

**ALL-ELECTRONIC COLOR TELEVISION  
CREATED BY RCA**

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*Statements by:*

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Radio Corporation of America*

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*NILES TRAMMELL, President  
National Broadcasting Company, Inc.*

Issued at First Public Demonstration of All-electronic Color Television,  
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Each of the three transmitted images—red, blue and green—is of the same number of lines, that is, 525; also the same horizontal scanning rate and the same picture repetition rate of 30 pictures a second as in present commercial television broadcasting.

The receiving set is equipped with three 3-inch kinescopes, which separately received the signals representing red, blue and green. This trio of kinescopes is called a Trinoscope. From it the three color images are optically projected into a brilliant composite picture which appears on a 15 x 20-inch screen in natural color, free from any flicker, color fringes or break-up of color.

By this new advance in television, *simultaneous* color transmission, instead of *sequential* transmission, color by color, is achieved.

#### **Converter Overcomes Obsolescence**

Since the electrical characteristics and all of the standards of the green image—including the synchronizing pulses—are identical to those of the present black-and-white standards, any broadcasts from color stations using the electronic simultaneous system can be received clearly on black-and-white receivers by the addition of the easily installed radio-frequency converter. No modifications whatever are required inside the set.

This converter will enable present-day television sets to receive color programs and reproduce them in black-and-white, even when transmitted on ultra-high frequencies. Thus, existing receivers will not be made obsolete by the introduction of color at some future date. On the contrary, their usefulness will be extended. For example, if a football game is broadcast by a color transmitter, the owner of a black-and-white receiver can see it in black-and-white. Even one of the first television sets introduced by RCA at the time of the World's Fair in 1939 can be adapted to tune-in the electronic color pictures in black-and-white.

Likewise, it will be possible for electronic color television sets to receive the broadcasts of black-and-white stations.

Furthermore, when electronic color television is established as a broadcasting service, the black-and-white receivers will be able to reproduce the color broadcasts in monochrome. Engineers explained that this cannot be done with any known system of mechanical color.

Officials of RCA pointed out that a station owner can begin with a black-and-white broadcast service. He may operate a monochrome transmitter on low frequencies and also an electronic color transmitter on ultra-high frequencies using the signal of the color camera to operate both transmitters. With such a dual arrangement, the problem of obsolescence for the broadcaster as well as the viewer is reduced to a minimum. In fact, the broadcaster would thereby be able to render service in both black-and-white and color from the same station.



## REALIZATION OF A PRINCIPLE

Brig. General David Sarnoff, President of Radio Corporation of America, in commenting upon the development said:

"The realization of this universal system of television, which transmits and receives both color and black-and-white pictures with equal quality, is as far-reaching as was the creation of an all-electronic television system which supplanted the mechanical discs used in black-and-white television when it first began. The realization of all-electronic color is as significant in television as electronic recording was over mechanical recording on phonograph records, or the present color movies over the early mechanical color on the screen.

"It is with great pride and satisfaction that I congratulate the men who have created all-electronic color television in our Laboratories," said General Sarnoff. "They have enabled RCA, the creator of all-electronic black-and-white television, also to create all-electronic color television which has been the dream of radio scientists from the beginning.

"The new RCA electronic color television system will be available to the entire radio industry. The development is so important in contributing to television leadership for our country that we have decided to demonstrate it publicly as apparatus becomes available for each successive step. We begin with the current demonstration in which still pictures are used, but which sufficiently establishes the basic principle; it will be followed by the transmission and reception of color pictures in motion, then outdoor scenes and finally electronic color television on large-size theatre screens."

## TIMETABLE FOR FUTURE DEMONSTRATIONS

Dr. C. B. Jolliffe, Executive Vice President in Charge of the RCA Laboratories Division, declared that this development in television, which establishes an all-electronic system of color transmission and reception, takes the issue of color television out of the range of controversy. All-electronic television, he said, is far superior to any mechanical system of color with its rotating discs and other well-known limitations.

