RADIO AGE

RESEARCH • MANUFACTURING • COMMUNICATIONS • BROADCASTING • TELEVISION

APRIL 1956

RCA PORTABLE TV

RCA's First Billion-Dollar Year

The Radio Corporation of America in 1955 did the largest volume of business in its 36-year history, exceeding one billion dollars in sales for the first time. This achievement puts RCA among the top twenty-five industrial companies in the United States.

Sales of products and services amounted to $1,055,266,000 in 1955, compared with $940,950,000 in 1954, an increase of 12 per cent.

Net profit before Federal income taxes was $100,107,000, and after taxes, $47,525,000. Earnings per share of Common Stock were $3.16 in 1955, compared with $2.66 in 1954.

The Corporation's Federal income taxes, social security, property tax, and other state and local taxes totaled $66,611,000 in 1955. In addition, the Corporation paid excise taxes of $31,387,000, making the total 1955 tax bill $97,998,000, an amount equivalent to $6.98 per Common Share.

Dividends totaling $24,069,000 were declared by RCA for 1955. This included $3.50 per share on the Preferred Stock and $1.50 per share on the Common Stock, against $1.35 for 1954.

Color television—the compatible system pioneered and developed by RCA—continued to gain momentum during 1955. The National Broadcasting Company expanded its color programing and RCA Victor introduced the first complete line of color TV receivers. The outlook is bright for color TV to move forward with increased rapidity in 1956.

Successful establishment of color television as a new service fully justifies the long years of experimentation and the millions of dollars which RCA has devoted to scientific research and engineering as a basis for leadership and steady growth.

Electronics is a science in which progress is born of change. The American public's spontaneous acceptance of new products and services is highly encouraging to scientific research. Eighty per cent of RCA's total sales in 1955 were in products and services which did not exist, or were not commercially developed, ten years ago. Research, development and engineering have spearheaded RCA's economic advance to the status of a one-billion-dollar sales unit in American industry.

David Sarnoff
Chairman of the Board

Frank M. Folsom
President

Results at a Glance

from RCA 1955 Annual Report

	1955	1954
Products and Services Sold	$1,055,266,000	$940,950,000
Per cent increase over previous year	12.1%	10.3%
Profit before Federal Taxes on Income	100,107,000	83,501,000
Per cent to products and services sold	9.5%	8.9%
Per common share	6.91	5.72
Federal Taxes on Income	52,582,000	42,976,000
Per cent to profit before Federal taxes on income	52.5%	51.5%
Per common share	3.75	3.06
Net Profit	47,525,000	40,525,000
Per cent to products and services sold	4.5%	4.3%
Per common share	3.16	2.66
Preferred Dividends Declared for Year	3,153,000	3,153,000
Per share	3.50	3.50
Common Dividends Declared for Year	20,916,000	18,899,000
Per share	1.50	1.35
Total Dividends Declared for Year	24,069,000	22,052,000
Reinvested Earnings at Year End	206,020,000	182,549,000
Stockholders' Equity at Year End	257,682,000	234,199,000
Working Capital at Year End	327,175,000	234,865,000
Ratio of current assets to current liabilities	3.1 to 1	2.6 to 1
Additions to Plant and Equipment	31,039,000	34,290,000
Depreciation of Plant and Equipment	19,123,000	16,260,000
Net Plant and Equipment at Year End	157,994,000	151,459,000
Number of Employees at Close of Year	78,500	70,500

A copy of RCA Annual Report for 1955 will be sent upon request. Write Radio Corporation of America, 30 Rockefeller Plaza, N. Y. 20.

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Electronics for Living

VOLUME 15 NUMBER 2

Radio Age

ARCH • MANUFACTURING • COMMUNICATIONS
BROADCASTING • TELEVISION

APRIL 1956

COVER

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NOTICE

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

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RADIO CORPORATION OF AMERICA
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HIGH WIDE WORLD — NBC's "Wide Wide World" literally hit a record high last January 22 with the operation shown here — a live pickup 11,500 feet above sea level at Utah's Alta ski resort, by a snow-shoeing cameraman.

A Mass Production Plant for Color TV

THE WORLD'S first manufacturing plant geared completely to the mass production of color television receivers was unveiled by RCA at Bloomington, Indiana, in early February. The new facilities, converted to color production at a cost of more than $5,000,000, were shown to newsmen on February 6 by RCA executives including Robert A. Seidel, Executive Vice-President, RCA Consumer Products, and W. Walter Watts, Executive Vice-President, RCA Electronic Components.

"We are now geared to produce, on each of our lines here, a color television set — completely tested, packed and ready for shipment — every 60 seconds," Mr. Seidel told the press group. "We are producing color receivers at this rate on one of our lines here today, and we have another color set line now in operation at our Indianapolis plant. Where we were able, little more than a year ago, to turn out ten color sets an hour, we can now produce 60 sets — one a minute — on each line."

These points were emphasized by Mr. Seidel in his talk to the press:

— During 1956, RCA expects to manufacture and sell more than 200,000 color TV receivers.

— The Bloomington plant conversion means that every production line at the plant can be switched to making big color receivers whenever it is desired, and the manufacturing process has been so simplified that "most of our present employees now engaged in the production of black-and-white sets can be transferred immediately to color work."

— RCA will continue to step up color set production to meet demand which is already mounting steadily as color takes hold.

— Ground has been broken at Bloomington and in Indianapolis for new plant facilities, creating additional space which will be available for color production. Present plans call for the additional expenditure of $3,000,000 in all.

Foresees Downward Trend in Prices

Concerning color set prices, Mr. Seidel said:

"Assuredly, the price of color sets will be adjusted downward as production increases and we are able to take advantage of the economies of mass production, the start of which you have witnessed today. Just when reductions will occur — and what prices will be — I am not in a position to state. I sincerely believe, however, that regardless of future price, today's color sets, ranging in price from $695 to $995, will remain excellent buys. And you can be sure that even when reductions are made, we will continue to sell sets in the $695 to $995 price bracket."

The press tour at Bloomington was highlighted by disclosures of various aspects of RCA's and NBC's color television accomplishments and plans, including color picture tube production, color set merchandising, and color broadcasting.

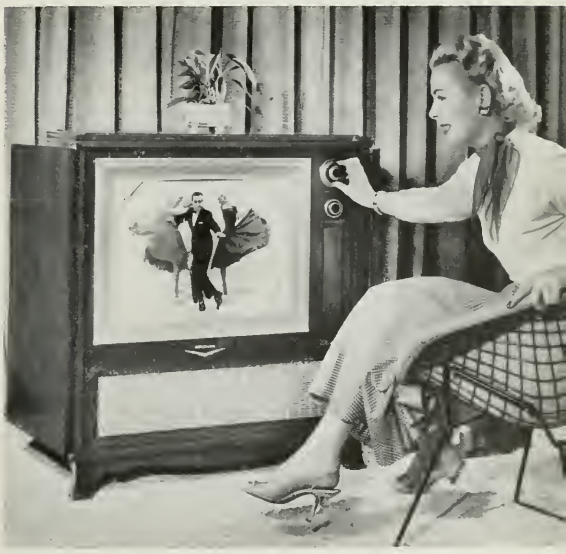
Color Tube Plans Discussed

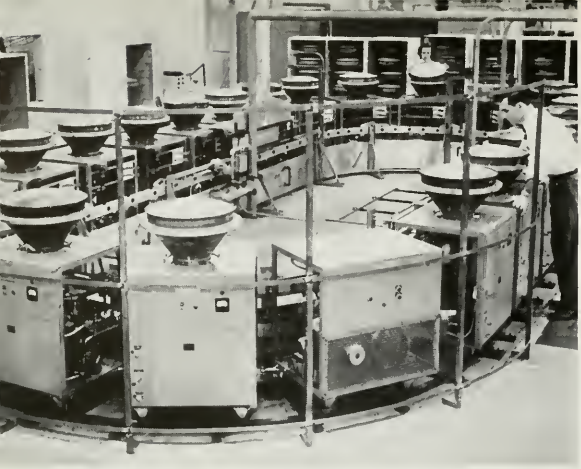
Mr. Watts' account of color picture tube production and plans highlighted these points:

— Approximately 220,000 square feet of floor space has been added to the area set aside at the Lancaster, Pa., plant of the RCA Tube Division for the development and manufacture of color tubes.

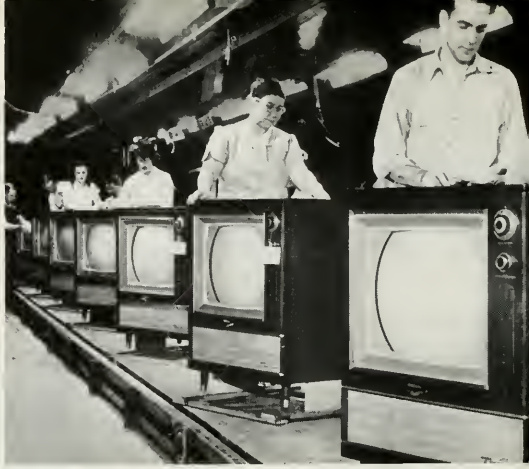
— Employment in this operation will be increased by at least 50 per cent during 1956. "This, added to the 50 per cent increase during 1955, indicates the extent of our activities — accomplished and planned in blueprint form — over a two-year period."

The "Cheltenham 21," shown here, is one of the products of the RCA Bloomington, Ind., plant, now geared to mass production of color TV.





These machines at RCA's Lancaster, Pa., plant automatically deposit thin layer of aluminum which increases the brilliancy of color picture tubes.



Experts give final adjustment to RCA Victor big-screen color sets as they near end of an assembly line at Bloomington, Ind., plant.

— A vast degree of mechanization has occurred in the manufacture of color tubes, and RCA has spent more than $8,500,000 on this facet of production.

— Under present schedules, RCA will surpass the previously announced production goal of 30,000 color tubes a month by the last quarter of 1956.

In regard to the design of the tube itself, Mr. Watts had this to say:

"As most of you know, RCA has never for one minute lost its faith in the round, metal aperture mask type of tube. Despite doubts expressed by a few others, we have gone ahead with our plans to concentrate efforts on this tube. The extensive array of new equipment which has been installed and of which there is more to come has been designed to handle this tube and this tube only. At this time, we see no reason to depart from this view. In our opinion, no other proposed color tube is near the mass production stage."

Five Production Lines are Shown

A first-hand picture of set production was given to the press group, including inspection of the five production lines at the Bloomington plant — each line nearly a half-mile long. They were shown production of large-screen color sets, beginning with neat piles of tubes, components, wires and solder, through every manufacturing step until the instruments were completed, tested and packed for shipment to RCA distributors and dealers.

It was pointed out to the group by George Leinenweber, plant manager, that some 3,800 persons are employed at the plant, which is a modern structure of stone construction, occupying 427,000 square feet on an 81-acre tract.

Outline of Merchandising Plans

Plans for merchandising color sets during the coming months were given to the group by Charles P. Baxter, Vice-President and General Manager, RCA Victor Television Division, who pointed out that RCA now has on the market the industry's first complete line of color receivers, including a table model set. He emphasized that RCA's color sales plans have placed emphasis on heavy advertising in all media on a national and local basis, that help has been given in training distributors and their dealers in the best marketing techniques for color, and that efforts have been made to educate the public to the fact that color TV is a new, exciting medium which provides something that never before has been available.

"We are doing everything possible to speed the nationwide growth of color television," said Mr. Baxter. "An indication of these efforts is reflected in the recent action by the RCA Service Company in reducing costs of color TV service contracts. The present price, announced a month ago, is $99.95 and includes installation and unlimited service for a twelve-month period — all at a $40 reduction from the previous price. . . . In reducing the service contract prices, RCA hopes to speed the nationwide coverage of color TV by making efficient, competent service available at the lowest possible cost to consumers."

From Richard A. R. Pinkham, NBC Vice-President, the group heard of color studio expansion now under way, and the prospects for greatly increased color pro-

gramming on the air. He stated that the $12,000,000 NBC color studio expansion program started last November will mean that by next autumn "we'll be in a position to double our live color programming on the network and do more film programs in color too."

