 1953 were $72,437,000 and $35,022,000. Earnings per share of common stock were $2.66 in 1954, compared with $2.27 in 1953.

The Corporation's Federal income taxes, social security, property taxes, and other state and local taxes totaled $54,953,000 in 1954. In addition, the Corporation paid excise taxes amounting to $26,862,000, making the total 1954 tax bill $81,815,000, an amount equivalent to $5.83 per common share, or more than double the year's net profits.

Dividends

Dividends totaling $22,052,000 were declared by RCA for the year 1954. Holders of the preferred stock were paid $3,153,000. Holders of common stock received $18,899,000. The dividend payments represented $3.50 per share of the preferred stock and $1.35 per share of the common stock.

In addition, on December 3, 1954, the Board of Directors declared the first quarterly dividend on the common stock for 1955 in the amount of 25 cents per share payable January 24, 1955.

Total current assets of RCA at December 31, 1954, amounted to $386,522,000 compared with $349,735,000 at the end of 1953. Additions to plant and equipment during the year 1954 amounted to $34,290,000.

A table of financial results achieved by RCA in the last ten years — year by year — shows annual average of gross income $525,868,000; earnings before Federal income taxes, $53,964,000, and net profit after income taxes, $27,555,000. The earnings before taxes represent an average over the ten year period of 10.3 per cent of gross income, and an annual average of profit after taxes of 5.2 per cent.

Highlights of Progress

Radio, television and all phases of electronics are under development on an ever-expanding scale, which means increased competition in all the Corporation's activities, declared General Sarnoff and Frank M. Folsom, president of RCA, in a joint statement in behalf of the Board of Directors. But competition, they pointed out, also means an expanding and more vigorous industry in which RCA continues to play a leading part.

Continuing, they stated: "RCA, having pioneered and developed compatible television, is now pioneering its commercial development and is helping the industry in every way possible to bring this new service to the American people.

"Dedicated to pioneering and research, the Corporation will continue to build upon the foundation of science. The progress it is making contributes to the economy and welfare of the Nation and strengthens our national defense."

In highlighting progress, the statement listed important advances made by RCA in 1954 which will have a stimulating effect on progress of the electronic industry. Among these advances are:

1. Twenty-one-inch color TV tube
2. TV magnetic tape recorder
3. Electronic light amplifier
4. Electronic cooling system
5. Electronic music synthesizer
6. Electrofax: a new, simplified dry photographic process

Plant Facilities

Calling attention to improvement and expansion in manufacturing, the Report stated that RCA invested during the year approximately $30 million in additional plant and equipment facilities. This brought to approximately $143 million the RCA outlay on new and im-

Another RCA Estate range nears completion at the Hamilton, Ohio, plant.

proved manufacturing plant facilities since 1946.

Enlargement of the RCA plant at Bloomington, Indiana, was completed early last year, making it one of the largest and most modern TV receiver manufacturing plants in the world. Expansion is now under way in the RCA plant at Lancaster, Pa., to meet the demand for color TV picture tubes. On a 58-acre tract at Cherry Hill, near Camden, N. J., construction has been completed on new headquarters for sales, engineering and administrative staffs of the Television Division, the Radio and "Victrola" Division and the RCA Service Company.

Employees

RCA now has 70,500 employees, an increase of 5,500 over 1953. Wages and salaries paid in 1954, including payments for vacations and holidays, amounted to $298,289,000. This represents 32 cents out of each sales dollar. An additional amount of $19,938,000 was provided to cover employee pensions, social security, group insurance and other benefits.

Suppliers

Representative of teamwork in industry, RCA purchases materials and components from 7,500 suppliers located in almost every state in the Union. During 1954, the Corporation paid $512,236,000 to other companies for materials and services it bought. This amount represents 54 cents out of each sales dollar. The majority of the suppliers are classified by the Government as small businesses. Added to RCA's own suppliers are thousands of others who supply the suppliers. Thus through a long line of cooperative effort, employment is provided for countless people working in many diverse fields.

Government Business

The Report stated that RCA products and services supplied to the Armed Forces accounted for approximately 24 per cent of the total sales in 1954. The backlog of Government orders at the year-end was in excess of $300,000,000. RCA scientists, engineers and technicians are actively participating in projects relating to national defense, such as guided missiles, radar, communication and navigational equipment, it was stated.

NBC Achievements

The Report stated that sales of the National Broadcasting Company in 1954 established a new record and were 14.3 per cent higher than in 1953.

Spot sales (purchase of time on a local basis by national advertisers) increased 28 per cent over 1953 in television and 14 per cent in radio. Network television billings increased substantially. Network radio billings, however, showed a moderate decline in line with the industry trend.

During 1954, the NBC television network expanded from 168 to 195 stations. Today, approximately 100 NBC stations are equipped to broadcast color, making this new service available to an area comprising 90 per cent of the nation's television homes. The NBC radio network now includes 209 stations.

Summary of Additional Activities

The RCA Annual Report revealed a number of additional activities that contributed to the record volume of business in 1954. These included:

Television Sets— The RCA Victor Television Division, producing its five-millionth TV receiver, sold a greater number of TV sets in 1954 than in any previous year.

Electronic Products—Sales of electronic apparatus for military and commercial application increased in 1954 by approximately 29 per cent over the 1953 level. Among important factors were the expansion of broadcast facilities for black-and-white and color TV, wide-screen film projection and stereophonic sound for theaters, and increasing industrial use of microwave and other radio equipment.

Adjusting a new picture tube for an RCA television set — one of the 5 million produced by RCA.

Industrial Electronics—Electronic applications in industry expanded notably, with emphasis on closed-circuit television, electronic inspection and production-control equipment, and communications systems.

Automation—A new era of "automation" (automatic operation) is being opened in business and industry through the applications of electronics. RCA is engaged in an extensive program of research and engineering in this field. An automatic production machine is being built by RCA for use in manufacturing a wide range of electronic apparatus.

Weather Radar—In 1955, RCA will manufacture in commercial quantities a new type of airborne weather-detection radar equipment, which enables pilots to "see" through storms and select the safest airpaths.

Electron Tubes—Increased use of electronic equipment during 1954 in such major fields as industry, communications, military operations and home entertainment expanded markets for electron tubes.

Radio Sales—The vitality of radio was evidenced by over-all industry sales approaching 11 million sets. Clock-radios continue to have strong consumer demand. New portable radios are among other innovations for 1955.

Phonographs and Records—In 1954, RCA extended its line of complete high fidelity "Victrola" phonographs by introducing a 45-rpm "hi-fi" table model and consolette. It also introduced a "45" record player that operates by sliding a record into a slot. Suggested list prices of RCA Victor popular and classical records were reduced by as much as 40 per cent at the end of 1954. This reduction and the interest it created in records should help the industry reach a volume of more than $300,000,000 in 1955. Sales of $225,000,000 in 1954 represented an increase of 10 per cent over the previous year.

Home Appliances—Plans for 1955 include a new line of completely automatic RCA Estate gas and electric kitchen ranges. There are nine gas and seven electric ranges, in 30- and 40-inch models. Consumer acceptance of RCA room air conditioners continued at a high level in 1954.

Foreign Trade—Sales of RCA products for home use and the expansion of microwaves in radio communications were among factors that contributed to 1954 as a record-breaking year for the RCA International Division. RCA exports reached a new high level during the past year and featured the largest shipment of appliances ever made to the Middle East. RCA television equipment is in use in 18 countries

outside the United States; seventeen of Canada's 28 television stations are RCA-equipped; a new RCA TV transmitter will be installed in Havana in 1955, making a total of six RCA TV installations in Cuba.

Communications — RCA Communications completed its 35th year in 1954, having processed more than 6,600,000 overseas messages during the year. This traffic volume, an increase of 3.5 per cent over 1953, was handled by RCA's 86 radiotelegraph circuits which link the United States with 68 countries and strategic areas around the world. There was a 35 per cent increase in the number of Teleprinter Exchange Service (TEX) calls, providing customer-to-customer connections with 15 foreign points.

Radiomarine—Over-all business in the radiomarine communications field was somewhat lower in 1954, as compared with 1953, chiefly because of reduced activity in the maritime industry. New electronic products were introduced by the Radiomarine Corporation of America in a program to broaden markets.

Maurice Evans starred in Shakespeore's "Macbeth" in one of NBC's most notable color TV presentations.

Radio-Television Training—Students enrolled in the resident school of RCA Institutes numbered 2,200 at the end of 1954, an increase of about seven per cent over the previous year. Of this number, 1,000 are veterans of World War II and Korea, studying under the GI Bill of Rights. The Home Study Department's TV servicing course had 1,700 students enrolled at year-end and more than 10,000 students enrolled in a supplementary course on service color TV.

Advances in Research

The Annual Report recalled that on January 31, in an address before the American Institute of Electrical Engineers, General Sarnoff discussed four electronic developments now under way at RCA Laboratories — the television magnetic tape recorder, the electronic light amplifier, an electronic music synthesizer and an electronic cooling system.

Other scientific advances covered in the Report included:

Development of a simplified color TV receiver using the RCA 21-inch color picture tube. This new 28-tube receiver uses about one-third less circuitry than earlier models and requires less than 300 watts of power.

Establishing through field tests that booster stations offer a practical means of extending UHF television coverage.

Development of a new electron tube — the Tacitron — having the possibility of use in many fields such as electronic computers and electronic industrial controls. Its primary use is to correct deficiencies which have restricted application of Thyratrons, used in electronic switch operations.

Creation of the RCA Metrechon — a new type of electron tube — as a means of brightening the "blip" — or echo — for radar detection.

Development of a new system called "Electrofax" for making copies of printed material.

Improvement in design and operation of transistors.

Development of a permanent-magnetic material, made from inexpensive oxides, to replace defense-critical materials in building permanent magnets which are essential components in many electronic instruments.

General Sarnoff and Mr. Folsom praised members of the RCA organization, declaring:

"We are proud of the splendid efforts of the entire staff and congratulate the 'RCA Family' on another year of outstanding achievement made possible by their industrial teamwork, craftsmanship and over-all interest in the progress of the Corporation."

Major Developments of RCA Research

Electronic Music Synthesizer, Cooling System, Light Amplifier, and TV Tape Recorder are Described by Sarnoff to Electrical Engineers

Two major new RCA research developments — an electronic music synthesizer and an electronic cooling system with no moving parts — were described by Brig. General David Sarnoff, Chairman of the Board of RCA, in an address on Jan. 31 before the American Institute of Electrical Engineers at its annual convention in New York.