“The problem is no longer how to transmit and receive color pictures by an all-electronic method, because the basic principles have now been solved,” said Dr. Jolliffe. “The problem that still challenges is how to operate television broadcasting as a steady and regular service to the public on the higher frequencies, whether in black-and-white or in color. To open the high-frequency spectrum and to make it commercially useful will require propagation studies under broadcasting conditions, development of new circuits, new tubes and new cameras, all of which must be field-tested before commercial standards can be recommended by the industry for approval by the Federal Communications Commission.

“Although we have solved the all-electronic color television problem, it will require a number of years to establish color television as a service to the public,” said Dr. Jolliffe. “What we have done today is to demonstrate the realization of the principle of simultaneous electronic color television. The apparatus used in the demonstration is purely experimental as developed in the Laboratories. It is not commercial equipment, but it reveals that the Amer-

ican people will be assured of the finest color television instruments in the future as they now have in all-electronic black-and-white television.

“Let me emphasize that the most important fact to remember in regard to color television is that any commercial system, whether it be mechanical or electronic, depends upon the ultra-high frequency spectrum in which the necessary band width for color exists. No matter how far the development of the principle and the apparatus has gone forward, there must yet be complete exploration and tests in the field of the behavior and limitations of ultra-high frequencies. We expect to complete our development of electronic color television apparatus before the ultra-high frequency spectrum is made ready for its use in a commercial way.

“This demonstration, therefore, does not change the time period estimated by us in December, 1945, that it would require five years to bring a color system to the present position of black-and-white television.

“We will move along rapidly in this development, but no matter how many years pass before the ultra-high frequency spectrum is harnessed for commercial color television service, no one need fear that the black-and-white television set of today is destined for quick obsolescence. The inexpensive converter takes care of the problem. In the meantime, the development of both black-and-white and color television will continue to advance, and eventually will increase the service to the public.

“We have demonstrated a principle that now enables us to go forward with a timetable which is not based on a scientific theory but on the required engineering of equipment,” said Dr. Jolliffe. “The system already has been perfected to a point where we now could show motion picture films or outdoor scenes in electronic color, except that we have not had the time necessary to build the essential equipment.”



## NBC COLOR TELEVISION PLANS

Niles Trammell, President of the National Broadcasting Company said that as a broadcaster, he was delighted with the news that an all-electronic color television system had been achieved at RCA Laboratories.

"We are mindful, as the scientists at the Laboratories have pointed out," said Mr. Trammell, "that new apparatus must be built and field-tested before color television can be brought to the home in a state of practicability to serve the public. In this task our engineers with their practical knowledge of broadcasting, will cooperate in every way with the scientists. We will include the new RCA electronic color system in our plans to establish nation-wide television, for this practical color system can be fitted into an expanding service."



*New York Journal of Commerce*

“A revolutionary development in radio science. . . . Demonstration shows that all-electronic color television is practical.”

*New York World Telegram*

“Flickerless, all-electronic color television dispensing with rotating discs and other moving parts was demonstrated publicly for the first time by Radio Corporation of America. . . . The demonstration proved that color television can be practical without driving black-and-white television receivers into obsolescence.”

*Radio Daily*

“An all-electronic color television system was demonstrated publicly for the first time in history at RCA Laboratories. . . . The demonstration was for the purpose of proving that the new development in radio science was flickerless and practical without use of rotating discs or any other moving parts.”

*The New York Times*

“A revolutionary advance in television. . . . Technically, it supplants the 20-year-old mechanical system of transmitting each color separately—first red, then blue and finally green with the persistence of human vision blending the separate hues into the composite picture. . . . As seen here today on a receiver with a screen 15 x 20 inches, the RCA images were virtually free of flicker and of good brilliance.”

*The Sun*

“The new RCA electronic color television system will be available to the entire radio industry. . . . It (this demonstration) will be followed by the transmission and reception of color pictures in motion, then outdoor scenes, then finally electronic color television on large-size theater screens.”

## PRESS REPORTS ON DEMONSTRATION OF RCA ALL-ELECTRONIC COLOR TELEVISION

*Newspaper and magazine writers were invited to witness the first public showing of the all-electronic color television system created by RCA. Excerpts from some of their reports follow:*

### *Motion Picture Daily*

"A complete departure from mechanical color. . . . By this new advance in television, simultaneous color transmission instead of sequential transmission, color by color, is achieved. . . . Existing television receivers will not be made obsolete by the introduction of color."