The major features of the expansion program listed by Mr. Pinkham included:

— Equipment of the Ziegfeld Theatre in New York as a color studio;

— Construction of an additional color studio in Brooklyn;

— Construction of an additional color studio at Burbank, California, at NBC's Color City;

— Installation of color recording equipment at Burbank, so that the increasing volume of network color programs can be recorded and broadcast in color at the same local time as in New York, whenever this is possible and practical;

— Additional expansion at Burbank, including more color film facilities, a new master control for Color City, and construction of a technical building to house this additional color equipment.

As for the programs themselves, Mr. Pinkham said:

"By next fall, we expect that many of our principal evening attractions, in addition to the 90-minute Spectaculars, will be presented in color. Depending on how the schedule works out, it's entirely possible that between NBC and CBS (Columbia Broadcasting System), there will be important color programs on the air every night of the week, with several color shows on key evenings like Saturday and Sunday."

Immediate evidence of expanded color programming by NBC was the special colorcasting of eight additional shows during March. These included the George Gobel Show on March 3, the Dinah Shore Show on March 6, 8, 20, and 22; "This is Your Life," on March 7; the "Texaco Star Theater", starring Jimmy Durante, on March 24, and the "Lux Video Theatre" on March 29. These productions were in addition to the continuing NBC color schedule, which totals now about 40 hours a month.

Color TV Opens New Era of Mass Sales, Says Folsom

AMERICAN retailing is on the threshold of an entire new era in mass merchandising with the advent of color television, Frank M. Folsom, President of RCA, told the National Retail Dry Goods Association recently at its annual convention in New York.

"Perhaps no other facet of our American merchandising system stands to gain as much from the intensive selling capacities of color television as does the retailer," he said. "No one has as much or as great a variety of merchandise and services to sell as the department, chain and specialty stores of America. No one meets the buying public in greater numbers or more intimately. No one should be more interested in the most advanced and best selling techniques available for reaching that public. So it is that, with color television, we combine sight, motion and sound to create a fabulous selling tool."

Mr. Folsom and Robert A. Seidel, Executive Vice-President, RCA Consumer Products, spoke to the convention before and after a special closed-circuit color TV demonstration designed to show NRDGA members how color can be used effectively as a new merchandising technique. The demonstration, produced by NBC TeleSales, originated at NBC's Colonial Theatre, at Broadway and 62nd Street in New York.

Called "Wide Wide Window," the special closed-circuit program represented a translation of a typical retail store window into television, which serves as a window to bring the store's merchandise into the average television home. Included in the program were demonstrations of varied and newsworthy merchandise, and actual television selling techniques. Arlene Francis, star of NBC's "Home" program, was mistress of ceremonies for the demonstration show, which included as participants, Jinx Falkenburg, Bill Cullen, Pegeen Fitzgerald, and more than twenty-five fashion models. The retailers, meeting at the Statler Hotel, saw the program on 40 RCA Victor color television sets in and around the grand ballroom of the hotel.

Said Mr. Seidel: "Right now, RCA's dealers are selling color receivers at only about a thousand a week — but the volume is mounting daily. During 1956, RCA will manufacture — and our distributors and dealers alone will sell at a profit — upwards of 200 thousand receivers. . . . Of course, color TV needs to be sold. But what new product doesn't? But color television is truly wonderful, and hundreds of thousands of your customers can afford sets now, at today's low prices of from $695 to $995. Hundreds of thousands of others will be able to buy color sets in coming months, as production increases and prices are adjusted downward."

Plan for a "National Education Reserve"

A "National Education Reserve" of teachers drawn from the technological ranks of industry to serve in their local schools has been proposed by Brig. General David Sarnoff, Chairman of the Board of RCA, as a means of alleviating the nation's critical shortage of scientists and engineers.

The proposal was made by General Sarnoff at the annual dinner of the National Security Industrial Association in Washington on January 26. Addressing some 1,400 leaders in government, the military services and industry, General Sarnoff said:

"Our safety and our industrial strength rest upon our success in expanding the nation's reservoir of physicists and scientists, trained engineers and technicians. Our economy and national security alike will suffer seriously unless we solve this problem promptly and vigorously."

Just before his address, General Sarnoff received the NSIA's James Forrestal Memorial Award, presented annually to "a distinguished American whose leadership has promoted significant understanding and cooperation between industry and government in the interest of national security." President Eisenhower was the first recipient of the award last year.

The citation referred to General Sarnoff as "a distinguished citizen, industrialist and soldier whose devotion to his nation in peace and in war has served as an example to all Americans, has provided outstanding leadership in encouraging vital understanding between industry and government in the interests of national security."

Charles E. Wilson, left, Secretary of Defense, looks on as Brig. General David Sarnoff receives the Forrestal Award from C. C. Felton, Vice-President of Revere Copper & Brass, Inc., who served as chairman at the annual dinner of the National Security Industrial Association in Washington.

Warns of Critical Shortage

In his address, broadcast over a coast-to-coast radio network of the National Broadcasting Company, General Sarnoff declared that unless the lack of qualified teachers at grade levels for such subjects as physics, chemistry and mathematics is met quickly, it will show up a few years hence in an even more critical shortage of trained personnel. Continuing, he said:

"In the presence of so many leaders of industry, I wish to offer a suggestion. It may not solve the problem completely, but it could go a long way toward a solution.

"I propose the establishment of a 'National Education Reserve' comprising qualified teachers in mathematics, physics, chemistry, engineering and related subjects, to be drawn from the technological ranks of industry. I have in mind the release — and with full pay for at least a year — of a reasonable number of men and women for teaching assignments in their local schools. This unique Reserve could also mobilize those who have reached the retirement age but whose knowledge and experience would make them inspiring teachers. In addition, it could include qualified people willing to volunteer their services to teach in night schools without giving up their industry jobs.

Would Enlist Cooperation of School Authorities

"The number of teachers recruited from any single organization would be too small to entail hardship for any one — but the total number comprising the corps could be drawn from such an extensive list of organiza-

tions that it would be large enough to give new impetus to teaching of the sciences in our school system. This would be especially true at the high school level which is our present major bottleneck. This Educational Reserve would, of course, have to be strictly an interim program, let's say for five years, to help meet an immediate situation. Moreover, whether the initiative is taken by industry or government, the plan itself would naturally be drawn with the consent and cooperation of school authorities who would prescribe the courses and regulate the instruction.

"In some degree, such a plan would amount to the restitution by business of personnel it has siphoned off from the school system. Men and women who normally would have become teachers of the sciences have instead gone into industry, where the rewards are more enticing. I think it is fair to say, in fact, that in the current crisis industry has an obligation to help develop this kind of Educational Reserve.

"Obligation aside, industry would be well advised as a matter of self-interest to help replenish the reservoir of trained men and women by stimulating relevant studies at the lower educational levels. Industry will need more and more technically trained people for its own expanding operations.

"Because of their practical experience, teachers in the Educational Reserve Corps would bring the breath of living reality into the classroom. They would help restore the sense of adventure to technical careers and inspire many an able and imaginative student to follow the scientific and technological disciplines into the college years. Enthusiasm is contagious.

Suggests Corps Be Set Up on National Basis

"To make the project attractive, teachers in the Reserve Corps should be given recognition and status, through membership in an organization somewhat similar to the various military Reserves. It should be set up on a national basis, perhaps created by an Act of Congress.

"I have presented this concept in broad terms. There are many details to be discussed and formulated by educators, representatives of industry and interested official agencies. But I trust that the basic idea has enough potential merit to justify closer examination."

General Sarnoff said that science and technology are the "very hallmarks" of American civilization, and added: "It comes as a shock, therefore, to be told that Soviet Russia is turning out engineers at a higher rate than we are. . . .

"According to one study, Soviet Russia, in the 26 years between 1928 and 1954, graduated 682,000 engineers as against 480,000 in the United States. Last year Russia graduated twice as many engineers as we did. One reason for this, of course, is that a police-state can compel its youth to enter careers most useful to the state. It conscripts brains even as it conscripts bodies."

General Sarnoff, who was recently appointed by President Eisenhower as Chairman of the National Security Training Commission, said that military Reserves pose no less a vital problem than an Educational Reserve.

"When we think and plan for robust defense, we cannot overlook the need for large and strong Reserve contingents," he continued. "These are essential elements in any long-range military planning. Indeed, the traditional American scheme has always been a relatively small active force backed by trained civilians who can be mobilized on short notice to meet an emergency.

"It is common knowledge that our Military Reserve strength is now far below requirements. The purpose of this Act is to recruit and train enough civilians to make our country safe and strong over the long pull. The job is to get the story more clearly and effectively to our young manhood and their parents. Efforts in this direction are now under way and we hope for a better response than there has been so far."

New Hi-Fi Tape Recorder

Illustrated here is RCA's new "Judicial' tape recorder featuring three loudspeakers and provision for recarding from microphone or radio-phonogaph.

Electrofax Enlarger for Microfilm

A HIGH-SPEED machine which employs the RCA Electrofax process to turn out standard-size engineering drawings from microfilm originals at the rate of fifteen per minute has been developed by RCA and was demonstrated for the first time on February 14.

The new enlarger-printer, which is expected to revolutionize today's techniques of storing and reproducing vital engineering drawings, is the first commercially-designed machine to utilize Electrofax, the swift and economical electrostatic dry-photographic process developed at RCA Laboratories. Arthur L. Malcarney, General Manager, RCA Commercial Electronic Products, announced that RCA is now accepting orders on the machine, which is priced at $85,000.

The device was developed under contract with the U. S. Navy, Bureau of Aeronautics, which has now taken delivery on the first machine at the Overhaul and Repair Department of the Naval Air Station at Alameda, California. The base is a typical repair center for naval aircraft, and the Electrofax enlarger will be used for jobs described this way by Mr. Malcarney:

"This enlarger-printer will be combined with Filmsort equipment developed by the Dexter Folder Company, under contract with the Bureau of Aeronautics, and other processing equipment, to provide for Navy evaluation of completely integrated system for low-cost storage and high-speed processing of engineering drawings essential for the maintenance and modification of naval aircraft.

"The system will introduce at the Alameda repair center important savings in the cost of handling and reproducing engineering drawings and in the space required for their storage. Equally important, the high-speed selection and reproduction system will make possible rapid push-button availability of filed drawings for maintenance purposes and for reference by bidders and suppliers. The Bureau of Aeronautics estimates that the system's potential in direct savings to Naval aviation exceeds one million dollars annually in procurement, reproduction, and storage costs."

Used with Filmsort Filing System

The new machine is the first enlarger-printer designed for use with the Dexter-developed Filmsort system — a relatively new method for filing and selecting drawings for reproduction. Filmsort utilizes individual exposures of drawings on microfilm, and each exposure or microfilm frame is mounted on a separate electric accounting machine card to provide maximum freedom and speed of selection. Conventional methods involve the filing of full-scale drawings, or recording on continuous rolls of microfilm. The Filmsort cards can be selected swiftly according to category by conventional electric punch-card machines. The RCA Electrofax machine can also work with 35-mm roll microfilm if desired.

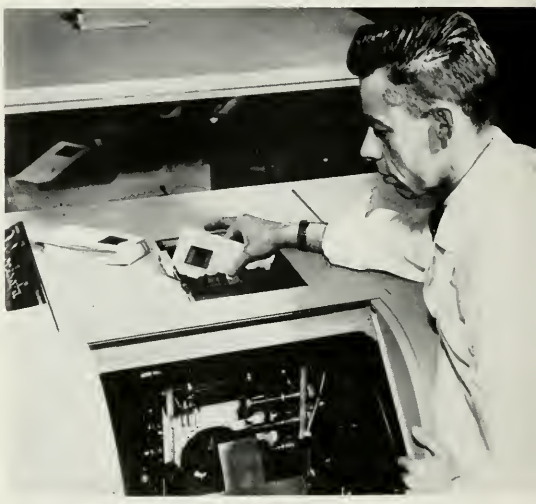
The combination of Filmsort, which permits swift access to microfilm files, and the Electrofax machine, which provides short-order reproduction, offers new standards in speed, efficiency and economy to virtually all high-volume processors of engineering drawings, Mr. Malcarney said. Possible applications of the device extend to government services and the aviation, building, engineering and other industries which employ large volumes of drawings.