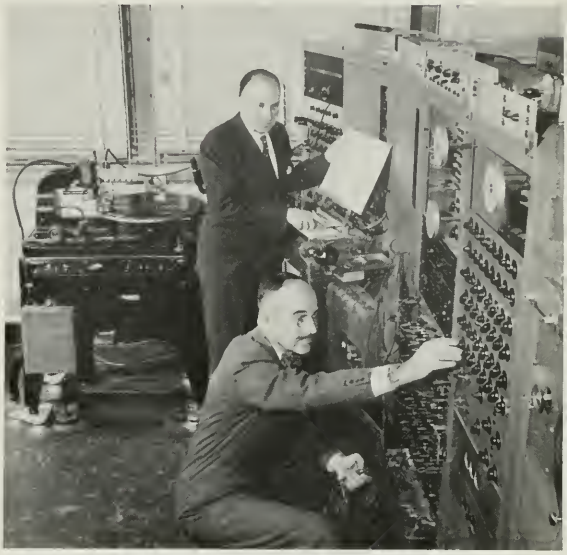
Together with the disclosure of these new fruits of research, Gen. Sarnoff discussed two additional RCA developments of major promise for the future — the electronic light amplifier and the magnetic tape recorder for television and motion pictures. He stated to the AIEE, of which he is a Fellow, that the motive for discussion of these developments publicly in their present experimental stage, before they are ready commercially, was his belief that competition can be as "stimulating in research as in manufacturing and merchandising."

Calling special attention to the RCA Electronic Music Synthesizer, because this was the first time that it had been publicly disclosed, General Sarnoff said that the scientists and engineers of RCA Laboratories have created an electronic system capable of generating any tone produced by the human voice or any musical instrument, as well as any musical tone which is beyond the capabilities of a voice or conventional musical instrument. It is a means, he said, for producing electronically, an infinity of new musical complexes employing the sound of human voices and conventional instruments, or tones that may never before have been heard, either in solo performance or blended in any desired orchestral arrangement.

Advantages of the Synthesizer

"This new system of making music should encourage musical composers to write new compositions that can take advantage of the wider scope and superior characteristics offered them by electronics for the expression of their genius," said General Sarnoff. "In this new role, electronics performs in marked contrast to the musician whose playing is limited to the use of ten fingers and sometimes also the two feet.

"This electronic instrument also offers new opportunities for production of phonograph records, since it can produce any kind of sound that can be imagined.



Dr. Harry F. Olson, background, and Herbert Belar, developers of the RCA Electronic Music Synthesizer, are shown with the system at the David Sarnoff Research Center of RCA, Princeton, N. J.

Further, with this new system, old recordings can be rejuvenated into new phonograph records free from distortion and noise.

"It is not necessary that a composer be able to play a musical instrument, for whatever musical effects he wants to create he can achieve by use of the synthesizer.

"But the vital factors of correct 'interpretation' of the music written by the composer — the heart, the soul and the mood of the composition — continue to be the task and function of the human being who synthesizes the music from the score. That person must be a good musician. In the hands of a great musician the electronic synthesizer can create great music."

Demonstrating the scope and possibilities of the music synthesizer, General Sarnoff's address was illustrated by a film showing the system in operation. The motion picture was supplemented by a magnetic tape recording of synthesized music made by engineers at

RCA Laboratories in Princeton and played before the audience present at the meeting.

Variety of Instruments Simulated

The musical selections from which excerpts were synthesized and the musical instruments simulated included, "Well-Tempered Clavier" by Bach, clavichord; "Polonaise" by Chopin, piano; "Clair de Lune" by Debussy, piano; "Hungarian Dance No. 1" by Brahms, an engineer's conception with no instrument simulated; "Holy Night" by Adams, electric organ; "Home Sweet Home" by Bishop, an engineer's conception and no instrument simulated; medley of Foster tunes, hillbilly band; "Nola" by Arndt, imaginary piano-like instrument, and "Blue Skies" by Berlin, orchestra.

General Sarnoff said that at his invitation Alfred Wallenstein, Conductor of the Los Angeles Symphony Orchestra, had recently visited the RCA Laboratories and observed the system in operation. Mr. Wallenstein heralded the music synthesizer as "a veritable fountain of inspiration and new ideas."

"Indeed, the entire world of sound can be tapped for the creation of yet unheard musical forms," he said.

The Anniversary "Presents"

Declaring that his own faith in the creative abilities of scientists and engineers has been boundless, General Sarnoff told also of RCA progress in three other electronic developments: an electronic cooling system, an electronic light amplifier, and a television magnetic tape recorder. These, it will be recalled, are the three "anniversary presents" which, in September 1951, he had asked scientists at the David Sarnoff Research Center in Princeton to produce by September, 1956. The latter date will mark his fifty years of service in radio.

General Sarnoff announced that an electronic air conditioner, designed without any moving parts, motors or compressors — in fact, a noiseless machine as required in the home — is on the way and encouraging progress is being made in RCA Laboratories. In effect, he said, it is an all-electronic cooling system, and as evidence of progress he presented the film of a small electronic refrigerator, the first result of research in this new field.

He declared that it is believed to be the first refrigerator to achieve practical storage and freezing temperatures entirely by electronic means, although the principle upon which it operates was discovered by the French physicist Jean Charles Peltier more than 120 years ago. Peltier observed that passage of an electric current through the junction of two dissimilar materials produces a cooling or hearing effect in the region of the junction, depending upon the direction of the current.

"This so-called 'Peltier effect' has long been a scientific curiosity chiefly because of the lack of materials capable of producing temperatures sufficiently low for practical use in cooling or refrigeration," said General Sarnoff. "Unlike Peltier, Lord Kelvin, and others who studied this effect, the RCA scientists were able to approach the task with new knowledge provided by recent studies in solid-state physics. Their research in this field, shed new light on the behavior of electrons in solid materials, and provided new information which has led to success in creating new materials. The discovery of Peltier has now been translated into practical application. Our continuing search for improved materials so far has revealed no evidence that a limit has been reached."

In still another new field, RCA scientists and engineers have made substantial progress in the development of an electronic light amplifier, General Sarnoff declared. He said that he has already seen an experimental RCA light amplifier that gives light amplification in ratios of more than 20 to 1.

"When that ratio reaches 100 to 1, a practical amplifier of light will be at hand," he added. "We will also have made a significant advance in the science of illumination for lighting and for television picture reproduction."

Pointing to another accomplishment in electronics, General Sarnoff said that the RCA TV magnetic tape recorder, as a major step into a new era of "electronic photography," is now being installed for field tests in the National Broadcasting Company.

"This new type of tape recorder," he said, "can provide useful services not only in television broadcasting but also in the motion picture and theatre industry, in home entertainment and education, and industry in general. An unlimited number of copies of tape recordings can be made quickly and economically. The recorded tapes can be preserved indefinitely or electronically 'wiped off' and reused again and again.

"Television tape recorders for home use are certain to be developed in the future. These will enable the TV set owner to accumulate a library of favorite television programs which can be seen whenever desired, in the same way that a library of phonograph records now makes it possible to hear favorite records at will."

Stimulus of Competition

Amplifying his philosophy that competition is as stimulating in research as in manufacturing and merchandising, General Sarnoff said:

"As members of a profession deeply concerned with scientific research and pioneering development, you are well aware that the number of people willing to risk their money in research and pioneering is very small

Nils E. Lindenblad, who directed development of RCA's electronic cooling system at the David Sarnoff Research Center, points out a feature of the experimental electronic refrigerator.

compared with those who are ready to risk their capital in established enterprises operating profitably.

"In television and in other instances — where the information is not 'classified' and does not involve our national security — RCA has continually made progress reports and released information that enabled others not only to catch up but at times even to move ahead of us. We welcome competition. It spurs our own activities and increases the possibilities for earlier achievement of desired results.

"For instance, our faith and persistence in pioneering television — first, black-and-white, and then, color — and our encouragement to others to get into the field, led to its present state of development which otherwise the American public might not have enjoyed for another ten years.

"Whether we succeed in completing an invention before others whom we stimulate to work along similar lines, is not as important as it is to bring a new product or a new service into existence and use. In helping industry to grow and prosper, we believe that we contribute to the public benefit and in the long run, our own as well. If an organization is to progress it must not stand in fear of obsolescence or competition."

Alliance of Science and the Arts

Commenting on the alliance of science and the arts brought on by the new developments in electronics, General Sarnoff urged the engineers to join forces with the artists and seek an understanding of the terminology and problems of each other in order to advance together.

"If you will form an intellectual camaraderie," he continued, "and arrive at a common language with your colleagues in the arts so that they can learn how to make full use of science and technology, you will see the fruits of your genius bloom in the vineyards of the cultural arts.

"For more than a quarter of a century, the entertainment arts have felt the magic touch of Electronics. As a result, music, drama, motion pictures, the phonograph and even journalism have taken on new dimensions. New interest has been created in them and their audiences have multiplied from thousands to millions.

"Medical men must also become better acquainted with the scientists and engineers in many phases of atomics and electronics so that the isotopes, color television, electron microscopy and similar developments can be applied effectively and quickly for the welfare of mankind and the extension of life's span.

"For the good of America and the world in general, the arts and sciences are challenged to work together and bring their respective talents and skills into focus. In effect, men of science and the arts must play on the same team and understand each other's signals so they can score together."

RCA's Aviation Systems Laboratory Is Dedicated at Waltham, Mass.

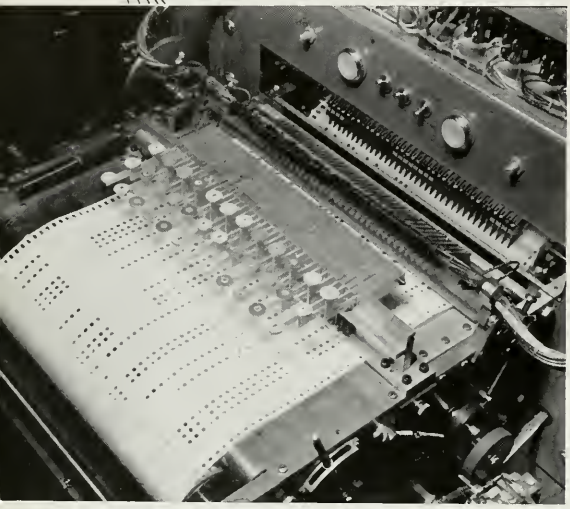
THE NEW AVIATION Systems Laboratory of RCA in Waltham, Mass., devoted to the development of specialized electronic fire-control systems for military aircraft, was opened formally on March 7 with a dinner attended by leaders in the Boston area.

Theodore A. Smith, Vice-President and General Manager, RCA Engineering Products Division, who was the principal speaker at the dinner, told the guests that the establishment of the new laboratory emphasizes the vital importance of systems engineering to national defense.

"RCA is one of the major contributors to the research, development and production programs of the Department of Defense," he said. "As the complexity of today's military aircraft increases, RCA is building and maintaining a dynamic electronic research and development organization devoted to the analysis and solution of the most complex scientific problems associated with airborne fire control."

How They Work . . .

Electronic Music; Electronic Cooling



These pictures show two key elements of the RCA Electronic Music Synthesizer: above, the master keyboard and punched paper record that controls output of the system; below, the recording system, with which tones are recorded separately on the upper disk and combined on the lower one.

The RCA Electronic Music Synthesizer and the RCA Electronic Cooling System, two widely diverse products of research at RCA Laboratories, attracted nation-wide attention on Jan. 31 when they were first described publicly by Brig. General David Sarnoff. Both were heralded by press and radio as developments of major significance in their respective fields. In view of the wide interest aroused, and the importance of these new systems, a more complete description is presented here of the principles upon which they operate.

THE RCA ELECTRONIC MUSIC SYNTHESIZER

The Electronic Music Synthesizer, developed at the David Sarnoff Research Center of RCA, under the direction of Dr. Harry F. Olson, is an infinitely versatile system for producing entirely by electronic means any known or imaginable tone or combination of tones.

Operation of the Synthesizer is based upon the fact that all sound can be broken down into a set of clearly defined physical characteristics each of which can be generated by electronic means. These characteristics are: frequency or pitch; intensity or loudness; growth to full intensity; duration at full intensity, and decay. Two additional characteristics possessed by many instruments and the human voice are portamento, or glide from one tone to another, and vibrato.

The Electronic Music Synthesizer has been equipped with circuits capable of generating each of these characteristics and combining them in any desired fashion, and with any desired rhythmic pattern. Unlike conventional musical instruments, however, it has no inherent physical limitations, and it requires no physical dexterity on the part of the performer, composer or engineer. As a result, a composer or musician, working with the Synthesizer, can create any musical effect he wishes to achieve, whether or not he is able to play an instrument.

How the Synthesizer Operates

The system is controlled by a coded paper record that is punched out by an operator at a keyboard resembling that of a teletype machine. The keys are arranged in five groups controlling note selection,

octave selection, timbre, volume, and growth, duration and decay. As the keys are touched, holes are punched in the paper tape. The resulting code, driven mechanically at speeds up to 5 inches a second, passes beneath brushes through which the information is passed to the appropriate circuits.

The output of the Synthesizer is normally cut into a phonograph disk recording. The recording system consists of a lateral cutter and a conventional 33⅓ RPM turntable which is coupled to the driving mechanism of the coded paper record to synchronize the two operations.

The Synthesizer is limited to production of a series of single tones, such as the tone of one wind instrument, one string of a string instrument, or one key of a keyboard instrument. This means that in simulating an orchestra or any combination of instruments, each must be synthesized separately, and the tones later combined on the recording to achieve the orchestral effect.

The Synthesizer's 16-inch disk record can accommodate six three-minute recordings. After these have been made, representing six different single-tone series, they are combined into a single recording. The process of combination may be carried on indefinitely to achieve any number of instruments desired in the orchestra.

This method of individual recording allows the operator to work upon each instrumental effect as it is recorded until he is satisfied with the performance. It also permits the levels of sound to be adjusted individually until the required total effect has been attained. Once these requirements have been met, the effect is retained on the coded paper record and may be replayed indefinitely in exactly the same form.

Ice produced in the freezing compartment of the RCA experimental electronic refrigerator is extracted here by Nils E. Lindenblad.

THE RCA ELECTRONIC COOLING SYSTEM

A system for cooling by electronic means has been developed by an RCA Laboratories team headed by Nils E. Lindenblad, motivated by General Sarnoff's request for an all-electronic air conditioner as a gift to mark the fiftieth anniversary next year of his association with radio.

To demonstrate the progress being made in this phase of the research program, the RCA scientists constructed what is believed to be the first refrigerator ever to operate effectively in a room temperature environment entirely by electronic means.

The cooling system demonstrated in the refrigerator produces low enough temperatures to freeze an appreciable amount of water to ice and to provide cool storage for perishable foods as rapidly as many standard electric refrigerating systems.

The freezing and cooling operations are accomplished by tiny thermojunctions, which absorb and remove heat from the cooling compartments when electric current is applied. The heat transferred from one end to the other of these thermojunctions is carried away by a flow of water through the system. Since there are no moving parts, the system operates in complete silence.

Principle is 120 Years Old

The principle upon which the system operates has been familiar to scientists for more than 120 years, since the discovery by the French physicist Jean Charles Peltier that passage of an electric current through a junction of two dissimilar materials produces a cooling or heating effect in the region of the junction, depending upon the direction of the current.

Using new knowledge provided by research into the behavior of electrons in solid materials, the RCA research team succeeded in creating new materials capable of achieving a substantially greater drop in temperature than in any previously published experiments. Prior to the RCA research program, the best performance known to have been achieved with the so-called Peltier effect was a lowering of temperature by 9° Centigrade (equivalent to 16.2° Fahrenheit). The new alloys developed at RCA Laboratories and used in the refrigerator achieve a drop several times greater, and a continuing quest for improved materials so far has discovered no indication that a limit has been reached.

Home of electronic progress—RCA's David Sarnoff Research Center, Princeton, N. J.

RCA Asks Court to Dismiss Government Anti-Trust Suit

RADIO CORPORATION OF AMERICA, in an answer filed on March 29 in United States District Court in New York to a Government civil anti-trust complaint filed November 19, 1954, said that RCA's patent licensing policies have been "a major factor in the spectacular growth of the electronics industry, including the radio-television industry, and the pre-eminence of the United States in that industry."

Branding the Government's request for relief as "unreasonable, unnecessary and contrary to the public interest," RCA denied each and every allegation in the complaint charging violation of the Sherman Act and asked the court to dismiss the suit.

Electronics is today the fastest growing and most dynamic industry in the world, the answer said, and any charges that RCA "has in any way restrained the electronics industry, including the radio-television industry, ignore the facts." On the contrary, it was stated, RCA has pioneered and been responsible for the creation and expansion of much of this industry.

Pointing out that it "has been in the forefront in all major industry advances, from the beginning of sound radio and broadcasting, through black-and-white television and now color television," the Corporation stated that its policies have meant more and better radio and television sets for the consuming public at lower prices.

RCA declared that its leadership has been "leadership by example, not by control in any way, shape or form.

"If RCA's leadership has been followed," RCA contended, "it is because RCA's courage, vision and foresight have been right and RCA has acted in the best interests of the industry and the public, and not through any dominance, restraint or control."

Flatly denying allegations in the complaint charging RCA with "package licensing," or compelling any prospective licensee to accept a license under more patents than he wants, RCA said that: "it grants patent licenses to competitors and others on reasonable and non-discriminatory terms and without restriction."

Describing the license agreements the answer stated that RCA's "licenses contain no restrictions as to price, quantity, territory, or anything else, require no minimum royalty, and are offered under any one or more patents and for any apparatus as may be desired by any prospective licensee."

The answer continued: "RCA's present royalty rates are further reduced, now being only ½ of 1 percent for radio broadcast receivers using tubes, 1⅛ percent for radio broadcast receivers using transistors, 1¼ percent for black-and-white television receivers, 1¾ percent for color television receivers, 1¼ percent for electron tubes other than color tubes, 1¾ percent for color tubes,

2 percent for color television commercial apparatus except government apparatus, 1½ percent for other commercial apparatus except government apparatus, and 1 percent for all commercial apparatus manufactured for government use.

"All RCA license agreements provide for various deductions which make the actual rates even lower. Moreover, RCA royalty rates are based on the manufacturer's selling price. Applied to retail selling prices to the public, these royalty rates are substantially cut in half.

"The fact that RCA's royalty rates compare most favorably with those of other licensors in this or any other industry is beyond dispute.

"In return for these reasonable royalty rates, licensees have the privilege of obtaining a license under, or using, any one or more patents under which RCA has the right to grant licenses. This licensing policy has resulted in licensees of RCA having complete freedom to manufacture apparatus in competition with RCA under any and all patents available to RCA, to the extent to which RCA has the right to grant such licenses. No royalties are payable on any apparatus under any license agreement granted by RCA unless the apparatus uses patents licensed by RCA."

Progress of the Industry

To substantiate the fact that RCA has not restrained the industry in any way, the answer to the Government's complaint said:

"Sales in the electronics industry, including the radio-television industry, following the termination of wartime restrictions demonstrate its vitality, rapid growth and freedom from the monopoly and restraint alleged.

"From the mere handful of companies and the relatively small amount of capital which made up the electronics industry in the early days, the industry has continuously expanded. Today there are literally thousands of companies in which billions of dollars have been invested engaged in this industry."

It was stated that today a very large number of independent companies are now manufacturing and selling television receivers and all of these companies are in open and active competition with RCA and with one another.

The industry's sales of radio and television receivers, RCA pointed out, increased from $54,400,000 in 1932 to $1,470,000,000 in 1953, a percentage increase of more than two and one-half thousand percent.

RCA admits that "more people buy RCA television receivers than any other make of television receiver and that more station owners buy RCA television transmission equipment than any other make. RCA further avers that in all of the categories of radio and television equipment there is intense and effective competition."

Reporting that as of January 1, 1955, there were 128,900,000 radio sets and 33,816,000 television receivers in the United States, RCA said that its policy "has contributed substantially to the ever-increasing number of radio and television receivers in the hands of the American public and to a continual lowering of the price of such receivers."

It was pointed out that during 1951 RCA spent on research and development a sum in excess of the amount received by it in royalty payments and that under its patent licenses it made the fruits of such research and development available to the electronics industry. In addition, the RCA answer pointed out that it makes substantial payments to others for the rights to use patents developed through their research and development in competition with RCA.

Cross-Licenses Enabled Industry to Develop

RCA traced its history from 1919 when it was formed "at the urgent request of the United States Government in order to free American communications from foreign domination and to create a new American radio company."

In order to accomplish this objective, it was necessary to set up various patent cross-licenses with General Electric Company, American Telephone and Telegraph Company, Westinghouse Electric & Manufacturing Company and others because no one could manufacture or use

(Continued on page 30)

Through symposio such as this on RCA's first commercial color TV receiver, RCA has shared the results of its research with the electronics industry.

Electronic Developments of Future will Reshape Society and Economy of Nations, Folsom Says

MODERN electronics, descended from many of the early electrical discoveries of Benjamin Franklin, will in the future "reshape the social and economic structure of many countries of the world," Frank M. Folsom, President of RCA, told a Philadelphia audience on February 22.

The occasion was the presentation to Mr. Folsom and to Rear Admiral Richard E. Byrd, USN (Ret.) of Good Citizenship Awards for 1955 of the Philadelphia Chapter, Sons of the American Revolution. The awards are presented annually for outstanding contributions to science, statesmanship and public welfare.

In his acceptance speech, Mr. Folsom linked the polar exploration activities of Admiral Byrd to advances in electronics to emphasize the speed with which electronic science has developed on the basis of the infinitely tiny particle which is the electron. He said:

"Like snowflakes pile up to help form the great polar icecaps, so too, tiny electrons—billions and billions of them—have built up the vast new electronics industry. Today this new industry is six times larger than it was in 1947, when television first became a commercial reality.