The particular features which distinguish the Electrofax machine include these:

— It is the first equipment of its type which can be used with either Filmsort cards or microfilm rolls.

— It is the only automatic enlarger-printer to use a direct dry-photographic process, printing direct from a microfilm original to paper.

H. G. Reuter, Jr., supervising engineer on RCA Electrofax project, inserts Filmsort cards in the new enlarger-printer for engineering drawings.



— It requires neither darkroom nor special protective lighting for location or processing, since the RCA Electrofax paper which is used does not become light sensitive until it is put into the printer.

— It is believed to be the fastest automatic enlarger-printer ever developed, with an output rate of fifteen 17 x 22-inch drawings per minute.

— It is equipped with a sight glass which allows an operator to check on the photographic process at all times.

Operation of the device is handled by push-buttons and it has an automatic focus. Standard A-, B-, and C-size drawings are produced by the machine in full scale, and larger drawings in half-size. It can be pre-set to reproduce up to 500 microfilm originals at one loading, with up to 24 multiple copies of each.

How the Enlarger Operates

The machine operates in this way:

Loading is accomplished by placing up to 500 Filmsort cards in a rack above the lens system, or by inserting a 100-foot roll of 35-mm positive microfilm in much the same manner that a typewriter ribbon is installed. The press of a button starts the microfilm originals —either cards or roll — feeding automatically into the lens system at the rate of one frame every four seconds.

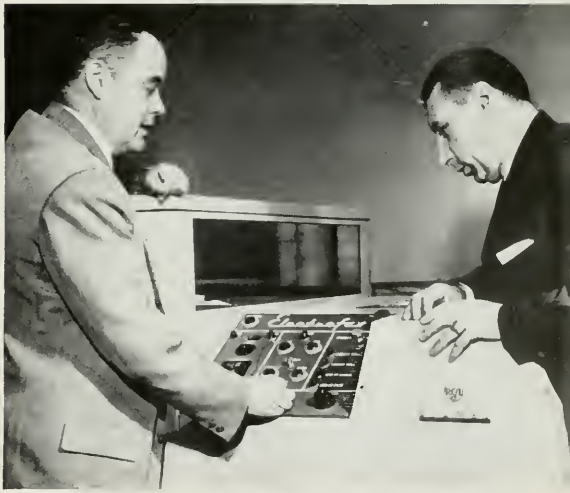
The images are projected through the lens onto the special Electrofax printing paper, which feeds automatically into the machine from a roll approximately 3500 feet long. At this point, the operation becomes a mechanized version of the Electrofax printing process developed at RCA's David Sarnoff Research Center in Princeton, N. J.

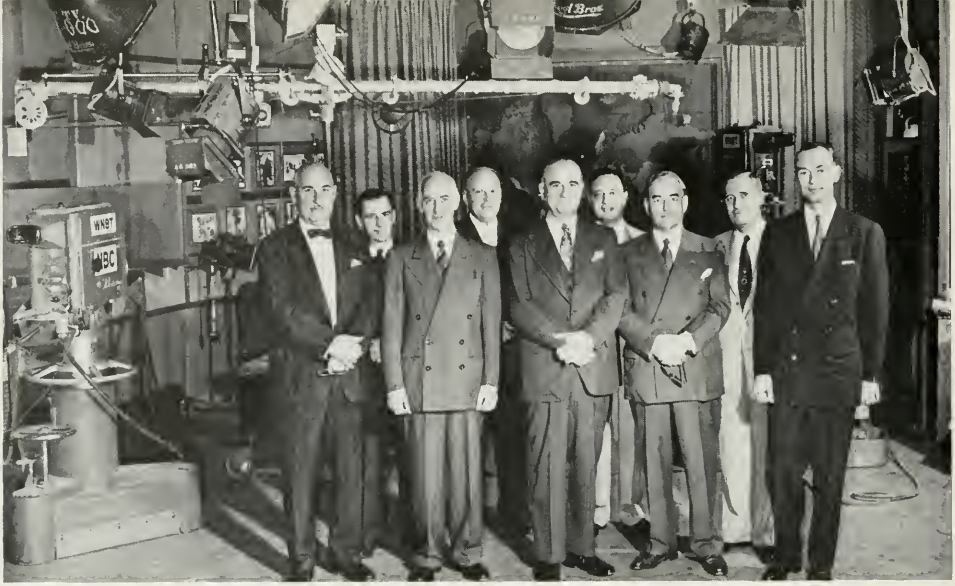
In the Electrofax process, light images are projected onto a special electrosensitive coating which can be applied to any solid surface — in this case, paper. The coating is made photosensitive by application of a charge of static electricity. During exposure, the charge is reduced or driven away in proportion to the amounts of light striking the different parts of the surface, leaving a latent electrical image. The image is made visible by brushing the surface with a magnetic brush carrying charged particles of pigmented resin powder. The powder particles cling to negatively charged areas of the surface, creating a visible print of the original projected image. The image is fixed in place by brief application of heat, which causes the resin particles to fuse on the surface.

In the new machine, all of these steps are carried out in sequence and automatically. The Electrofax paper, with a sensitivity several thousand times greater than that of blueprint paper, moves through the machine at a rate of 23 feet per minute. As it emerges, bearing the permanently printed reproductions, the paper is wound on an output roll from which the reproductions can be cut as needed.

Finished reproductions of engineering drawings flow from Electrofax enlorger-printer as shown at rate of 15 per minute.

Arthur L. Malcarney, right, General Manager, RCA Commercial Electronic Products, discusses new Electrofax machine with Dr. James Hillier, Chief Engineer.





In this group photo taken in a modern NBC studio in New York are nine of RCA's television pioneers. Left to right, they are Ray F. Guy, NBC; Don Castle, NBC; Julius Weinberger, RCA; Merrill H. Trainer, RCA; Dr. Alfred N. Goldsmith, RCA consultant; Barton Kreuzer, RCA; Dr. Arthur F. Van Dyck, RCA; Lester Looney, NBC, and Theodore A. Smith, RCA.

The Early Days of Television

By Arthur F. Van Dyck

Staff Assistant to the Vice-President and Technical Director, RCA

TELEVISION was little more than a dim and distant goal when, in 1927, a few young engineers began work on it at the Laboratory of the Radio Corporation of America, in Van Cortlandt Park, New York City.

The dream of some day being able to "look over the hills and far away" had been a vision of physicists and scientists for decades, but the problems in accomplishment, like those of interstellar travel today, seemed almost insurmountable. Preliminary explorations had been made by various workers before that time, but results were primitive at best. However, by 1927, the development of new tubes and circuits afforded new possibilities, and a special group was organized for intensive attack on the problem.

The Laboratory was built in 1924, and was headed by Dr. Alfred N. Goldsmith, who had been director of research for the Marconi Wireless Company of America before the formation of RCA in 1919. Dr. Goldsmith possessed in large measure that rare combination of technical knowledge, imagination, and good judgment which is vitally important to rapid progress in research and development. As a result, the Laboratory made an outstanding record in several fields, of which television was one. Assisting Dr. Goldsmith were Julius Weinberger, in charge of research; Raymond Guy, in charge of broadcast station design, and the author, in charge of engineering and testing.

The new television development group was headed by Theodore A. Smith, then a young engineering graduate, now Vice-President and General Manager, Defense Electronic Products. He had a staff of eight assistants, and their work proceeded with such vigor and speed that notable results were obtained within a year. Prior to this time, television pictures had been like black-and-white cartoons, with jerky movements and images only two or three inches wide.

Within the year, Smith and his group had developed and built a small transmitter which gave good performance, and they proceeded immediately to develop a larger one, having 5000 watts power. The Federal Radio Commission issued call letters W2XBS for these experiments in 1928, and the transmitter was installed in the RCA

Photophone space at 411 Fifth Avenue, where convenient studio facilities were available. In this location, television broadcasting was conducted daily from 7 to 9 p.m. on the assigned frequency of 2000 to 2100 kilocycles.

Rotating Disc Was Used

All this was before the days of iconoscopes and all-electronic television. Subjects were scanned by a rotating disc with minute holes punched in a spiral near the periphery of the disc. Twenty complete pictures of 48 scanning lines each were transmitted every second. This was extremely crude by present day standards, but it was quite an advance then!

The beginning programs were crude, too. They consisted of still photographs, painted signs, and occasional views of staff personnel. Closeness to the RCA Photophone recording studios made it possible occasionally to entice actors from the sound movie sets to appear before the new-fangled television cameras.

It was here at "411" that "Felix the Cat" made his television debut. Felix was attached to a slowed-down phonograph turntable and placed in front of the mechanical scanning disc camera. His antics, and those of the other performers, animate and inanimate, were radiated by W2XBS and viewed on six receivers located in various parts of the city to observe reception (compared with the six million or so receivers now in New York City!).

The Laboratory did not overlook the systems aspects of television while these experiments, aimed primarily at home reception, were going on. Theater size television was envisioned, too. This vision, and hard engineering work, resulted in a public demonstration at the RKO Theater, at 57th Street and 3rd Avenue, in January, 1930. The demonstration used a screen six by eight feet in size, and the transmission was by radio over a distance of about one mile. In these tests, the scanning disc was six feet in diameter, with small lenses replacing the previous simple holes around the rim of the disc.

"Provocative and Stimulating" Results

Results at the theater were reported as "provocative and stimulating". The pictures were judged acceptable when only head and shoulders of subjects were televised, but quality at best was far inferior to that of motion pictures. However, large-screen television had been accomplished.

In July 1930, the conduct of further testing was taken over by the National Broadcasting Company, and the equipment was installed in larger quarters in the New Amsterdam Theater Roof, where it remained until 1933, when operations were transferred to the Empire State Building.

In 1929 and 1930, fundamental changes in the organization of RCA occurred, beginning with the purchase of the Victor Talking Machine Company. The radio engineering activities of the Van Cortlandt Park Laboratory, the General Electric Company, and the Westinghouse Company were transferred to Camden, New Jersey, and the Van Cortlandt Park installation was closed.

The General Electric and Westinghouse Companies had been active in television development during the period prior to the reorganization, and their television activities moved to Camden in January 1930. Particularly noteworthy among these was the work of V. K. Zworykin, which, with the kinescope for receiver reproduction, and with the iconoscope for camera pick-up, completed the conversion of the previously limited mechanical system to an all-electronic system.

Pioneering Stage Completed

Thus was the pioneering stage completed. The systems work of Goldsmith, Weinberger, Smith and Rodwin, the tube and circuit work of Zworykin, Vance, Bedford, Kell, Schade, Tolson, Holmes, Leverenz, and others, made a solid foundation for the new service of television, upon which it could grow soundly and securely into the future.

The early whirling discs at Van Cortlandt Park, Pittsburgh, and Schenectady, had done their part in

Perhaps the first star of TV was Felix the Cat, shown in this 1930 picture of tests at W2XBS, predecessor of today's WRCA-TV in New York.

Public TV service was inaugurated by Brig. General David Sarnaff in this historic telecast at New York World's Fair in 1939.

making the early history of television. But, in 1935, RCA-NBC installed the first all-electronic apparatus, with 343 lines and 30 pictures per second, and within a year, 441 lines.

By 1939, the RCA system was ready for public service, which was inaugurated at the opening of the World's Fair in New York in April of that year. On July 1, 1941, five months before Pearl Harbor, NBC received from the FCC the first commercial television license for its transmitter on the Empire State Building. Thus was launched the final stage of television development which has continued, except for the short wartime interruption, to the present vast and important new public service.

Perhaps we should not call this stage the final one, because there is one more — that of color television. That stage is now with us, but here too we find the imprint of the work of the pioneers. Goldsmith's conception of the shadow-mask color kinescope, and Bedford's compression of color information into narrow channels, have brought the final stage to practicality sooner than the early pioneers had dared to hope.