"With the advent of color television, the long and growing list of new electronic products and services includes industrial TV, theatre television, radar, new types of communications apparatus, electronic computers and transistors. The electronics industry is undergoing an expansion that may be regarded as high tribute to the men who have pioneered this fascinating art and science.

Expansion So Far Only the Beginning

"Yet this expansion appears to be little more than the beginning. In the years ahead, increasing use of electronic products and services will reshape the social and economic structure of many countries of the world. America, as the scene of the most extensive pioneering and development of electronics, is well on its way to vast and beneficial changes through application of this modern science, its ingenious devices and techniques.

"Electronics can now serve in many fields. Besides being perhaps the greatest boon to communications, it promises new efficiency in manufacturing, product control, clerical operations, and transportation. It offers new aids to health, safety and public welfare. Its techniques

Rear Adm. Richord E. Byrd, USN (Ret.), and Fronk M. Folsom, President of RCA, shown as they received Good Citizenship Awards for 1955 of the Philadelphia Chapter, Sons of the American Revolution.

can relieve men of routine and drudgery and effect enormous savings in time, money and materials."

Recalling the work of Benjamin Franklin, whom he called "a great Philadelphian," Mr. Folsom paid tribute to his "inspired work in electricity—forerunner of electronics."

Quoting a letter from Franklin to John Priestley in 1780 predicting transportation in defiance of gravity, higher agricultural productivity, the prevention and cure of many diseases, and a lengthening of the human life span, Mr. Folsom said:

"During the years that have passed since his letter to Priestley, great, indeed, has been the progress of true science. Thousands of people, mail and cargoes now are transported through the air with amazing ease; agriculture has diminished its burdens of labor and greatly multiplied its production. The span of life has been lengthened and many diseases prevented or cured. Wondrous means of communications have made it possible to spread ideas, news and information from nation to nation at the speed of light."

Non-breakable Plastic Case Is Novel Feature of 1955 RCA Victor Portable Radios

A NEW TYPE of portable radio whose plastic case is so rugged that it is guaranteed against breakage for five years was introduced to dealers and distributors in mid-February by the RCA Victor Radio and "Victrola Division.

The new case, named the "Impac," passed exhaustive tests to prove its non-breakable quality, including numerous trials of weight and impact. The results, it was stated by James M. Toney, General Manager of the Division, proved the case to be so tough that RCA Victor is able to back it with the first guarantee of its kind ever offered in the radio industry.

The public is expected to buy some 1,500,000 portable radios this year, according to recent market surveys. Mr. Toney, emphasizing this prospect, said that the "Impac" case is "one of the greatest, if not the greatest, development in radio history." As such, he added, this year's RCA Victor portables are expected to be the fastest-selling merchandise in the prospective market.

The rugged new case encloses five of the new portable radios in the 1955 RCA Victor line. The "Impac" models range in suggested list price from $27.95 to $49.95.

The new RCA portable radios, featuring the extremely rugged "Impac" line.

Communications of the Future

ADVANCES in communications based on current laboratory developments will bring into use picture-frame television, machines and systems that respond to the spoken word, and electronic systems capable of scheduling production and controlling manufacturing and commercial processes, according to Dr. E. W. Engstrom, Executive Vice-President, RCA Research and Engineering.

In a talk in New York to the American Society of Mechanical Engineers, Dr. Engstrom predicted that the most significant future communications developments would take place in four areas, which he identified as:

Solid-state devices,
Advances in personal communications,
More efficient use of communication channels,
Data handling machines for business and industry.

The impact of the advances to come within the next 75 years, he said, make it necessary for "both the scientist and the engineer to become familiar with, and to develop skills in, areas broader than the technology for which they are basically trained."

"The scientist-engineer relationship must be broadened to include the arts, the humanities, and politics," he said. "These will be the needs in the future in order that the scientist and engineer may discharge with competence their growing responsibilities."

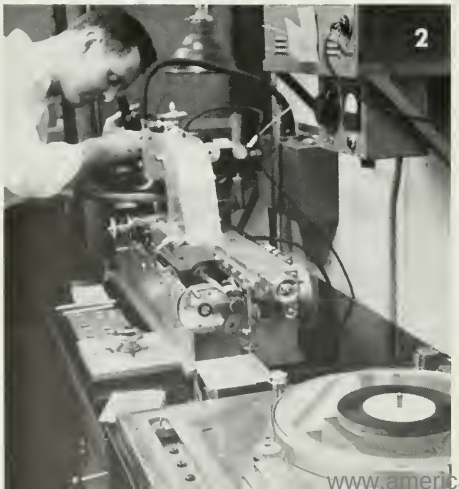
Concluding, Dr. Engstrom said:

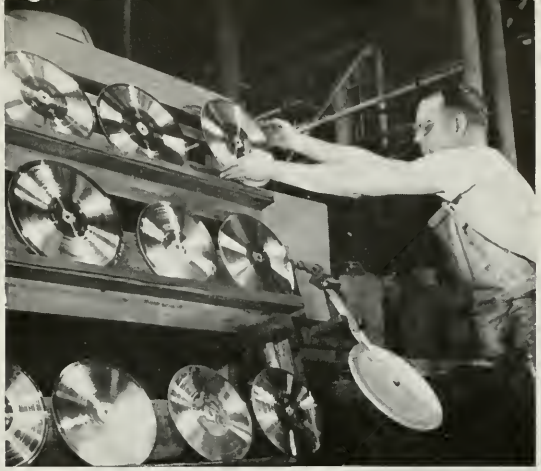
"The advances made and the even greater ones to come in the varied spheres of communication can serve to promote greater harmony and understanding among all peoples. Increased communications can be a means to a oneness of spirit and purpose. In order that this might be achieved, we need to be sure that we and our systems and circuits of communications are attuned with, and include, the Creator of all. This, too, is good engineering."

How RCA Victor Records Are Made

TECHNICAL skill is blended with artistic talent to produce RCA Victor records, representing the finest in recorded music. These scenes show the steps involved in record production at RCA Victor Record Division facilities in New York and Indianapolis, Ind.

1. In the recording studio, an engineer adjusts controls to achieve proper balance as sound is recorded on tape. **2.** From tape, music is re-recorded on discs. Here grooves are being cut in the disc's plastic surface. **3.** From a master disc, a mold is made. This show how mold is carefully separated by hand from the master. **4.** From the mold, a nickel stamper is made for pressing records. Here the operator uses a microscope to center the stamper accurately. **5.** A thin layer of chromium is spread over the stamper to help it resist scratches and abrasions. **6.** Plastic sheet, the raw material for discs, is broken into forms like these en route to the pressing room. **7.** Stampers, plastic, and paper labels meet in the pressing room, where an operator, as shown here, can turn out a molded record every few seconds. **8.** At regular intervals, a record from each press is inspected. by listening on high-fidelity equipment. **9.** The finished product, another RCA New Orthophonic High Fidelity Sound recording, is placed in its colorful package as it leaves the RCA Victor plant.





A Tribute to the TV Serviceman

NATIONAL TELEVISION Servicemen's Week, a nation-wide tribute to the 100,000 technicians who service the 34,500,000 television sets of the American public, was inaugurated on March 7 at the close of NBC's unprecedented color telecast of "Peter Pan."

With 62 stations of the NBC network carrying the filmed ceremony in color and 13 more stations in black-and-white, W. Walter Watts, RCA Executive Vice-President, Electronic Products, presented a symbolic statuette to Robert Hester, of Mission, Kansas. Mr. Hester was chosen to represent the country's TV technicians because of the location of his service business near the television geographical center of the United States.

The statuette is a 14-inch gold-finished figure of a man holding aloft the symbol of electronics. The figure stands on a black plastic base inscribed with an RCA dedication to TV technicians.

Purpose is Public Recognition

The idea of a National Television Servicemen's Week was originated by RCA as a public recognition of the contributions of technicians to the establishment of television as a national service. In order to make the "Peter Pan" colorcast and the statuette presentation ceremony available to the maximum number of viewers, RCA arranged for the placement of RCA 21-inch color TV sets in key cities throughout the nation. Nearly 4,000 personnel from RCA distributors were invited to viewing rooms to witness the 2-hour broadcast as guests of RCA sales representatives in the various areas.

In addition, RCA is awarding prizes totalling $10,000 to radio-TV service dealers responsible for the most effective promotions of National Television Servicemen's Week in their respective neighborhoods. The prizes include complete sets of five RCA test instruments for color TV servicing, one set to be awarded in each of the company's eight sales regions.

Survey Shows Attitude Toward Serviceman

In connection with the Week, E. C. Cahill, President of the RCA Service Company, announced on March 9 that a survey completed by Elmo Roper indicated that a great majority of the nation's TV set owners are more than pleased with the promptness, quality, prices and courtesy of TV service technicians.

The survey, sponsored by the RCA Service Company and the Consumer Products divisions of RCA, showed that 80 per cent of the families interviewed plan to continue in the future with the same service company they now employ. Other questions in the survey showed that 79 per cent of all service calls were answered within three days, and that 87 per cent of the persons interviewed were satisfied with the prices charged.

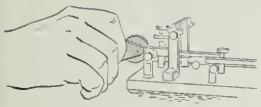
"These findings, made public during observance of National Television Servicemen's Week, are a mighty tribute to the integrity and spirit of the more than 100,000 highly-trained and skilled technicians who install and maintain television receivers in America's homes," Mr. Cahill said.

The latest survey is the seventh annual study of its kind conducted by the Roper organization for RCA. Undertaken and carried out on a scientific, impartial and nation-wide sampling basis of approximately 5,000 families, the survey was described by Mr. Cahill as the most extensive ever carried out to determine authentic public feeling toward technicians.

"Naturally, we are pleased with the results of the findings," Mr. Cahill added. "Not only is the RCA Service Company proud of the record of its service technicians, but we are proud to be associated with an industry which has in its ranks the thousands of trained and reliable independent technicians that make up the entire electronics service business. If this most recent survey proves any one point, it is that the record of the country's TV service technicians warrants continued public confidence in their work — and I am sure the industry will continue to provide just as good service in the future as it has in the past."

W. Walter Watts, right, Executive Vice-President, RCA Electronic Products, is shown presenting a symbolic statuette to TV Servicemon Robert Hester, of Mission, Kan., in ceremony telecast over NBC network on March 7 to mork Notional TV Servicemen's Week.

This Tube Can Translate Code at—



100,000 Words a Minute

A NEW ELECTRON-IMAGE tube that can translate coded signals from tape, keyboard or radio into clearly-defined letters and figures at speeds up to 100,000 words per minute for high-speed photographic recording has been announced by RCA.

The new tube, developed at the David Sarnoff Research Center of RCA Laboratories at Princeton, N. J., fills an acute need for high-speed printing devices operating directly from data in coded form. When it achieves commercial form, its initial application is likely in electronic message transmission and computing systems. Further development is expected to fit it for wider application in general printing as an electronic means of typesetting.

In operation, the tube simulates typesetting in selecting letters and figures one by one from a "font" and placing them in luminous form on the 5-inch circular tube face either in lines or in any pattern desired. The ability to place the characters where they are wanted gives the tube wide flexibility for such tasks as producing financial statements, balance sheets and bills, where letters and figures must be placed in various positions on a form.

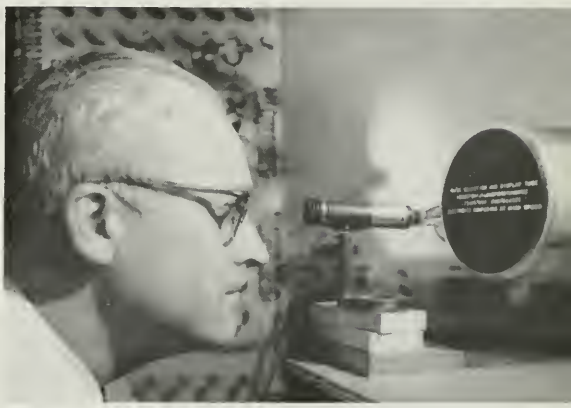
The "font" from which characters are selected is a lantern slide bearing a chart of letters and figures which are projected from outside the tube onto a sensitive layer at the rear of the tube. Any of a variety of slides may be used, permitting selection from a wide range of type styles for reproduction on the tube face.

How the Tube Operates

The new image tube was developed by Warren H. Bliss and John E. Ruedy under the supervision of C. J. Young and Dr. G. A. Morton, of the technical staff at the David Sarnoff Research Center. It is 25 inches long and resembles in appearance the cathode-ray tubes used in oscilloscopes. Its operation, however, is substantially different.

The layer at the rear onto which the slide is projected consists of photo-emissive material, which emits a stream of electrons in the pattern of the projected letters and figures. The electron stream, carrying all of this information, is accelerated forward in the tube by a voltage applied to the wall coating of the tube.

The selection of letters and figures in the required order is accomplished with a tiny aperture at the neck of the tube, permitting only one character at a time to pass through. As the electron stream moves toward the aperture, a magnetic deflection coil around the outside of the tube shifts the stream so that the desired character passes through the aperture and speeds toward the tube face. Another set of magnetic coils then focuses and deflects the character to its proper place on the face, where it appears in visible form on a phosphor screen like those used in television picture tubes. As many as 4,000 characters have been produced clearly in a single pattern on the 5-inch tube face. The second set of coils is capable, however, of varying the size of the letters and figures on the screen if enlargements are required.



The new RCA electron image tube that converts code to words and figures at high speed is adjusted by Warren H. Bliss at the David Sarnoff Research Center.

The entire process of selecting the character, passing it through the aperture and placing it in the right location on the tube face can take place at speeds up to 10,000 letters a second, depending upon the rate at which coded information is fed into the circuits controlling the tube.

The source of the coded information can be perforated paper tape, magnetic tape, wire or radio signals, keyboard selection, or an electronic storage unit such as a magnetic memory. In tests of the tube at the RCA Laboratories, the source has been a perforated tape like those used in teleprinter circuits. In any case, the coded input can control both the selection of the characters and their location on the face of the tube.

"Peter Pan"—"An Unforgettable Evening"

Peter Pan, Wendy and her brothers fly to Neverland. Wires were invisible to television viewers.

THE LARGEST AUDIENCE ever assembled to watch a television program on a single network — 67,300,000 viewers — tuned their sets to NBC channels across the country on March 7 to watch Peter Pan come to life through the enchanting art of Mary Martin.

From 7:30 to 9:30 p.m., EST, the adventures of Peter and Wendy in Neverland, brought straight from a highly successful run on Broadway to the color studios of NBC in Brooklyn, held an almost exclusive place on color and black-and-white TV screens. Thousands of parties were organized, under the auspices of parent-teacher associations, TV stations, Ford and RCA-Victor dealers and neighborhood groups, just to watch the program. Color sets were placed in hospital wards in many large cities so that bedridden children and adults might also be sprinkled with Peter Pan's magic fairy dust.

Press reception of the program was perhaps the most uniformly enthusiastic ever aroused by a television show. An editorial in the *New York Herald Tribune,* commenting on the program, said: "Having put on 'Peter Pan' so brilliantly, the television industry is entitled to take its bows." Some examples from the nation's leading TV critics:

"100 Per Cent Enchantment"

"Last night's presentation of Mary Martin as 'Peter Pan' was a joy . . . an unforgettable evening of video theatre."—Jack Gould, *New York Times.*

"Just about 100 per cent enchantment . . . as close to perfection as we've got yet; conceivably the most polished, finished and delightful show that has ever been on television."—John Crosby, *New York Herald Tribune.*

"One of the greatest triumphs in show business history . . . an enchanted evening."—Tony La Camera, *Boston Record.*

"There have been many Peter Pans since Maude Adams first essayed the role in this country, but it is doubtful if any of her predecessors had the elfin charm and acting skill of Miss Martin"—Jack Hellman, *Daily Variety,* Hollywood.

"The production, we sincerely believe, will stand forever as one of video's listening milestones."—Bob Williams, *Philadelphia Bulletin.*

"Through this children's classic, TV came of age." —Larry Wolters, *Chicago Tribune.*

"TV's most ambitious and rewarding project."— Stan Anderson, *Cleveland Press.*

The program which produced this reaction among audience and critics alike was the first ever to feature a full-length Broadway production with its original cast. The television version was identical to that which played in New York for 32 weeks — the only difference being in the far greater audience by which the single television performance was seen.

Unique Sound Pickup System

Since the play itself was staged for an ordinary theatre, its translation to the medium of television presented no unique technical problems to the practiced personnel of NBC — other than one of microphone pickup from Miss Martin as she floated through the air. None of the show was pre-recorded, since it was felt that a "live" performance was essential to maintain spontaneity.

With the star and three children whizzing back and forth past stationary microphone booms at an elevation of some 20 to 30 feet, ordinaty methods of sound pickup would be unsatisfactory. The solution was a portable transistorized microphone and transmitter developed by NBC engineers. The entire installation was small enough to be concealed on Miss Martin's person. The antenna was concealed in a split leather belt around her waist, the tiny microphone was worn on her chest, and the transmitter, no larger than a king-size package of cigarettes, was fastened under her arm.

To conceal a receiving antenna large enough to cover the large flying area and maintain the same volume level from the highest to the lowest points of Miss Martin's swooping flight, a wire was placed on the studio floor, covered with tape and painted over to match the surrounding scenery. The rest of the antenna consisted of a large loop of wire strung under the lights.

By this means, Miss Martin carried an enthralled audience with her on the flying trip to Neverland, soaring gracefully through some 100 gyrations in the course of the 2-hour program by means of the same type of flying device that has been used for all theatrical presentations of "Peter Pan."

Mary Martin and Jerome Robbins, director of the TV production of "Peter Pan," form an airborne dance team, above, in rehearsal. Below Cyril Ritchard, as the venomous Captain Hook, rallies his crew aboard the pirate ship.

An air view of NBC's Color City, the new West Coast headquarters for the network's color programming.

Color City

Color City, one of the world's largest television studios and the first ever designed from the start specifically for color TV, opened in a blaze of color on March 27 as the West Coast color programming headquarters of the National Broadcasting Company.

A 90-minute "spectacular," "Entertainment 1955," with an all-star cast, dedicated the great new studio before an assembly of motion picture, theatre and broadcasting celebrities including Sylvester N. Weaver, Jr., President, and Robert W. Sarnoff, Executive Vice-President of NBC.

Color City is the latest and most impressive addition to NBC's array of color facilities, already the most extensive in the television broadcasting industry. Opening the entire field of Hollywood talent to NBC color cameras, it permits an early increase in the network's schedule of colorcasting.

The combined engineering talents of RCA and NBC make of Color City one of the most elaborate and versatile television studios ever built. Taking its place with two existing studios and a service building on NBC's 50-acre tract in Burbank, the new building incorporates television's largest lighting system and a major air-conditioning system designed to handle the problem of heat generated by the lights required for color telecasting.

A touch reminiscent of the Elizabethan theatre is provided by an "audience pit"—an area sunk below the studio floor level so that spectators may watch a production at close quarters without interfering with the cameras. When it is not in use, the pit is covered to become part of the studio floor.

Equipped as a "Nerve Center"

Besides the main studio building, the new construction includes a technical building which serves as the "nerve center" for all NBC facilities at Burbank. Among its features are audio and video control centers, a film center equipped with two RCA 3-Vidicon camera chains, and an announcer's booth for newscasts and commercials.

Commenting on Color City as a unit, *Progressive Architecture* magazine described it as a successful effort "to provide as much flexibility as possible, allowing for future changes as new factors become known."

"Many exceptional things were done here," the magazine commented, "both to make the facilities as efficient

as present knowledge makes possible and to anticipate future needs."

With the opening of the new center in Burbank, NBC's inventory of color telecast facilities now includes five separate originating points for color, as well as special equipment for televising color film.

These facilities include:

The NBC Brooklyn studio — The world's largest television studio. Formerly a Warner Brothers motion picture sound stage, the Brooklyn installation was altered and equipped at a cost of $3,500,000 and dedicated in September, 1954, as a home for NBC's color spectaculars and other major color productions. The memorable color telecast of "Peter Pan" originated here.

The Colonial Theatre, New York — The world's first fully equipped studio for compatible color. Most of NBC's major shows were staged before color cameras here on a rotating basis during the 1953-54 season. The Colonial can handle productions of any size and has alternated with the Brooklyn studio in the handling of the 90-minute spectaculars.

Studio 3-H, Radio City, New York — Used for smaller productions, commercials, and for research in staging, lighting, costuming and makeup.

The NBC Color Mobile Unit — The only unit of its kind in existence, this has been used by NBC to cover festivals, sports events, natural wonders and national shrines in various parts of the country. With its own built-in generator and radio relay, the mobile unit can range far from network and power lines to provide color television coverage almost anywhere in the United States.