Recently, nine men met in an NBC television studio for a group photograph. They were surrounded by the elaborate lights, cameras, boom microphones, and associated trappings of the modern TV studio. The scene was in striking contrast to the studio where they had worked 28 years ago. These were the men who had formed the nucleus of RCA's Van Cortlandt Park television staff. And, amazingly, all of them are still active today, in various branches of the broad television services of RCA-NBC.

New RCA Flight Laboratory Tests Military Equipment

A Flight Laboratory for testing airborne electronic equipment and systems in the air and on the ground has been established by RCA at the New Castle County Airport in New Castle, Delaware.

The new facility, now in limited operation, is to be completely equipped by May for operations connected with RCA airborne equipment and fire control systems for military aircraft and with RCA ground radar systems. Charles R. Sharp, veteran test pilot and aeronautical engineer, has been appointed manager.

One feature of the new operation is a flying laboratory — an Air Force C-47 transport plane equipped with aeronautical test equipment, enabling engineers to observe in flight the performance of electronic equipment.

Theodore A. Smith, Vice-President and General Manager, RCA Defense Electronic Products, announced that the Flight Laboratory will serve "as a proving ground for airborne electronics developed for the military services."

"It will be equipped with aircraft and equipment necessary for air and ground tests of all types of RCA airborne electronics, from basic radar devices to complex control systems," he said. "We have located our Flight Laboratory at New Castle because of its proximity to RCA defense production and design centers at Camden and Moorestown, N. J., and its facilities for accommodating jet aircraft."

The new laboratory, occupying 27,000 square feet of a new hangar, includes administrative offices, electronic test facilities, and maintenance and storage areas for aircraft and spare parts. In a nearby hangar is the East Coast Field Support Depot of the RCA Airborne Systems Department. This unit can perform depot-level maintenance on military electronic equipment manufactured by the department, and it provides classroom facilities for instructing personnel of the armed forces and plane manufacturers in the installation, maintenance and operation of RCA electronic equipment.

In addition to flying aircraft based at New Castle, Flight Laboratory pilots operate planes based at other airports where RCA is conducting flight testing of airborne electronic systems. At present they are flying F-86D jets based at Bedford, Mass., for tests of advanced electronic systems under development at the RCA Airborne Systems Laboratory in Waltham, Mass.

TV in a Small Package

Little larger than a table model radio is RCA's new portable TV set.

RCA Victor television has achieved new compactness and portability with the introduction of a high-quality, 22-pound receiver only slightly larger than a table model radio.

Known as the RCA Victor "Personal," the compact new set is now in production following more than a year of intensive development and design work. With an advertised price of $125, the "Personal" is expected to meet with wide appeal in the home, in the office, and as a second set in many households.

Charles P. Baxter, Vice-President and General Manager, RCA Victor Television Division, emphasized in announcing the novel set that "the use of precision-designed components, developed expressly for this new chassis, enables the 'Personal' to give typically excellent RCA Victor performance and high-level reception comparable to much larger receivers."

Picture Tube Weighs Only Three Pounds

The little set measures 10¼ inches high, 9¼ inches wide, and 12⅞ inches deep. It is built around a compact picture tube developed by the RCA Tube Division. The tube itself has an outside diagonal measurement of 8½ inches, weighs only three pounds, and is less than 11 inches long. According to Lee F. Holleran, the Tube Division's general marketing manager, the shortness of the new tube has been achieved by employing wide-angle, 90-degree deflection.

The economical design of the "Personal" is emphasized by the fact that it contains only 10 tubes in addition to the picture tube, four crystals, one tube rectifier and a double selenium rectifier, yet it performs 24 tube functions comparable to many larger sets. Seven of the 10 tubes bear the imposing description "double purpose duothermionic," meaning that each tube, with two electrically separated groups of elements, provides the equivalent of two single tubes.

The "Personal" has a V-type disappearing rod antenna which is adjustable for best reception in normal signal areas. For areas where signals are weaker, and where outside antennas are required for larger sets, the new portable has a connection for an external antenna.

The sets are being made available in four colors — red, gray, ivory, and black. For easy handling, a matching carrying handle which folds inconspicuously into the top of the cabinet has been provided. There is also a matching stand, which is detachable simply by manipulating two knobs. When the stand is attached, the cabinet can be tilted up or down for the best viewing angle.

The tuning controls of the "Personal" are located under a small panel on top of the cabinet, and they run the gamut of those usually found on console models. Included are fine tuning, contrast, brightness, vertical and horizontal hold, channel selector, and volume.

The new RCA "Personal" TV is shown here in contrast with current console model RCA Victor "Haverton 24."

RCA Announces Graduate Fellowships for Employees

TEN graduate fellowships in the fields of science, business administration and dramatic arts have been established for its employees by RCA in honor of Brig. General David Sarnoff, Chairman of the Board of RCA.

The move was announced by Dr. C. B. Jolliffe, Vice-President and Technical Director of RCA, who is Chairman of the RCA Education Committee. He stated that each of the fellowships is valued at approximately $3,500, and includes a grant to the fellow, tuition fees, and an unrestricted gift to the college or university selected.

Operation of the program was described this way by Dr. Jolliffe:

"Recipients of the David Sarnoff Fellowships will be chosen from the various RCA divisions and subsidiaries. Guided by executives of their divisions, employees will choose an appropriate graduate school. Employees will be given a leave of absence for the duration of the fellowship.

"This is an expansion of a program which has been in effect for several years. It is a recognition by RCA that there are many men and women within the Corporation who wish to improve their educational qualifications by graduate study. Such improvement is also advantageous to our program of personnel development.

"The association of General Sarnoff's name with these fellowships is especially appropriate, since he advanced through the ranks of the organization. General Sarnoff recommended adoption of the RCA Scholarship Plan in 1945 and fully realizes the need for helping young people within the Corporation. On September 30, 1956, he will complete fifty years of service with RCA and its predecessor company, the Marconi Wireless Telegraph Company of America, which he joined as a messenger boy."

First Fellowship in Medical Electronics

Besides the David Sarnoff Fellowships, Dr. Jolliffe said, RCA is awarding ten college and university graduate fellowships in the fields of science, physics, electrical engineering and dramatic arts, including RCA's first fellowship in medical electronics, which has been established at Johns Hopkins University, Baltimore, Md., with a grant of $3,500 to be made in the Fall of 1956.

"The fellowship at Johns Hopkins University emphasizes the growing importance of electronics in the medical profession," he noted.

Nine other RCA graduate fellowships will be awarded to students at the following universities:

California Institute of Technology (Science)
Carnegie Institute of Technology (Dramatic Arts)
Columbia University (Physics)
Cornell University (Engineering Physics)
University of Illinois (Electrical Engineering)
New York University (Electrical Engineering)
Princeton University (Electrical Engineering)
Rutgers University (Physics)
Yale University (Dramatic Arts)

33 Undergraduate Scholarships Granted

"In addition to the fellowships, RCA has granted 33 undergraduate scholarships in the fields of science, dramatic arts, music and industrial relations at designated colleges and universities throughout the country," Dr. Jolliffe said. "The recipients of these scholarships are selected by the respective colleges and universities. Each scholarship provides a grant of $800 to the student.

"RCA has also made several contributions to educational institutions to assist in meeting the growing need for financial aid from industrial corporations.

"RCA has been a contributor to educational institutions for a number of years. For the year 1956, its contributions will amount to more than $250,000. This is in addition to aid to RCA employees under Tuition Loan and Refund Plans and other indirect aids to employees that can be used for self-improvement."

A New TV Eye for the Battlefield

BATTLEFIELD television, in the form of a hand-held camera and a back-carried transmitter with which a soldier-scout can send battle pictures to a receiver half a mile away, is the latest electronic addition to the U. S. Army's combat communications system.

The new unit was built by RCA to specifications laid down by the U. S. Army Signal Corps Engineering Laboratory at Fort Monmouth, N. J., where it was demonstrated publicly for the first time on February 20. In tests of the equipment, two soldiers — one equipped with the compact camera and transmitter, and the other with the Signal Corps' hand-sized transceiver — effectively performed as a reconnaissance team to send verbal and visual information back to headquarters.

The Signal Corps pointed out that the self-contained television unit provides unprecedented mobility by eliminating the cable connections that have been needed in earlier combat television models to supply the power for operation. With the battery-operated equipment, the announcement pointed out, the TV scout can reach previously inaccessible spots, moving unhampered through woods and hedgerows, and over ditches and streams. When his mission is completed, he can move readily to a new location, taking his electronic eye with him.

During demonstration at Fort Monmouth, N. J., soldiers equipped with RCA-built portable TV transmitter and transceiver radio send data to headquarters.

Camera Weighs 8 Pounds

The hand-held camera, which resembles a cigar box in shape, weighs only 8 pounds. The transmitter, in back-pack form, weighs 47 pounds, complete with its built-in power supply. The voice which accompanies the picture can be handled, as done in the Fort Monmouth tests, by transceiver radio.

According to the Signal Corps, the camera can pick up pictures at distances up to a mile away and can transmit them to a receiver half a mile distant.

The camera can be used for a variety of functions. In scouting, it is held with the aid of a pistol grip which enables the scout to steady the camera and to "pan" or sweep across the scene of action. Mounted on a tripod, it can operate unattended as a silent sentry or as a front-line artillery observer. Placed in helicopters, it could be used in directing air-sea rescue operations. The Signal Corps pointed out that an unmanned camera might also be stationed in a suspected radioactive area, unaffected by gamma radiation that would endanger a soldier.

The small camera has four interchangeable lenses, including a wide-angle lens for viewing a broad sector, and a telephoto lens for viewing distant subjects. The transmitter, resembling a small suitcase in appearance, is capable of transmitting continuously for two hours on its five-cell rechargeable silver zinc battery. The battery is about one-third the size and weight of an automobile battery, and can be replaced easily in two minutes.

Receiver Is Mounted in Jeep

At the receiving end, the Signal Corps has mounted the 10-inch aluminized picture tube and its accompanying circuits in a jeep for fast mobility. The electrical system of the jeep provides the necessary power for the receiver, and either commercial power or ordinary household current can be used as well. From the jeep, the televised picture can be relayed to a headquarters or fed into a commercial TV system. In a pinch, according to the Signal Corps, the receiver can be used in a fox-hole.

For a comprehensive view of combat action, a commander in the receiving jeep can push buttons on a console to bring in pictures taken by five cameramen at different locations in the field.

How Printed Circuits are Made

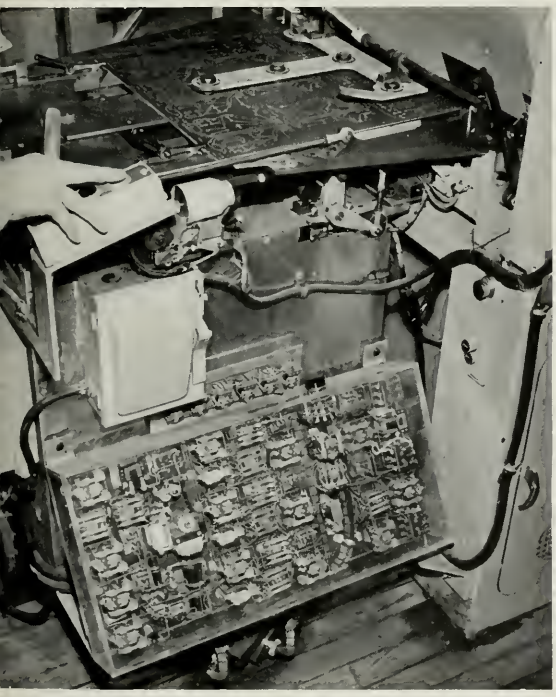
The printing of electronic circuits is being widely adopted throughout the electronics industry as a means of achieving greater efficiency and economy in the assembly of many devices, including radio and television sets. Printed circuits, in which wire connections are replaced by copper strips printed on a flat board, permit hitherto complicated assembly processes to be mechanized, result in economy of materials, and provide a new degree of simplicity in replacement of parts. RCA now employs printed circuits like those shown at left in its black-and-white and color TV receivers. The pictures on these pages, taken at RCA's Camden, N.J., plant, show the steps involved in making printed circuits.