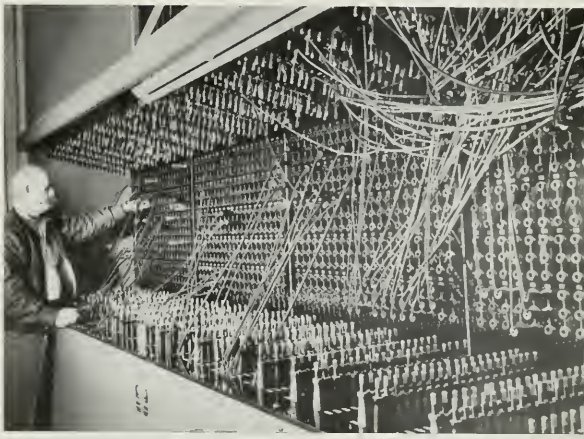
NBC Creates TV Industry's First Children's Program Review Group

Creation by the National Broadcasting Company of the television industry's first Children's Program Review Committee was announced on April 7 by Joseph V. Heffernan, NBC Financial Vice-President. At the same time, Mr. Heffernan announced appointment of Dr. Frances Horwich, producer-star of NBC-TV's award-winning "Ding Dong School," to the new post of Supervisor of Children's Programs for NBC.

Testifying in Washington, D. C., before the Senate Subcommittee on Juvenile Delinquency, Mr. Heffernan said that the new committee will consist of Dr. Horwich, Mrs. Douglas Horton, former president of Wellesley College and war-time director of the WAVES, and Dr. Robert F. Goldenson, a psychologist and expert on family relations.

Color City's cameras focus on an attractive pattern.

This shows the control room at the Burbank studio.



Color City's elaborate lighting switchboard.

Color TV Helps the Doctors

MICROSCOPIC views of tissue removed from a patient at the University of Pennsylvania Hospital were examined simultaneously by pathologists in Washington, Baltimore and Philadelphia on January 19 by means of RCA color television. The occasion marked the first use of color TV of government-approved standards for inter-city medical consultation and diagnosis.

The dramatic presentation, illustrating the value of compatible color television as a new tool for medical and pathological use, formed part of a demonstration conducted jointly by the Armed Forces Institute of Pathology and RCA. It was followed by two additional programs employing the RCA compatible color system on an inter-city basis to explore further the usefulness of this new medium in diagnosis, consultation, teaching and research.

The program, running for 45 minutes, began as Dr. I. S. Ravdin, Professor of Surgery at the University of Pennsylvania in Philadelphia, performed an operation with the assistance of his son, Dr. Robert Ravdin. A waiting pathologist, Dr. Robert Horn, carried out an examination of the tissue removed by the two surgeons while the color TV camera, peering at the prepared specimen through a microscope, transmitted the image to more than 150 pathologists in Washington and a smaller group in Baltimore.

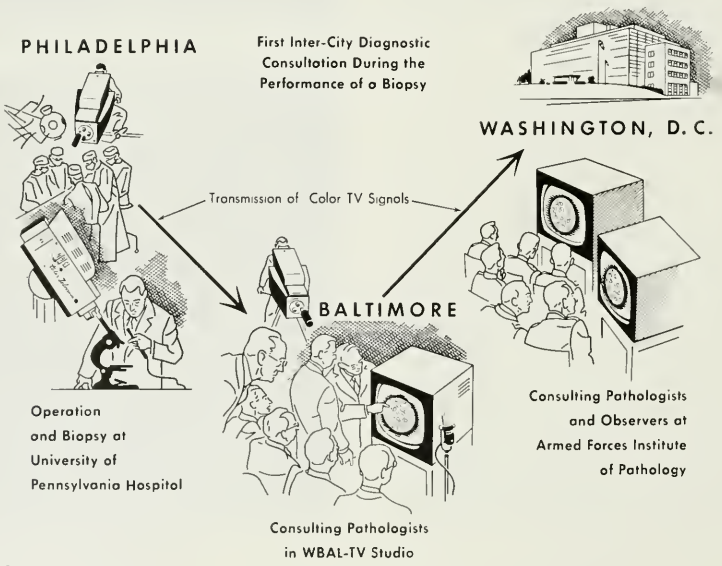
After examining the image of the section on a color TV receiver in Baltimore, Dr. Hugh G. Grady, Director of the American Registry of Pathology, AFIP, commented on the results of his diagnosis. His remarks were carried instantly to Washington and Philadelphia, where the operation had been performed.

Highlight of Symposium on Medical TV

The color telecast diagnosis highlighted a three-day symposium sponsored by the Armed Forces Institute of Pathology to bring together for the first time men of medicine and industry to investigate and discuss how color television can best be used in the fight against disease. The Institute, which is the central laboratory for the United States Army, Navy and Air Forces, as well as other government agencies, provides diagnosis and consultation services for civilian pathologists as well.

The Washington group attending the symposium participated in the telecast feature before a number of standard RCA color television sets installed in a hall of the new atomic attack resistant building of the Institute in northwest Washington. The Baltimore viewers were gathered at the studios of WBAL-TV, whose color cameras later covered the diagnostic consultation there.

Later portions of the telecast were designed to il-



A nurse at the University of Pennsylvania Hospital, Philadelphia, is coached by an RCA technician during rehearsal for the inter-city medical TV demonstration.

lustrate the effectiveness of compatible color TV in disseminating pathological information and techniques over distances, and in conducting important pathological conferences between individuals and groups in widely separated locations.

The first of these included a pickup from the Baltimore studio, where Brig. General Elbert DeCoursey, Director of the AFIP, introduced a special demonstration for observation by members of his staff in Washington. This consisted of the showing in color of special techniques and procedures in which color is an important factor. A color film of unusual pathological significance also was transmitted.

The final presentation, conducted by Dr. Lorenz E. Zimmerman, Chief of the Ophthalmic Pathology Branch of the AFIP, represented a seminar for participation by distant audiences — in this case a group of pathologists of the Veterans Administration and the three armed services in Baltimore and Philadelphia. Dr. Zimmerman showed a series of color microscopic slides and conducted a complete conference with the help of the color TV system.

Color TV Ready to Serve Medicine, Says Goldsmith

Dr. Alfred N. Goldsmith, pioneer electronics engineer and inventor, who participated in the Washington symposium, observed at the end of the demonstration that color television is now ready to serve the medical profession in many ways.

"This inter-city presentation, which so effectively brought pathologists together for the first time through the use of color television, should prove to be an eye-opener for the entire medical profession," Dr. Goldsmith said.

"In effect, RCA has shown that color television, operating on standards already approved by the government, can and will give the medical profession's universities, lecture halls, consultation rooms, clinics and laboratories a scope as wide as the country, and can provide to all of these an interconnection with the immediacy of light itself."

Dr. Goldsmith urged the standardization of a medical color TV system, emphasizing that the system adopted for medical purposes should be identical with the approved standards of compatible, simultaneous color television now bringing this new service to the public through broadcasting.

New Flush-Mounted Window Units Feature RCA Air Conditioner Line

A new series of flush-mounted window models is the main feature of the 1955 line of RCA room air conditioners, for which a nation-wide advertising campaign was launched in early March.

The flush-mounted units include four newly-designed models known as the Super Series and ranging from ½-ton to 1½-ton capacities. The ½-ton model is shown in the picture at the right.

Details of the new models were disclosed by John W. Craig, Vice-President and General Manager, RCA Victor Home Appliance Division. He emphasized that all of the Super units offer a newly incorporated two-speed cooling system employing twin fans to provide more positive air flow and greater ventilation capacity. An automatic thermostat for constant cooling temperature control is also incorporated as standard equipment in the series, he said.

Progress Report from RCA on . . .

A Novel Camera Tube for Color TV

A REVOLUTIONARY new type of color television camera tube that generates simultaneously the red, green and blue signals of color TV is under development and has been successfully tested by scientists and engineers of the Radio Corporation of America, it was disclosed at the annual convention of the Institute of Radio Engineers in March.

The developmental tube, known as the Tricolor Vidicon, represents a major step in a continuing research program aimed at achieving an all-purpose color television camera as simple and compact as those now used for black-and-white TV, according to RCA scientists. In tests at the David Sarnoff Research Center of RCA, Princeton, N. J., it has shown the ability to televise color slides, color motion pictures, and scenes where high lighting may be used. Further development is expected to achieve greater sensitivity, making the tube suitable for use under varied lighting conditions.

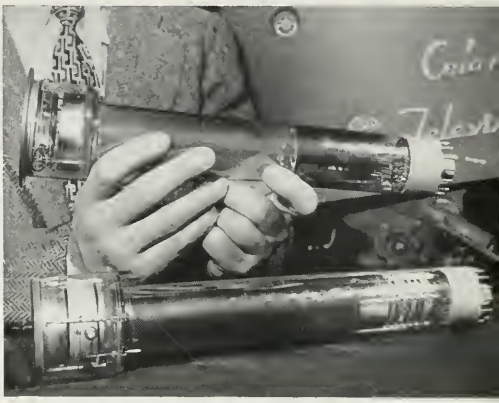
Details of the new tube were given in a progress report to the IRE by a five-man team of RCA scientists headed by Dr. Paul K. Weimer. The group includes Dr. Sidney Gray, Dr. Stefan A. Ochs, Harold Borkan, and Harry C. Thompson.

It was pointed out by the group that a single camera tube capable of generating simultaneously all three of the primary colors of color TV is a major goal of television research. In present color TV cameras, they explained, a separate tube is used to pick up each color, and the three independent signals are later combined into a composite signal for broadcast.

Advantages of the Developmental Tube

Dr. Weimer, delivering the paper for the research team, pointed out that the developmental Tricolor Vidicon combines all of the color pickup functions for the first time in a single tube no larger than the standard RCA Image Orthicon tube used in black-and-white cameras. Since all of the color signals are generated simultaneously in the same tube, he said, precise optical and electrical registry is ensured, thus avoiding any danger of overlapping or "fringing" of color signals. In addition, he said, use of a single tube will permit greater simplicity and compactness in color camera design.

The research team gave this explanation of the operating principles involved in the Tricolor Vidicon:



RCA's experimental Tricolor Vidicon pickup tube for color TV is shown above held over a standard black-and-white Image Orthicon tube for comparison.

The heart of the tube is a unique and intricate color-sensitive target applied to the face of the tube by an evaporation technique. The target, a rectangle whose diagonal measurement is only 1½ inches, consists of nearly 900 fine vertical strips of alternating red, green and blue color filters, covered by three sets of semi-transparent conducting signal strips spaced so closely that a group of several strips would be covered by the diameter of a human hair. The signal strips corresponding to a given color are all connected to a common output terminal, and insulated at the same time from the strips of the other two colors.

Three Color Signals are Generated

As the target is scanned by a single electron beam projected from the rear of the tube, the color-sensitive filters permit the signal strips to produce electrical signals corresponding to the arrangement of light and color in the scene before the camera.

The beam, sweeping horizontally across the face and moving in lines that progress from top to bottom of the target — as in present camera tubes — scans the face completely thirty times each second. As the beam strikes all of the color-sensitive strips at each scanning, the tube generates directly the three simultaneous primary color signals that form the composite signal for broadcast.

In the drawing above, a United Air Lines plane peers through a storm with RCA's airborne weather radar unit. Photo of radar screen at right shaws how the pilot can find route that avoids storm cores.