1. Process begins with preparation of a large production photo-master of the original circuit drawing. Here photo-master is copied from small drawing at top.

2. Photo-master is used to produce a glass negative, seen here being inserted in photo contact printer. The negative contains a number of duplicate patterns.

3. Image is printed on a plastic board with a veneer of photo-sensitized copper. Here the board is inserted in the printer, against the glass negative, for exposure.

4. Exposed board is then developed photographicolly and put through an etch bath which dissolves unexposed copper, leaving replica in copper of the original circuits.



5. Up to several hundred circuits are printed on master board, which is then cut into strips. Here RCA's self-setting shear automatically positions board for cutting.

6. Each printed circuit board is punched to provide for insertion of components. RCA's Programmed Punch Press, (above) can punch virtually any pattern.

Encouraging UHF Television

ULTRA-HIGH-FREQUENCY television, devised to permit the growth of television beyond the twelve channels available in the very-high-frequency band, drew renewed public attention recently with two important developments — the presentation by RCA to a Senate committee of six suggestions for aiding the growth of UHF, and development by RCA of an experimental super-power tube which has set an all-time record in UHF transmission.

In a statement on March 15 to the Senate Committee on Interstate and Foreign Commerce, Dr. E. W. Engstrom, Senior Executive Vice-President of RCA, declared that the battle for UHF television is well worth fighting in the public interest, and he presented six suggestions to aid this important phase of TV development.

Dr. Engstrom, with a background of experience relating to the technical performance of TV in the UHF channels, appeared at the invitation of the Committee to discuss the status of transmitting and receiving equipment for UHF television. His suggestions were:

— Authorization by the Federal Communications Commission of higher power for UHF stations.

RCA's new super-power UHF tube is shown in this picture by L. P. Garner, who directed development group at Lancaster, Pa., plant.

— Authorization by the FCC of the use of directional antennas by UHF stations.

— Authorization by the FCC of the use of booster and translator type stations.

— Action by the FCC to de-intermix on a sufficiently broad basis to create a nucleus of predominantly UHF service areas from which UHF may grow and expand.

— Encouragement of multiple owners and others with resources and know-how to undertake the operation of UHF stations.

— Repeal by Congress of the excise tax on all-channel color television receivers.

As a preface to these suggestions, Dr. Engstrom said:

"In making these suggestions, I do so in the belief that I do not have, nor do I believe that anyone has, a complete answer to all the questions which have been raised during the start-up period of UHF. It seems clear that there is no single plan or solution which will be fully effective. Rather, one must consider and act upon all of the valid proposals."

Sees No Known Alternative to UHF

Referring to the need for an understanding of television performance at ultra-high frequency and for making a correct application in each situation, Dr. Engstrom said, "There is no known alternative, for we need the UHF channels in addition to the VHF channels for our still growing black-and-white service and for the color service which is the newest of the mass communications media."

In reference to the excise tax, Dr. Engstrom told the Committee that if Congress were to exempt all-channel color sets from such a tax, "we would then take appropriate steps to provide for the production of only all-channel color receivers as soon as practicable thereafter." He continued:

"We believe that removal of the excise tax would be sufficient reason for all manufacturers to make all color receivers tunable to both VHF and UHF; in other words, all-channel receivers. As color receivers replace black-and-white receivers, which they are bound to do, the UHF audience for both black-and-white and color transmissions would grow. That the UHF audience grow is basic to the success of UHF.

"In conclusion, it is my opinion that the battle for UHF television is well worth fighting in the public

(Continued on page 25)

Expanding World Trade

By Albert F. Watters

Vice President of RCA, Operations Manager
RCA International Division

WORLD business, always an active interest of RCA, today promises to be a major factor in its future growth. The year 1955 saw RCA International Division reach the highest level of sales and profit in RCA history. 1956 is delivering further evidence of progress. The first quarter showed the highest sales volume on record for the Division. All the main categories of the Division's activity are expanding: direct export of RCA products, both consumer and capital goods; manufacture and assembly of RCA products by RCA's associated companies; licensing of RCA patents and inventions.

This upward drive is the result of several factors, among which RCA policy is paramount. The Radio Corporation of America believes in international trade as a corporate opportunity for service and profit, and has equipped RCA International Division with the instruments for gaining an appropriate share of world business.

The past few weeks have seen striking examples of RCA's intensive new cultivation of world trade. In March of this year, the first of 100 links in a country-wide microwave system was opened in Cuba with Major General Fulgencio Batista, President of the Republic of Cuba, sending the first teletype message and making the first telephone call between two military bases, Campo Batista and Ciudad Militar. Other new RCA equipment demonstrated to President Batista included mobile microwave and mobile radar.

Shortly thereafter RCA signed a contract with Henrique Ascanio, owner of radio station Ondas del Lago in Maracaibo, Venezuela, to equip his TV station, the first in that thriving city, thus extending TV to another important market in Venezuela.

During the same period negotiations were concluded with London Decca and associated companies for manufacture and distribution of RCA records in England, West Germany, and Switzerland. This is a basic step in achieving distribution of the RCA catalog throughout the world. At the same time the RCA International Division was participating in the first demonstration of TV in Uruguay and contracting for a broadcast studio installation in Mozambique which will be one of the world's largest. The Division also was making heavy shipments of consumer goods to Puerto Rico, Egypt, Peru and many other areas.

Henrique Ascanio, left, General Manager af radia station Ondas del Laga, Maracaibo, Venezuela, and Albert F. Watters, RCA Vice-President and Operations Manager of the RCA Internatianal Divisian, discuss agreement establishing first TV statian in western Venezuela.

March saw finalization of a new line of radio receivers and record players made in Germany for our export markets. This line, originally made for soft currency areas, has gained world acceptance — 1956 unit sales will be three times those of 1954.

Carrying on Expansion Plans

RCA International Division, which handles the foreign trade operations of Radio Corporation of America, is carrying on expansion plans with RCA's 12 associated companies. The companies, located in Argentina, Australia, Brazil, Canada, Chile, England, India, Japan, Italy, Mexico, Spain and Switzerland, are reinforcing progress on several fronts, enlarging sales opportunities and aiding the economic welfare of the countries in which they are rooted.

The RCA associated company in England, RCA Photophone Limited, has moved into bigger and better plant facilities and has begun production and sale of custom High Fidelity equipment. Industria Electronica, S.A., the associated company in Spain, is now assembling communications equipment for the Spanish government, as well as manufacturing records and record players. The reorganized company in Australia, RCA of Australia Proprietary Limited, will commence the manufacture of records in 1956.

On Spitsbergen, Norwegian island north of the Arctic Circle, this RCA transmitter operates regularly not far from the North Pole.

RCA technicians work on a temporary antenna atop a 12,000-foot peak in the Colombian Andes.

RCA Victor Radio, S.A., associated company in Brazil, is building a new tube plant at Belo Horizonte in the state of Minas Gerais. Electron tubes will be manufactured there beginning in 1957 for radio and industrial applications. TV picture tubes are now being produced in a new wing of the RCA Victor factory in São Paulo.

Corporacion de Radio de Chile, S.A., RCA's Chilean associate, has started to produce tubes for electronic equipment for home and industry. Plans are being developed by RCA Victor Mexicana, S.A. de C.V., the associated company in Mexico, to build a tube manufacturing plant, the first in Mexico.

A new parts plant was recently opened at Renfrew, Ontario, to augment radio, television and electron tube production at the Montreal plant of RCA's associated company in Canada, RCA Victor Company, Ltd. In addition to the new Renfrew plant and the original plant headquarters at Montreal, there are two other plants now in production, one manufacturing records at Smith Falls, Ontario, and one making radio and TV sets at Prescott, Ontario.

The Canadian program of distribution, as well as manufacturing expansion, is in line with the growth of the Canadian economy. Distribution centers located in Ottawa, Toronto, Vancouver, Calgary, Winnipeg, Quebec, Montreal and Halifax make possible more efficient service to dealers and to the public.

This expansion of overseas companies and affiliates is spearheaded from RCA International Division headquarters in New York. Specialized services are provided to these companies, as well as management counsel, all organized to assure the rapid flow of information on finance management, production, and merchandise techniques.

New RCA developments such as high-speed record production, or the design and assembly of TV receivers, are quickly passed on to the overseas companies so that the technological pace of RCA's overseas manufacturing parallels that of RCA plants in the U. S.

Late last year, Laboratories RCA, Ltd., was established by RCA International Division in Zurich, Switzerland, to provide facilities for services to licensees in Europe similar to those provided to RCA licensees in the United States through the Industry Service Laboratory. This followed the establishment of a similar service laboratory in Tokyo, to provide service to licensees in Japan.

Within the past year additional licensing agreements to press records and distribute the RCA record catalog have been made between RCA and companies in France, Belgium, Holland, Sweden, Norway, and South Africa. In each of these countries records are, or will be, manufactured and distributed under the RCA monogram label, increasing volume and establishing the RCA trade-mark more firmly than ever as the symbol of the finest in recorded music in the world.

The RCA International Distribution Center at Clark, New Jersey, is now being enlarged to handle the increasing flow of direct export business, which is doubling

the volume of a few years ago. Increased shipments of consumer products are going to all markets open to imports. Increases have been notable in radios, Orthophonic High Fidelity, tubes, records, sound products, and the RCA Whirlpool line.

Communications Systems Speed Progress

Communications systems, engineered and installed by RCA International Division in cooperation with its distributors and companies, are accelerating social and economic progress in Europe, the Middle East, Africa, Asia and the Americas.

There are over 200,000 channel miles of RCA Microwave in service around the world, serving a wide range of industry as well as many governments. In countries like Colombia, Venezuela, the Dominican Republic, and Cuba, RCA radio systems prove an effective and swift means of communication.

The RCA VHF system in Colombia employs huge parabolic reflectors, first of their kind in South America, beaming telephone calls over the towering Colombian Andes. Last year, at inauguration ceremonies of the RCA radiotelephone system linking with the chain built in 1949, General Gustavo Berrio Muñoz, Minister of Communications, spoke to the governors of Antioquia and Valle and to the mayors of Medellin and Cali. His voice was transmitted from peaks such as "La Teta" (11,800 feet) and "El Campanerio" (12,000 feet) into the cities in the new radiotelephone network.

There are 20 VHF radiotelephone channels now operating between Bogotá and Medellin, and 28 between Bogotá and Cali. It is expected that this system will be expanded further still in the future, which means more voices will be calling and speeding business in Colombia.

Less than a year ago, a VHF communications system which links all major cities of the country with modern microwave radio relay equipment was delivered by RCA International Division to the government of the Dominican Republic. The completion of this system, which was begun in November 1953, appropriately enough coincided with the four-day holiday commemorating the 25th anniversary of the Government of Generalísimo Doctor Rafael Leonidas Trujillo. More recently a special link was added in Ciudad Trujillo to this nationwide hookup connecting the World's Fair (Feria de la Paz y Confraternidad del Mundo Libre) with the nationwide network.

RCA sound is performing useful functions on a world basis. In Panama, a complete RCA sound reinforcing and voting tally system was recently installed in the new House of Representatives Building. Each representative's desk is provided with a microphone and stand and voting plate which operates electro-mechanically to facilitate recording and adding of votes.

As peoples and governments in Latin America, the Middle East, Africa and Asia began working after World War II for progress through electronics, RCA International Division was ready to build for the future with them.

The oldest bank in the Republic of Mexico now has its own RCA-equipped radio network to communicate with its branches. The Bank's 72 branches are linked

In Saudi Arabia, RCA's new single-sideband two-way radio has found important application.

In Thailand, the RCA monogram looms prominently in the launching of a new television service, as shown here.

with five transmitter-receiver stations in Mexico City and ten similar units are in the Bank's main operating zones, speeding banking service, and lowering the costs of banking operations.

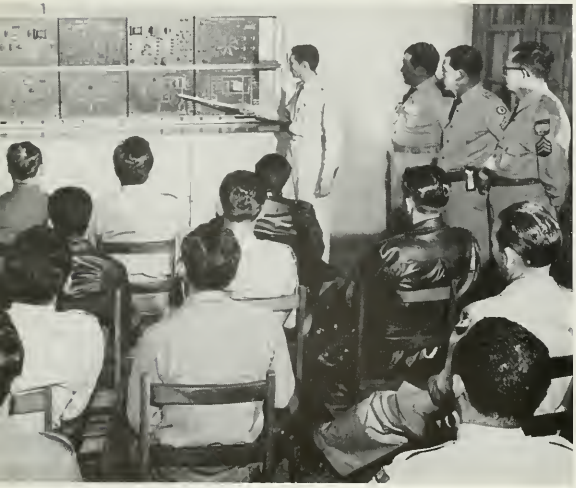
In Colombia, two-way radio communication is speeding the construction of an important transportation artery connecting two of the country's major cities. The road, covering a distance of 1,000 miles, winds over rugged mountains. The contractors found radio essential to efficient operation, handling the flow of information and instruction for working crews.

The Indonesian Navy uses an RCA communications system between its land operations and its naval bases on the coast. In December, 1955, the Republic of Laos reported election results over RCA radiotelephone equipment at polling places in the first free election held in the country. The police departments of Kuwait and Formosa are similarly equipped.

Major world airlines are now using or have ordered RCA weather radar. These airlines include BOAC, Iberia, Air France, Sabena, Swissair, Pan American, CMA of Mexico. The Royal Australian Air Force is now using this equipment.

Television is growing in many countries. Rivaling expansion anywhere in the world, TV continues to make spectacular strides in Cuba. Two networks are functioning there, CMQ-TV and Television Nacional, along with independent station Channel 2. Two new stations recently added to the Television Nacional network bring to ten the number of RCA TV transmitters in the country. Venezuela added three transmitters last year and, in the same 12 months, RCA equipment helped launch TV in Thailand, and in Guatemala, first in Central America. A TV receiver market is opening in Panama, with the inauguration of television by the U. S. armed forces in the Canal Zone.

In Cuba, an RCA Training School has trained Cubans to operate the giant microwave system being built for the Cuban government.



Swiss Nitroglycerine Firm Uses TV Eye

Demonstrations with closed circuit TV have stirred the imaginations of peoples in Southern Rhodesia, the Belgian Congo and Egypt. RCA closed circuit TV was the attraction at the U. S. Government-sponsored American Pavilion at International Trade Fairs held in Pakistan, Indonesia and India. TV Eye is being used by a Swiss manufacturer with a remote control system to insure maximum safety in the production of nitroglycerine.

In all probability, an RCA 1 KW transmitter is sending its radio beam from a location closer to the North Pole than any other radio station. It is situated on Spitsbergen, the Norwegian Island far inside the Arctic Circle.

A new station began broadcasting early this year with an RCA 50 KW transmitter in the Philippines. The Manila *Chronicle,* a leading newspaper in the Islands, branched out into broadcasting in an enterprise promising to be one of the largest commercial stations in the Pacific.

RCA radio has been adopted by an importing firm in Ecuador. The company opened up a radio station to advertise the products it imports. Mexico recently had special inauguration ceremonies for a new RCA 50 KW transmitter at a key station in a network of 107. In the Belgian Congo, radio is being used by religious missions for educational purposes. In Korea, RCA-equipped broadcast stations, ranging from 5 KW to 100 KW, are supporting the government's battle against Communism there and in the whole Far East area.

As exporters, with a worldwide organization, the RCA International Division handles the worldwide distribution of products such as Gilfillan GCA equipment, Schulmerich electronic carillons, and Duo-Therm heating appliances. The markets for all of these are growing.

To the RCA International Division, 1956 is the Key Year. It is a year of decision, of moving up to new levels of achievement. RCA enjoys a fine reputation abroad and is honored by the patronage and friendship of many people. Its management is determined to build upon this strong foundation.

WNBQ Converts to Color

THE world's first all-color television station—WNBQ, the NBC-owned TV station in Chicago—began operations on Sunday, April 15, with a nationwide audience in attendance via the television screen. The formal inauguration was announced by Robert W. Sarnoff, NBC President, near the conclusion of a broadcast of "Wide Wide World" in a program devoted to the general theme of entertainment.

Watching monitors at a reception in Chicago's Merchandise Mart, home of WNBQ, was a distinguished gathering of governmental, civic, and broadcasting industry leaders. Invitations to the reception, held in the Merchants' and Merchandisers' Club, were extended to officials of the Federal Communications Commission, the National Association of Radio and Television Broadcasters, and the City of Chicago, as well as to the press, officials of RCA and NBC, station managers of NBC affiliated stations and other broadcasters visiting Chicago for the NARTB Convention meeting on April 16.

Following the inauguration ceremony by Mr. Sarnoff, guests were conducted on tours of the new color studios and the RCA-NBC Exhibition Hall on the 20th floor of the Merchandise Mart. Throughout the week, broadcasters were invited on guided tours of the color-converted station.

Wherever they turned during the week following the inauguration, broadcasters — as well as the Chicago public—were confronted by color television. The RCA Distributing Corporation and the RCA Service Company installed color receivers in dozens of locations around Chicago—in the Merchandise Mart lobby, in department stores, in bank lobbies, in hotels, etc. WNBQ provided a continuous closed circuit color feed from 9 a.m. until 11 p.m., consisting of local or network programs which were in color. Color film was transmitted during the times that network black-and-white programs were being broadcast.

The changeover to color television by WNBQ will be heavily promoted nationally and locally. In addition to the official ceremony of "Wide Wide World," there were two other network color originations from WNBQ. "Camel News Caravan" will originate from Chicago on Monday, April 16, and "Today" will offer a remote broadcast from WNBQ two days later. "Monitor" and "Weekday" will present radio features about the event. Radio network news programs will offer coverage. Network programs and stars will salute the station.

"WNBQ's Spectrum Spectacular," as the station's promotion campaign is known, was placed in operation on March 19. It increased in scope and momentum until the peak day of April 15. The campaign utilized newspaper and trade paper advertisements, radio and television announcements, program features, car cards, sky writing (in three colors) and other devices for attracting the attention of the public. Broadcast announcements are being made to invite the public and special groups, such as schools, to tour the new color studios after operations have been started.

Checking over blueprints for WNBQ's conversion to color are, left to right, Henry T. Sjogren, assistant general manager of WNBQ; Jules Herbuveaux, NBC Vice-President and General Manager of the station, and Howard C. Luttgens, the station engineer.

The station has four color television studios, five live color TV camera chains and associated equipment, and two color film camera chains. In addition, WNBQ plans call for the construction on the roof of the Merchandise Mart of a building with 25,000 square feet devoted to various TV production and service shops. An additional 25,000 square feet has been leased for further expansion and possible use as an outdoor color TV production area.

The RCA-NBC Exhibition Hall, on the 20th floor, will have RCA color receivers which will be operating continuously. The Exhibition Hall leads into a floor-to-ceiling windowed public viewing corridor, known as the RCA Hall of Color, overlooking the new color studio.

NBC on "Operation Deepfreeze"

THE National Broadcasting Company has scored one international "news beat" after another on the current American expedition to the Antarctic. The NBC News Department provided the first photographs of the expedition, the first tape recordings and the first motion picture film, both in color and in black-and-white.

These exclusive reports have been the work of William B. Hartigan, NBC correspondent-cameraman who accompanied Admiral Richard E. Byrd on his latest tour of exploration to the South Pole. The expedition, which the United States Navy calls "Operation Deepfreeze," represents the first major phase of American participation in the International Geophysical Year.

Hartigan's reports have covered every aspect of the expedition from the jumping-off point in New Zealand through the ice-breaking work of the *U.S.S. Glacier,* the arrival at McMurdo Air Base, a rescue of a group whose plane had crashed, a dramatic flight over the geographical South Pole, and the landing of four large Navy planes on an ice runway in McMurdo Bay after an historic, non-stop 2,550-mile flight from New Zealand.

Hartigan's filmed reports have appeared on NBC-TV's "News Caravan," "Today," and other shows. His tape recordings have been broadcast on such programs as NBC Radio's "News of the World," and WRCA's "11th Hour News." Still photos made from his film clips were the first of the expedition to be provided to the newspapers and wire services.

Films Used in NBC-TV Documentary

Hartigan's exclusive film was also used in NBC-TV's full-hour, all-color documentary program entitled "Antarctica: Third World." The program pointed up the long-range significance of the fact that the Antarctic, unlike the "Old World" of Europe, or the "New World" of North and South America, is largely unexplored.

The program showed the human story underlying the scientific effort to tame a continent. The camera recorded the struggle of men working, traveling, and living under severe Antarctic conditions.

Some of the most memorable footage of "Antarctica: Third World" was shot by Hartigan when he joined two New Zealanders on a 112-mile hike along the McMurdo shoreline, dragging behind them two sleds with 700 pounds of gear. During the hike, Hartigan injured his knee so severely that he was forced to stay behind while the other two went ahead for help.

Turning the camera on himself, he recorded his lonely vigil in the icy wastes. When his companions became overdue, he speculated aloud, sound-on-film, as to whether they might have met with an accident and

Photos on these pages are taken from film record of NBC's William B. Hartigan. This shows *U.S.S. Glacier* off Antarctic coast.

Rescue of crew of this reconnaissance plane which crashed in Antarctic waste was filmed by Hartigan. Two men were hurt in crash.

Aboard the *U.S.S. Edisto*, Hartigan films the Antarctic shoreline and himself, as he narrates commentary for NBC telecast.

might never return. He recalled that earlier on the same hike, the other two had slipped into an ice crevasse and only his own solidly-placed pick-axe had saved them all.

A Second Brush with Death

Hartigan was rescued, but long afterward he had another brush with the hazards of the Antarctic. When nine Navy men were stranded on Ridley Beach, he boarded a helicopter sent out to pick them up. But the rescue plane itself became hopelessly bogged down when it landed, stranding Hartigan and the pilot with the others. All eleven were rescued only after a long and perilous struggle through the surf on a life raft.

The objective of the present Antarctic expedition is to select sites for bases, air strips and supply depots which will be used for exploration in the International Geophysical Year, which begins officially in July, 1957.

Davidson Taylor, NBC Vice-President in charge of Public Affairs, has declared that the network will keep abreast of future developments of the I.G.Y. and report on them as they occur.

"The I.G.Y. is a cooperative effort of the private scientific societies of all the major nations of the world," Mr. Taylor said, "including the U.S.S.R. and Red China, as well as the U. S. and the other great nations of the free world."

"There are some scientists who believe that the results of these investigations may constitute the most important contribution to human knowledge ever to result from a single scientific project.

"Evaluations and other ramifications of the International Geophysical Year will continue for several years beyond 1958.

"It is our determination here at NBC that we shall continue to report on the network all significant developments, as they occur and for as long as they continue to occur."

Encouraging UHF Television

(Continued from page 18)

interest. The stature of television today has been built upon the twelve VHF channels and only a partial use of the 70 UHF channels. Television needs more than twelve VHF channels in order to fulfill its promise. The UHF channels were provided to meet this need. We must work, therefore, toward solutions of the UHF growth problems which have appeared in order that television may come to fulfillment."

Earlier, a major technical achievement bearing on the improvement of UHF-TV broadcast equipment and techniques was announced at the Lancaster, Pa., plant of the RCA Tube Division. On February 16, an electron tube constructed of machined metal and ceramics, with the general size and shape of two flat-brimmed straw hats placed brim-to-brim, enabled RCA engineers to set an all-time record in UHF transmission.

The developmental super-power tube was combined in an experiment with an RCA super-power antenna to radiate 4,500,000 watts of continuous wave energy at a frequency of 537 megacycles — more than four times the output of the most powerful existing UHF-TV stations. Success of the test, according to W. W. Watts, Executive Vice-President, RCA Electronic Components, makes possible extended and improved TV broadcast service throughout the present so-called fringe or weak areas.