RCA Weather Radar Aids Smooth Flight

THE largest order for airborne radar in the history of commercial aviation — 200 of RCA's C-band weather-derection radar units that "see" rhrough storms and enable pilots to locate and follow air paths having the least turbulence — was announced on April 5 by United Air Lines.

W. A. Patterson, President of United Air Lines, announced the signing of the contract with RCA for delivery of rhe units at a total cost of $2,500,000. He said rhat modification of planes and installation of the units will require another $1,500,000, making a total outlay of $4,000,000 for the project. Mr. Patterson added that United thus becomes the first airline in the world to begin fleet installation of C-band radar as standard equipment.

The RCA equipment is described by Theodore A. Smith, Vice-President and General Manager, RCA Engineering Products Division, as C-band radar operating at a frequency of 5400 megacycles per second. RCA's selection of this band instead of higher frequencies followed exhaustive laboratory and flight evaluation tests which showed 5400 megacycles to be the optimum frequency for weather reconnaissance.

Tested in Storm Areas

The studies were carried out by RCA, United Air Lines and McGill University. Actual tests included 40 technical and operational flights in storm areas. The results show rhat C-band radar, using a transmitter power of 75 kilowatts, was capable of penetrating a minimum of 15 miles of 60mm-per-hour rainfall, revealing corridors for smooth flying through apparently solid storms, officials said.

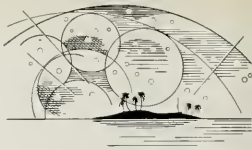
United Air Lines will install the radar units at its San Francisco maintenance base, and the company's first radar-carrying planes are scheduled to enter service this fall, followed rapidly by others until the program is completed, Mr. Patterson announced. He described the project as "one of the great technological advances in air travel comfort and dependability."

"From the days of World War II when airborne radar made such great contributions to military operations, there has been much talk as to what it might do for the commercial airlines," Mr. Patterson said. "Now that radar is available and suitable for airline use, we are proceeding to take advantage of its tremendous possibilities."

D. R. Petty, the company's vice-president, flight operations, said:

"Weather-mapping C-band radar, the first to be developed specifically for commercial airline use, will enable our pilots to fly through areas now detoured with considerable loss of time.

"C-band radar also reveals surface features, such as lakes and mountains, but its primary value lies in keeping pilots informed of changing weather conditions as far as 150 miles ahead. With this knowledge, they can plan their flights with greater precision, greater passenger comfort."



From London to Bikini

30 Years of International Programs . . .

By Frank H. Goring
Manager, Program Transmission Service
RCA Communications, Inc.

THIRTY YEARS AGO, in March, 1925, with earphones pressed tightly to their heads, the comparative handful of people who then comprised the American radio audience heard their first international broadcast — the cheery voice of a London announcer saying, "Hello, America." After his greeting came the strains of the orchestra at London's Savoy Ballroom, playing a medley of American tunes.

Portions of the medley were lost somewhere between London and New York, for the quality of the signal emitted from the Aeolian Hall studios of WJZ for the American audience had more curiosity value than fidelity. Nevertheless, indistinct as it was, the music heralded a new era in international communications — an era that turned the American living-room into an echo-chamber for the news of the world.

It took pioneer RCA engineers another five years of experimenting before international program circuits were sufficiently improved to meet commercial requirements. Since that time, however, hundreds of thousands of news and special events broadcasts have filtered through the control console in RCA Communications' lower Manhattan operating terminal to be re-broadcast by the American radio networks.

These programs have originated from every geographical area of the globe — from Byrd's hut beneath the Antarctic ice cap to the Papal Palace in the Vatican. Topically, they have ranged from British Coronations to foxhole interviews with G.I.'s in Anzio, New Guinea, and Korea. Wherever someone was able to rig a transmitter, RCA's Program Service has brought in the voices of current history — a radio listening diet that has made the United States increasingly aware of international interdependence.

A Two-Way Arrangement

Nor has the arrangement been one-sided, for other nations of the world listen just as intently to the happenings in America, particularly today, with the United States a focal point of international events.

RCA's Program Service was solidly booked for days to provide complete coverage of the last Presidential election. Daily commentaries on American activities by correspondents of foreign broadcasting services are transmitted point-to-point by RCA for re-broadcast to overseas audiences.

Each year, RCA makes the World Series and World Championship bouts truly world-wide when it helps carry the results to an international audience. United Nations' sessions are carried to other member nations over special voice channels. Voice of America broadcasts also form a part of the program material which RCA regularly transmits overseas.

RCA's Program Service has on many occasions performed the spectacular — unusual events that in themselves made news. Whether it be from a presidential train enroute to Chicago, a lone ship deep in the Antarctic ice floes, a submarine off the coast of California, or an expedition observing a solar eclipse in a dense South American jungle, the world-wide facilities of RCA can be relied upon to help bring the story to the American fireside. But the more important, though less spectacular story concerns the day-to-day job of giving intercontinental range to the voices of commentators and reporters upon whom the world depends for its news.

Service For All Broadcasters

Despite its corporate relationship with the National Broadcasting Company, RCA Communications provides all broadcasters with international program facilities to the extent that today, over 75% of all overseas programs heard in the United States are received via RCA.

From its main program control console in New York, which is linked by micro-wave relay to the international transmitting and receiving stations at the eastern end of Long Island, RCA maintains lines to each of the major networks. Through these lines, programs received from abroad are piped directly to the broadcasting studios, either for immediate rebroadcast or for tape recording and subsequent use.

Normally broadcasters order the facilities they need several hours in advance of actual program time. News events, however, are usually unscheduled. Consequently, RCA Program Service is constantly on the alert to set up overseas circuits at a moment's notice. RCA's Program Service is the international electronic ear of TV as well as radio broadcasting. An order for a usual NBC morning news round-up for rebroadcast on the "TODAY"

oadcasting Service of RCA Communications carried John Rich's Korean Wor stories to U. S. listeners.

key point in world-wide broadcast service is this control console at RCA Communications in New York.

rst-hand reports on U. S. political conventions, as shown ere, go to overseas listeners via RCA Communications.

program looks something like this:

From Rome — Jack Begon
655am to 715am air time 701 — 703am
From Bonn — Robert McCormick
655am to 715am air time 704 — 705:30am
From Paris — Frank Bourgholtzer
655am to 715am air time 707 — 709am
From Cairo — Wilson Hall
700am to 715am air time 709:30 — 711am
From Telaviv — Al Rosenfeld
705am to 715am air time 712 — 714am

Arrangements are made by NBC to have its foreign commentators available and prepared at the exact time allotted for the broadcast. RCA, meanwhile, has advised the overseas radio terminal of the ordered programs and what frequencies will be required for the contact. Usually all points are lined up and ready fifteen minutes prior to the beginning of the network programs. Time checks and cues have been exchanged and final adjustments made to transmitters and receivers.

Transmissions on Cue

On cue, usually Dave Garroway's, "Go ahead, Rome", the commentators, in order, begin their transmissions. From the studios of Italradio on Rome's Via Callabria, Jack Begon's voice hurdles the Atlantic to be picked up by a short-wave receiver at RCA's Riverhead, L. I. station, then journeys to the lower Manhattan control center by micro-wave relay. There it is amplified, monitored, and fed by wire lines to NBC master control at Rockefeller Plaza — then one last jump, again by wire, to the "TODAY" studio in the RCA Exhibition Hall before its final re-transmission as the audio segment of Garroway's morning TV program.

Pacific Operations

At San Francisco, RCA Communications maintains a duplicate of its New York program facilities for coverage of the Pacific and the Orient. International programs received at this terminal are fed into the national networks through their West Coast stations. Conversely the San Francisco terminal also links American broadcasters with their affiliated stations in Honolulu. Network programs originating in the United States are thus regularly transmitted to Hawaii.

Including coverage of the original A-Bomb tests in Bikini, there isn't much in the way of unusual hook-ups that RCA's Program Service hasn't tried during its few decades of operation. Of all its accomplishments, it biggest contribution has been its ability to provide the intercontinental electronic bridges which probably have helped more than any other single factor to bring about the international awareness and understanding that exists in much of the world today.

Anti Trust Suit

(Continued from page 13)

electronic equipment without the patents of a number of different companies, the answer pointed out.

"The purpose and effect of these cross-licenses were to free the industry," RCA said. "Without them the industry would have been paralyzed by conflicting patent holdings and endless patent litigation. With these cross-licenses the industry was freed and enabled to develop rapidly."

The situation created by these cross-licenses was the subject of a Government proceeding in 1930, which resulted in a consent decree, under which General Electric Company, American Telephone and Telegraph Company and Westinghouse Electric & Manufacturing Company disposed of their stock in RCA and new cross-licensing agreements were drawn up, the Corporation said.

This consent decree and the new cross-licensing agreements which were reaffirmed by the courts in 1942, RCA said, represented the considered and correct judgment of the Government that this was the best way to achieve continued growth of a competitive radio-television industry free from restraint. It was pointed out that as recently as 1954, on a motion to construe the decree, the court reasserted the fact that the cross-license agreements were approved by the consent decree.

"That the cross-license agreements approved by the consent decree have had the effect intended and expected by the Government is fully borne out by the dynamic growth of the industry," RCA continued.

"These agreements expired by their terms on December 31, 1954, so far as new inventions are concerned. Yet the complaint filed only six weeks before this expiration is an attack on these very agreements which were recommended and stated to be in the public interest by the Government in 1932."

RCA said that the issues in this case have already been adjudicated as a result of the 1942 decision when the Delaware District Court ruled that "since these consent decrees are based upon an agreement made by the Attorney General which is binding upon the Government the defendants are entitled to set them up as a bar to any attempt by the Government to relitigate the issues raised in the suit." The answer added:

"RCA avers that the Government cannot attack a consent decree to which it is a party by charging RCA with violating the law—beginning the very day after the decree was entered—because it has conformed to the provisions of the decree. The consent decree of 1932, and the cross-license agreements approved thereby, represent the considered and correct judgment of the Government and the court, as well as of the defendants, that this was the best way to achieve the objectives of the Government's petition, namely, the continued growth of a competitive radio-television industry free from restraint. The correctness of this judgment and the intensely competitive industry which has resulted from the policies and practices of RCA under and pursuant to this decree is shown by the soaring sales of radio and television receivers since 1932.

"RCA's policy of licensing its competitors and others on reasonable and non-discriminatory terms and without restriction has been a major factor in the rapid growth of the electronics industry, including the radio-television industry."

Many Companies Engaged in Research

Stating that research activities play an important part in the development of radio and television products, RCA said that it has been a pioneer in the research and development of radio receivers, black-and-white and color television receivers and various other radio and television products and devices which have vital significance for the national defense. No other organization, it was declared, has contributed as much to the research and development of these products and devices as RCA, and RCA's patent licensing policies have enabled its competitors and others to enjoy the fruits of RCA's research and development on reasonable and non-discriminatory terms and without restriction.