The 4,500,000 watts of radiated power produced at Lancaster were obtained by feeding approximately 100,000 watts, generated by the electron tube, into the antenna, which had a gain of nearly 50.

Appearing before the same Committee on March 28, Joseph V. Heffernan, Financial Vice-President of NBC, testified on allocation considerations as related to broadcasting:

"If our generation fails to lay a broad foundation for UHF service in the 70 channels reserved for that purpose," said Mr. Heffernan, "then other communication services will move in and make use of that part of the spectrum. If this happens, this spectrum space will forever be lost to broadcasting and no other band of frequencies anywhere near as well suited for television is available. The issue, simply stated, is shall the 70 UHF channels continue to be available to broadcasting or shall they be lost to other radio services?"

RCA's New Portable Radios

SIX NEW portable radios, operating on either batteries or AC-DC power and featuring non-breakable "Impac" cases and a rotating antenna which eliminates the need for shifting the set around for best reception, have been introduced by RCA for the 1956 market.

The new line was announced by James M. Toney, Vice-President and General Manager, RCA Victor Radio and "Victrola" Division, who pointed out that 29 per cent of all radios purchased last year by the public were portables — an indication that "more and more persons are realizing that the portable is the ideal all-purpose radio."

The price range of the new sets, as advertised nationally, runs from $29.95 to $139.95, said Mr. Toney, adding that the lowest-priced model this year will retail for $5 less than last year's similar three-way model packaged in the non-breakable "Impac" plastic case. The portable line also includes, in addition to the six new models, RCA Victor's two transistorized portable sets which were announced last fall.

A new portable in the 1956 line is one incorporating a marine band as well as the standard broadcast band. Four of the new models feature the RCA Victor "Wavefinder" rotating directional rod ferrite antenna mounted on the top of the set, as well as extra-powerful circuits using 90-volt batteries.

The Six Models

The six models, and their main features, are described briefly below together with their nationally advertised prices. Each is equipped with the "Impac" nonbreakable case, and the tube total in each instance includes rectifier.

— The Shipmate, a five-tube chassis with enclosed ferrite core antenna. ($29.95).

— The Midshipman, a five-tube chassis with the "Wavefinder" antenna and extra-powerful circuit. ($34.95).

— The Wanderlust, a five-tube chassis with "Wavefinder" antenna, and incorporating a polished aluminum front and vernier tuning for precise station selection, as well as extra-powerful circuit. ($39.95).

— The New "Globe Trotter", a six-tube chassis, equipped with slide-rule vernier tuning with rubber-mounted 3-gang condenser, which provides tuned radio frequency amplification for stations in weak signal areas, and extra-powerful circuit. ($49.95).

— The New Yachtsman, a six-tube chassis with slide-rule dial and vernier tuning, two-band equipment for long-distance reception on either the marine or the standard broadcast band, plus extra-powerful circuit. ($69.95).

— The Strato-World II, a six-tube chassis and 7-band operation, including International Short-Wave Bands, two domestic short-wave bands and one standard AM band. Other features include a pull-up 48-inch telescopic antenna for short-wave broadcast, and "Magic Loop" and "Signal Finder" antennas for difficult reception as encountered in trains and buses. ($139.95).

All of the portables include the "Golden Throat" Tone System, an exacting balance of amplifier, speaker and cabinet, supersensitive permanent-magnet speakers and automatic volume control to maintain uniform volume for weak and strong stations.

In addition to the new line of portable radios, Mr. Toney announced introduction of a new twin-speaker "Victrola" portable phonograph — a single-play, 3-speed player nationally advertised at $39.95.

One of the six new RCA portable radios for 1956 is the "Wanderlust," shown here — equipped with "Wavefinder" rotating antenna.

Medical Color TV on Wheels

COLOR television for medical use has now been put on wheels by RCA to permit closed-circuit telecasting of surgical and clinical demonstrations from practically any hospital in the country.

This latest development in television aids to medicine is a van carrying three color TV cameras and all necessary control room equipment. The first of its kind to be produced, the unit has been purchased by the Philadelphia pharmaceutical firm of Smith, Kline and French, which has pioneered in closed-circuit color telecasts for medical and surgical meetings throughout the country.

The mobile studio will be operated from parking areas adjacent to hospitals. Its color cameras, placed within a hospital, will send their signals by cable to the unit, from which the telecasts will be transmitted by closed circuit to projector and screen at a medical meeting. Included in the equipment is RCA's 3-Vidicon compatible color camera for medical use, developed by RCA Laboratories and scheduled for installation at the Army's Walter Reed Medical Center in Washington as part of a large-scale RCA color television installation there. With all of the new equipment, which operates on commercial color TV standards, Smith, Kline and French will be able for the first time to originate and transmit medical colorcasts to TV stations for local or network broadcast.

G. F. Roll, Public Relations Director for Smith, Kline & French, signs contract for RCA color TV "studio on wheels," as A. R. Hopkins, Manager, RCA Broadcast and TV Equipment Department, looks on.

Importance of Color TV is Cited

The growing importance of color television as a new service to medicine was emphasized by G. F. Roll, Director of Public Relations for Smith, Kline and French, in an announcement of the purchase from RCA. He pointed out that Smith, Kline and French sponsors an average of 15 programs a year in closed-circuit color TV surgical and medical meetings.

"These colorcasts, presented as a service to the medical profession, highlight latest advances in surgical and clinical techniques and attract a total of 50,000 to 60,000 visitations by surgeons and physicians," he said.

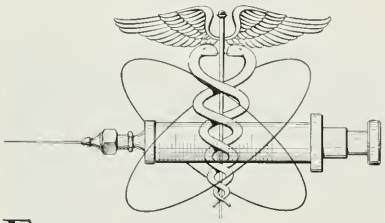
"The availability of standard studio broadcast equipment for closed-circuit colorcasts will enable us to introduce clearer definition and greater color accuracy of picture, and to add appreciably to the value of these S. K. and F. medical demonstrations for medical audiences."

The first of these demonstration broadcasts, according to Mr. Roll, was presented by S. K. and F. in June, 1949, before the convention of the American Medical Association in Atlantic City, N.J. From the pioneer closed-circuit telecast through last December, the company has produced such programs before 79 medical and surgical meetings, with a total of 1,135 clinical presentations and 706 surgical operations, involving nearly 900 hours of programming and attracting about 400,000 visitations by surgeons and doctors, he added.

Why color television for medical demonstrations? Mr. Roll explained it this way:

"We have concentrated on color presentations because the realism which color visualization provides is the essence of the value of the closed-circuit TV medium. In surgery, for example, form and contrast alone are not sufficient to provide a true picture of human tissue, areas of infection, location of vital arteries and veins, or the extent of circulation. The addition of color in such televised presentations, particularly those of broadcast quality, provides the required realism and authenticity. Color TV also gives a sense of third dimension, not obtained in black-and-white pictures, which is invaluable in revealing the extent and depth of lesions and incisions."

New Electronic Techniques for Medicine



ELECTRONIC diagnostic techniques may help the doctor of the future by reporting on the physical condition of a patient and indicating steps that should be taken to treat ailments, according to Dr. V. K. Zworykin, television pioneer and Honorary Vice-President of RCA.

With today's trend toward an era in which everyone may expect detailed medical checkups at frequent intervals, and with new diagnostic techniques bringing an increasing number of tests in each checkup, Dr. Zworykin foresees the likelihood of "an impossible load" on the doctor in interpreting and performing such checkups without assistance that electronics may provide.

These points were made by Dr. Zworykin at the national convention of the Institute of Radio Engineers in New York. His talk was one of 25 technical papers and talks presented by RCA scientists and engineers at the three-day meetings. Among these were five reports which for the first time gave full engineering details of RCA's magnetic tape recorder for television.

Dr. Zworykin, as Chairman of the IRE Professional Group on Medical Electronics, talked of the present and expanding role of electronics in providing help to medical science.

As a possible solution to the difficulty which may face the doctor of the future in handling an expanding and increasingly complicated series of medical checkups, Dr. Zworykin suggested a new electronic development, saying:

"The information provided by the various tests which are made at different times with today's examining techniques might be considerably more meaningful if a whole series of measurements, such as electrocardiogram, temperature, blood pressure, etc., could be recorded simultaneously by a single piece of electronic equipment operated by a technician. In large part the recorded data might be in the form of deviations from a prescribed norm for the age, height and weight of the patient, which could be set on the testing apparatus.

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

A leading electronic contribution to medicine is RCA's electron microscope, shown here in operation at Armed Forces Institute of Pathology, Washington.

Suggests System Based on Computing Techniques

On the basis of known electronic computing techniques, an even more elaborate system might be developed, Dr. Zworykin suggested. He described it this way:

"Looking farther into the future, we can imagine the testing apparatus to feed the information derived from the tests and converted into numerical quantities into an electronic computer, which would have stored in its memory the best medical knowledge of the day. The computer would apply this stored information to

the correlated data obtained from the patient to arrive at a verdict regarding the physical condition of the patient, and, eventually, indicating steps for the correction of malfunctions.

"While such a complete diagnostic device admittedly appears rather remote, it appears less fantastic to imagine an electronic system which would merely indicate whether the patient is or is not in need of further medical attention. Such more modest equipment might prove extremely useful in reducing the case load of the physician."

Dr. Zworykin talked of these future possibilities against a background of increasing reliance by physicians and biologists upon electronics experts to select the techniques and to build and operate the electronic apparatus needed by medical science. Referring to such apparatus used in medicine and biology today, he pointed to the use of black-and-white and color television for instruction and visual consultation over distances, x-ray systems, the electron microscope, the television microscope, infrared and ultrasonic equipment, and an array of measuring devices such as electronic particle counters, radiation meters and electrocardiographs.

RCA Color TV is also being used, as shown here, to transmit views of tissue for pathological examination.

Dr. Engstrom Awarded Medal by Society of Swedish Engineers

DR. E. W. ENGSTROM, Senior Executive Vice-President of RCA, was awarded the John Ericsson Medal by the American Society of Swedish Engineers on February 12 in recognition of "outstanding achievements" in the technical field. The award followed by a few days the announcement of Dr. Engstrom's election as a Foreign Member of the Royal Swedish Academy of Engineering Sciences.

The John Ericsson Medal honors the Swedish-born American inventor and engineer among whose many achievements was design and construction of the "Monitor" of Civil War fame. The medal presentation was made by Dr. E. F. W. Alexanderson, Swedish-born pioneer in radio and electrical engineering, who praised Dr. Engstrom for "ability and creativeness" and for his leadership.

In his remarks of acceptance, Dr. Engstrom spoke of the objectives of scientific and engineering development today, and called for an intensive effort by the United States "to be first and to build an impregnable strength" in intercontinental missiles in order to deter aggression.

Transistor Development by RCA Is Subject of New Book

IMPORTANT technical advances resulting from extensive research and development of transistors by RCA scientists and engineers have been made available publicly for the first time in a comprehensive book, "Transistors I," covering transistor theory, design and use.

Announcing publication of the book, Dr. Irving Wolff, Vice-President, Research, of RCA, called it "a major contribution to the technology of transistors and related semi-conductor devices, which are revolutionizing many aspects of electronics with amazing rapidity."

He explained that RCA's research and development work on semiconductors, transistors, and their applications have been so extensive that "scientific and engineering reports have accumulated in an unprecedented manner." As a result, the book includes many previously unpublished reports which RCA feels to be of major significance in this field.

The 676-page book, published by the *RCA Review*, contains 41 technical papers by RCA scientists and engineers. Of this total, 31 are new papers never before published. "Transistors I" is priced at $4.50 and is available from the *RCA Review*, David Sarnoff Research Center, Princeton, N. J.

Success Story: NBC Television Films

On March 3, 1953, the National Broadcasting Company established the NBC Film Division as a major operating division of the company to handle an increasingly important business in film syndication. Attesting to its lively growth in the ensuing three years, the Division during recent weeks has:

— reported a record sales year for 1955;

— moved to larger quarters on Fifth Avenue in New York;

— appointed a new advertising agency;

— been transferred to the Kagran Corporation, NBC's wholly-owned subsidiary, and taken the new name "NBC Television Films."