RCA said, however, that the research and development which it conducts in electronics is but a small part of the total research in this industry conducted in the United States, and that many companies not formerly in electronics are now intensively active in the field.

Listing many substantial competitors with large resources for research and development that exist in the radio-television industry, RCA said:

"These include the Admiral Corporation, Columbia Broadcasting System, Inc., Allen B. Du Mont Laboratories, Inc., Emerson Radio & Phonograph Corporation, General Electric Company, International Telephone and Telegraph Corporation, Motorola, Inc., Philco Corporation, Raytheon Manufacturing Company, Sylvania Electric Products, Inc., Westinghouse Electric Corporation, Zenith Radio Corporation, and others. The published sales figures of the companies named alone, for the most recent annual period, exceed two billion dollars. Each of these companies maintains extensive facilities for its own research and development. Each of these companies has every incentive to follow and has followed a program of intense and active research and development to produce better products in this highly competitive market as well as to license others."

The tremendous expansion of research and development in all phases of the electronics industry is forcefully demonstrated, according to RCA, by the fact that many companies, not formerly in electronics, with large and powerful research and development facilities are now devoting their efforts to intensive research in electronics.

These companies were said to include aircraft manufacturers such as the Boeing Airplane Company, Douglas Aircraft Company, Inc., Hughes Aircraft, the United Aircraft Corporation; automobile manufacturers, such as the General Motors Corporation and Willys Motors, Inc.; business machine manufacturers, such as the Burroughs Corporation, the International Business Machines Corporation, The National Cash Register Company and Remington Rand, Inc.; manufacturers of industrial control equipment, such as the Maxson Corporation, Minneapolis-Honeywell Regulator Company, and the Otis Elevator Company; manufacturers of automation equipment, such as General Mills, Inc., and the United Shoe Machinery Corporation; and companies engaged in the development of atomic energy applications, such as General Dynamics Corporation; and companies engaged in the motion picture industry, such as the Bell & Howell Co. and Paramount Pictures Corporation.

It was stated that the assets of these companies alone total many billions of dollars and their research facilities far exceed those of RCA and that a substantial part of the electronics research and development work of these companies has direct application to the radio-television industry.

RCA Expenditures in TV Research

"RCA spent more than $50 million on the development, research and promotion of black-and-white television before it realized any profit from such expenditures," the answer stared. "RCA pioneered the introduction of black-and-white television to the American public and it furnished its competitors with complete information regarding the manufacture and servicing of black-and-white television receivers in order to encourage its competitors to enter the television market.

"RCA has spent more than $50 million on the development, research and promotion of a compatible system of color television . . . which preserves the value of millions of black-and-white sets in American homes. Color television activities are still being pioneered by RCA at a substantial loss.

"RCA has, and is continuing to pioneer the introduction of color television to the American public and it has furnished its competitors and others with complete information regarding the manufacture and servicing of compatible color television receivers in order to encourage its competitors to enter the color television market."

The answer stated:

"RCA avers that its policy of licensing its competitors and others on reasonable and non-discriminatory terms and its policy of granting licenses to prospective licensees under any patent or patents and for any apparatus for which such prospective licensees desire a license, has contributed substantially to the dynamic growth and development of the electronics industry, including the radio-television industry. These policies have encouraged and increased competition in radio-television research and development, patents, patent licensing, patent rights, manufacturing, sale, distribution, and the introduction of new developments in the public interest.

"RCA's policies have encouraged the development and expansion of the electronic art in innumerable directions and with tremendous vitality and dynamic energy. No industry in this country has progressed so far in so short a time.

"The rapid and continuous emergence of new and improved electronic products for industry, for the home and for national defense, rendering obsolete existing products, which is characteristic of this industry, completely refutes the existence of any monopolistic control, domination or restraint as alleged in the complaint.

"When RCA was formed at the request of the Government in 1919, only the most courageous and far-sighted could have foreseen the tremendous vistas which would be opened to American industry and the American public through the encouragement and development of the electronic art. The research and development activities which at one time were engaged in by only a very few have for many years been pursued by substantially all members of the electronics industry, including the radio-television industry.

"Today aircraft manufacturers, automobile manufacturers, business machine manufacturers and many other areas of American industry, and universities as well, are actively conducting research and development in electronics and are producing electronic equipment.

"This chain reaction of research and development in the electronics industry was initiated with the formation of RCA and is attributable in large part to RCA's policy of making inventions available to others."

RCA declared that it rests on the record that its patent licensing agreements and RCA's conduct have resulted in the most intensely competitive industry in the United States today.

The answer was filed by John T. Cahill, Attorney for the Radio Corporation of America.

RCA news in brief

Has Eight Arms and Flies

NBC recently instigated the first coast-to-coast flight by an octopus. Arlene, a 40-pound specimen from San Francisco's Steinhardt Aquarium, flew east for a guest appearance on the March 9 "Home" program, accommodated in a specially-designed oxygen-sealed container contrived to prevent her from suffering discomfort on the way. On her arrival at New York's Idlewild Airport, she was met by a truck bearing a tank of special sea water scooped up by members of the "Home" staff, who went 25 miles offshore to get it. Six kinds of rare and steady-nerved tropical fish travelled in the container with Arlene.

New Transistor

A new metal-encased transistor, no bigger than a pencil eraser, is being produced by the RCA Tube Division for low-power audio applications in communications and other types of electronic equipment. The tiny device, which measures only ¼ inch in diameter and 11/16 inch in length, incorporates exceptional stability and uniformity of characteristics, together with a number of design features that permit its use in most low-level audio-frequency applications, the Division said. The insulated metal envelope is hermetically sealed for maximum moisture protection.

Hall-Size TV

Television for the auditorium is the latest word from the RCA Tube Division, which has announced a new 5-inch projection kinescope capable of producing black-and-white TV pictures measuring up to 8 × 6 feet when it is used with a suitable reflective optical system. The new kinescope is expected to find wide use in closed-circuit types of large-screen TV projectors used for demonstration, training and educational purposes. Among its features are an aluminized white fluorescent screen with high stability under varying conditions of screen current, and an operating maximum voltage of 40,000 volts — unusually high for a tube of this type.

Musical Travel

People who can't make it to see the current Cinerama show in New York will at least be able to hear the music, thanks to the RCA Victor Record Division's new recording of Morton Gould's musical score for "Cinerama Holiday." Chosen by *Woman's Home Companion* as "The Record of the Month" for March, 1955, the new release is conducted by the composer and includes the musical presentation of a trip through the American Southwest, to Paris, on a mountain ski run, and on other adventures presented in the film.

Microwave for Texas

A 478-mile RCA microwave radio system linking key compressor stations of the El Paso Natural Gas Company, El Paso, Tex., has just been completed by the RCA Engineering Products Division. This installation, the second RCA microwave system installed for the El Paso Company's expanding gas transmission system, hops the rugged, mountainous terrain of the Texas-New Mexico border area between El Paso and Farmington, N. M. It employs standard RCA microwave equipment to provide both teletype and voice circuits.

The Eye Again

Two more banks in the Southwest are now using RCA's "TV Eye" closed circuit television system to speed customer service and ease clerical tasks. The Central State Bank, Oklahoma City, has put a "TV Eye" camera on the bank floor, with the receiver in the bookkeeping department, for rapid checking of signature and balance. The Irving State Bank, Irving, Tex., is using its "TV Eye" to connect two drive-in windows with the bookkeeping department, 300 feet away, providing instantaneous verification of signatures and confirmation of balances.

Prices Down, Sales Up

A preliminary report on the effect of the RCA Victor Record Division's price cuts of up to 40 per cent on Jan. 3 showed a 100 percent increase in the sale of RCA Victor classical long-playing records during the first month following the reduction. And in dollar volume, sales of records in this category ran 32 per cent ahead of those for the same period in 1954, according to Emanuel Sacks, Vice-President and General Manager, RCA Victor Record Division.

New RCA Radar "Weather Eye" Sees Through Storms

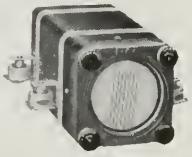
In our time, man has won round after round in the century-old contest against the elements. For thousands of years, caravan leaders, ship captains, and now airplane pilots —men responsible for the safe transport of travelers and merchandise—have studied the skies. What unseen far-distant dangers lurked there? Fog? Storm? Hurricane?

The most recent scientific victory is something new in Radar—an electronic "Weather Eye" developed by RCA.

In airplanes, this supersensitive instrument peers miles ahead. It gives advance warning of weather disturbances. The signals on its radar screen point the way to a safe course *around* storm areas, or even *through* them.

The leadership in electronic research that made the "Weather Eye" possible is inherent in all RCA products and services. And continually, at the David Sarnoff Research Center of RCA, Princeton, N. J., scientists are continually at work to extend the frontiers of "Electronics for Living"—electronics that make your life easier, safer, happier.

New RCA Weather Mapping Radar weighs under 125 pounds, takes little space in a plane.



RCA®

RADIO CORPORATION OF AMERICA

ELECTRONICS FOR LIVING

WHY THIS SIGN IS YOUR GUIDE TO FINER TELEVISION

RCA's 36 years' experience is yours to share in TV—black-and-white or color

When the time comes for you to purchase a TV set and enjoy the most fabulous medium of entertainment ever created for the home, here are facts that will help you make the right decision.

To pioneer and develop television, in color as well as in black-and-white, called for a special combination of practical experience, great resources and research facilities in the fields of communications and electronics.

RCA was well qualified to do the job:

EXPERIENCE: RCA has been the recognized leader in radio communications since its formation thirty-six years ago. Its world-wide wireless circuits, established in 1919, and its development of electron tubes, laid the groundwork for radio broadcasting in 1920 . . . and the first nationwide radio network in 1926.

Radio broadcasting led to television—and in 1939 RCA made history by introducing black-and-white TV as a service to the public.

Dr. V. K. Zworykin of RCA invented the iconoscope, or television camera tube, and he developed the kinescope, now universally used as the picture tube.

RESOURCES: Pioneering and development of color TV has been one of the most challenging and expensive projects ever undertaken by private industry. To date, RCA has spent $50,000,000 on color TV research and development, in addition to the $50,000,000 previously spent in getting black-and-white TV "off the ground" and into service.

RESEARCH FACILITIES: RCA has one of the most complete, up-to-date laboratories in the world—the David Sarnoff Research Center at Princeton, N. J. It is the birthplace of compatible color television and many other notable electronic developments.

No wonder that you can turn to RCA to find all of the essentials of quality and dependability born only of experience.

In addition, the RCA Service Company, manned by a corps of trained technicians, operates service branches in all principal television areas. No other organization is so thoroughly equipped to install and service your television set, as well as any other RCA product.

RADIO CORPORATION OF AMERICA

Electronics for Living