The transfer to Kagran, whose activities previously were limited to licensing and merchandising, is described by NBC President Robert W. Sarnoff as a move that "will permit more efficient operation and provide greater flexibility for NBC's syndicated film business."

Having started virtually from scratch three years ago in the face of heavy competition, NBC Television Films now controls 17 successful TV film series, operates two streamlined and self-contained film exchanges, and administers the largest library of stock film footage in the television industry. Domestically, 12 NBC Television Films programs have been sold in more than 100 markets, and 14 programs are sold in the New York market alone.

Sales in 1955 were 20 percent higher than in 1954. The increase is attributed not only to new productions, which were quickly and profitably distributed through a series of major regional sales, but also to continued brisk activity in such perennial best sellers as *Dangerous Assignment, Badge 714, Life of Riley, Victory at Sea,* and *Hopalong Cassidy.*

The new productions commissioned in 1955 included three TV film series of 39 half-hour episodes each: *Steve Donovan, Western Marshal,* starring Douglas Kennedy and Eddy Waller, filmed in Hollywood by Vi-Bar Productions; *The Great Gildersleeve,* starring Willard Waterman, produced by Matthew Rapf at the Hal Roach Studios in Hollywood; and *Crunch and Des,* based on Philip Wylie's popular series of *Saturday Evening Post* stories, starring Forrest Tucker and filmed in Bermuda by Bermuda Productions, Ltd., and RKO-Pathe, Inc.

Sales abroad were significant both in the light of today's revenue and in the creation of a good atmosphere for future sales to countries with rapidly growing television audiences. *Inner Sanctum* and the half-hour *Hopalong Cassidy* series were sold to Associated Rediffusion, Ltd., and *Roy Rogers* to Associated Television for showing on British commercial TV — and are reported immediately to have won favor with the British TV audience. *The Visitor* and *Life of Riley* were sold to the BBC. Through its Australian representatives, Amalgamated Wireless (Australasia) Ltd., NBC Television Films sold seven programs in Sydney and Melbourne for broadcast next fall.

The NBC Film Library, which now includes about 21 million feet of cross-indexed and catalogued film, plus 14 million feet of March of Time library stock, received and processed in 1955 nearly 1,000,000 feet of 16-mm and more than 700,000 feet of 35-mm news film, amounting to some 800 hours of film.

Miles of film — a typical storage aisle in the NBC Television Film Library.

Quotes from RCA

Robert A. Seidel, Executive Vice-President, RCA Consumer Products, to the National Retail Dry Goods Association, New York, January 11, 1956.

The Impact of Color TV:

"Why all the excitement, you may ask, if only 50,000 color sets are presently in American homes? Well, in all, nearly 40 million TV receivers are in use—and thanks to compatible color, which RCA pioneered and developed, black-and-white receivers do not go blind when color is on the air. All sets receive color pictures in black-and-white. But experience, backed by cold figures, proves that when a show is colorcast the number of people who view it, whether in color or black-and-white, is greater than if the same program were carried in black-and-white. . . . Color is exciting — and there is a ready market for color sets: many millions are waiting for the opportunity to see color shows."

Sylvester L. Weaver, Jr., Chairman of the Board, NBC, to National Appliance and Radio-Television Dealers' Association, Chicago, January 16, 1956.

The TV Market:

"If you have the confidence in the schedule and the programming that we have as broadcasters, you would not worry about black-and-white sales falling apart—because what we are offering the people is so good that those who will not be able to afford a color set in the next year or two will still buy the new large-screen, low-cost black-and-white sets that you have available to them."

Emanuel Sacks, Staff Vice-President, RCA and NBC, to the Philadelphia Club of Printing House Craftsmen, Philadelphia, March 10, 1956.

Responsibility in Entertainment:

"The field of entertainment differs in one respect from all others. That is in its wide exposure. There is no need to explain the impact of television. It has provided entertainment, education and public affairs with wings and now, with the inception of color television, its message is conveyed in breath-taking beauty. We are aware of this influence — and we are also aware of the responsibility that goes with it. . . . By constantly striving to improve the quality of programs and by giving to the American people the best that our ingenuity can provide, we may feel that satisfaction of having performed our function well. . . ."

Dr. Douglas H. Ewing, Vice-President, RCA Laboratories, at Drake University Executive Development Series, Des Moines, Ia., February 16, 1956.

Research is Vital:

"We are engaged today in technological competition with a determined and powerful opponent who would destroy the individual initiative which has been the source of our technology and our prosperity. Even without such competition, we would depend for our future welfare and prosperity upon the willingness of American management to become fully research-minded, to carry an increasing responsibility for research, and to apply its results to production methods and products on the broadest scale. In the face of such competition, the ability of management to meet this challenge becomes a matter of our very survival as a free society."

Charles P. Baxter, Vice-President and General Manager, RCA Victor Television Division, to press representatives at RCA plant, Bloomington, Ind., February 1, 1956.

Promoting Color:

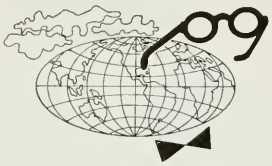
"We are doing everything possible to speed the nationwide growth of color television. An indication of these efforts is reflected in the recent action by the RCA Service Company in reducing costs of color TV service contracts. These cost reductions mirror the fact that every day more and more people are buying big color TV sets and that the demand will increase by leaps and bounds during the weeks and months ahead."

Dr. V. K. Zworykin, Honorary, Vice-President, RCA, at opening of 1956 Career and Job Show, New York, March 23, 1956.

Enjoyment with Opportunity:

"The fields of science and engineering possess the essential ingredients which account for happiness in work for a young person with an inquisitive mind. They teach him to ask questions and supply him with tools to obtain answers. They give him a feeling of mastery over the forces of nature beyond that enjoyed by his fellows. They provide the satisfaction of adding to the storehouse of human knowledge and contributing to human welfare."

RCA news in brief



Now It's History . . .

The first year of "Wide Wide World," the adventurous NBC program, has been recorded on 38 reels of film and placed in the reference department of the Library of Congress in Washington as an authentic history of contemporary life. According to the NBC announcement, this is the first such assemblage of an entire series of live shows to be admitted by the Library. The collection was presented on March 4 to L. Quincy Mumford, Librarian of Congress, by Davidson Taylor, NBC Vice-President in Charge of Public Affairs, and Sherrod E. Skinner, Vice-President with the sponsoring General Motors Corporation. Said a spokesman for the Library, the collection is "a valuable documentary —a two dimensional record of these times that will be of great value to scholars of the future."

Get Your Copy Now . . .

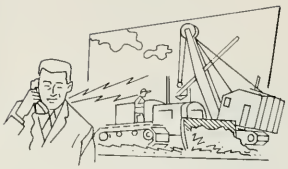
The RCA Tube Division is publishing again. This time it's a 24-page catalog, "RCA Photosensitive Devices and Cathode-Ray Tubes." The contents are technical data on 45 types of phototubes, six types of TV camera tubes, and 56 types of cathode-ray tubes, together with tabular data and a socket-connection diagram of each tube type. You can get your copy for 20 cents from RCA Tube distributors or from Commercial Engineering, RCA Tube Division, Harrison, N. J.

Record Economy . . .

A novel coupon plan which enables customers to obtain free three $3.98 records in the course of a year and to buy up to 24 additional $3.98 records at $2.98 each has been inaugurated by the RCA Victor Record Division. It works this way: the customer buys his coupon book from the record dealer for $3.98, then chooses free any classical or popular $3.98 album in the dealer's stock, for which he turns in the first of the 27 coupons. Each month for the next year he is notified of the advance release of two albums, and he can buy one at the dealer's for a coupon and $2.98 each. In July and October, the customer can obtain free two more $3.98 albums by presenting the special coupons to the dealer. The total saving on record purchases through the year adds up to $31.96.

Clinic for Brewers . . .

Emissaries of ten of the major brewing companies spent three days at Camden recently for a briefing and demonstration of RCA's latest equipment and techniques for electronic inspection of beer, ale and other bottled beverages. The objective was to acquaint users and purchasers of the RCA inspection machines with advanced methods for obtaining maximum speed and efficiency at the inspection stage on the production line. The RCA-developed "inspector" looks over 150 bottles a minute with its electronic eye.



Calling All Fork-Lifts . . .

Now you can talk by radio with the operators of your fork lifts, straddle trucks, towing tractors, yard cranes and other materials-handling vehicles. RCA has introduced a new two-way radio system which can be used interchangeably, without conversion devices, in electric materials-handling vehicles operating with 24-, 32-, or 36-volt batteries. The new equipment features built-in voltage-conversion facilities which promise more economical radio operation and extended battery life. Conversion from 24- to 32-volt operation involves only the interchange of two plugs, while a jump from 32 to 36 volts requires only rotation of the radio's vibrator.

Westward Ho . . .

It's out to Los Angeles for RCA's commercial aviation sales department. In a move to speed and facilitate customer service, all sales activities for the RCA line of custom aviation equipment for commercial and private aircraft have been transplanted from Camden, N. J., to 11819 Olympic Boulevard, Los Angeles, in RCA's manufacturing plant for electronic aviation equipment. David H. Robinson, Manager, RCA Custom Aviation Equipment, explains that the relocation is intended to provide proximity with engineering and manufacturing facilities and to enable customers to obtain design, manufacturing, and sales assistance at a single establishment. A prominent item handled by the department is RCA's "weather eye" radar which enables pilots to detect storms lying as much as 150 miles ahead.

You always get more for your money with RCA VICTOR TV

whether you spend $199.95

"HIDDEN PANEL" TUNING. Dials are concealed. You tune standing up! New "All-Clear" picture with RCA "Silverama" aluminized picture tube. Balanced Fidelity Sound. Mahogany grained finish or limed oak grained finish. The *Towne Special 21** (21S6055). Stand, opt., extra.

or $269.95

STAR PERFORMER. High-priced performance and high-style cabinetry at moderate cost. "4-Plus" performance brings you extra brightness, extra contrast, extra steadiness. Mahogany grained finish. As shown in limed oak grained finish, $279.95. The *Gladstone 21** (21T635).

*Full 261 square inches of viewable picture.

or $329.95

LUXURY TV. A console masterpiece! Twin speakers. Illuminated "Front-Window" VHF channel indicator. "Magic Monitor" Deluxe chassis delivers best picture possible even in difficult reception areas. Luxurious mahogany grained finish. The *Allison 21 Deluxe** (21D645).

At your service! RCA Factory Service, assuring you of expert installation and maintenance, is available in most TV areas—but only to RCA Victor TV owners.

Manufacturer's nationally advertised VHF list prices shown, subject to change. Slightly higher in far West and South. UHF optional, extra. • See Milton Berle, Martha Raye on NBC-TV alternately, 2 out of every 3 Tuesdays. See NBC-TV's spectacular "Producers' Showcase" in RCA Compatible Color or Black-and-White, March 5.

RCA VICTOR
Trade ® RADIO CORPORATION OF AMERICA

EVERY YEAR MORE PEOPLE BUY RCA VICTOR THAN ANY OTHER TELEVISION

At a noted New York hospital, new RCA color camera telecasts an operation.

Now RCA color TV helps doctors of tomorrow give you better surgical care

With the new, compact RCA color TV system developed specifically for medical use, students in other parts of the hospital can now see vivid close-ups of operations on standard color receivers. They can study enlargements of pathological slides that often determine the course of surgery. And what they learn today, of course, will help them to give you better care tomorrow.

Here is another milestone in electronics from RCA. And continually, RCA scientists at the David Sarnoff Research Center, Princeton, N. J., search for new horizons of "Electronics for Living"—that make life easier, safer, happier.

RADIO CORPORATION OF AMERICA
Electronics for Living

In other parts of hospital medical students see close-ups of operation on Big Color RCA Victor TV. Shown above: "Director 21" model.

Fight Cancer with a Checkup . . . and a Check.