### *New York Daily News*

"A revolutionary innovation. . . . Existing black-and-white television receivers need not become obsolete when electronic color takes the air. . . . A simple inexpensive radio-frequency converter makes it possible for the black-and-white set to pick up color programs and reproduce them in monochrome. Furthermore, it will be possible for electronic color television sets to receive the broadcasts of black-and-white stations. . . . Thus that bugaboo of television set owners—obsolescence—has been solved at last!"

### *New York Herald Tribune*

"A major advantage lies in the fact that television receivers bought today will not become obsolete if this color system is adopted. They can be cheaply converted to the proper wavelength, and by using only one of the three channels, will produce black-and-white television with all the accustomed clarity and fidelity. . . . In the Princeton studios the color images were satisfactory."

*The Wall Street Journal*

“Television, up to now, has depended upon a mechanical rotating filter to obtain its color. RCA’s new system does away with the rotating filter, using instead a combination of electronic tube, mirror and photo-electric cells to obtain natural shades. . . . The color quality of the images left nothing to be desired.”

*United Press*

“Both images and colors were sharply defined. . . . Pastels appeared as faithfully as if the pictures had been projected on a screen with a lantern slide. . . . Brigadier General David Sarnoff, President of Radio Corporation of America, said the demonstration was intended to show, shortly after its birth, one of the greatest developments in radio history.”



## RCA-NBC FIRSTS IN TELEVISION

- 1923—Dr. V. K. Zworykin, now Director of the Electronic Research Laboratory, RCA Laboratories Division, applied for patent on the iconoscope, television's electronic "eye." (December 29).
- 1929—Dr. V. K. Zworykin demonstrated an all-electronic television receiver using the kinescope, or screen tube, which he developed. (November 18).
- 1930—Television on 6 x 8-foot screen was shown by RCA at RKO-Proctor's 58th Street Theater, New York. (January 16).
- 1930—NBC began operating W2XBS, pioneer experimental television station in New York. (July 30).
- 1931—Empire State Building, world's loftiest skyscraper, was selected as site for RCA-NBC television transmitter.
- 1932—RCA initiated field tests with 120-line, all-electronic television. (May 25).
- 1936—Television outdoor pickups demonstrated by RCA at Camden, N. J., on 6-meter wave across distance of a mile. (April 24).
- 1937—RCA announced development of electron projection "gun" making possible television pictures on 8 x 10-foot screen. (May 12).
- 1937—Mobile television vans operated by RCA-NBC appeared on New York streets for first time. (December 12).
- 1938—Scenes from Broadway play "Susan and God," starring Gertrude Lawrence, telecast from NBC studios in RCA Building. (June 7).

- 1939—RCA and NBC introduced television as a service to the public at opening ceremonies of New York World's Fair, featuring President Roosevelt as first Chief Executive to be seen by television. (April 30).
- 1939—Improved television "eye" known as the "Orthicon" was introduced by RCA. (June 7).
- 1939—Major league baseball was telecast for the first time by NBC, covering a game between the Brooklyn Dodgers and Cincinnati Reds at Ebbets Field. (August 26).
- 1939—First college football game—Fordham vs. Waynesburg—televised by NBC in New York. (September 30).
- 1939—RCA television receiver in plane over Washington picked up telecast from NBC station in New York, 200 miles away. (October 17).
- 1940—RCA demonstrated to the FCC, at Camden, N. J., a television receiver producing images in color by electronic and optical means employing no moving mechanism. (February 6).
- 1940—New York televised from the air for the first time by a plane equipped with RCA portable television transmitter. (March 6).
- 1940—Television pictures on 4½ x 6-foot screen demonstrated by RCA at annual stockholders meeting in Radio City. (May 7).
- 1940—Coaxial cable used for first time in televising program service by NBC in televising Republican National Convention at Philadelphia and transmitting scenes over New York station. (June 24).
- 1941—Demonstrating television progress to the FCC, RCA exhibited the projection-type home television receiver featuring a screen 13½ x 18 inches.—Televi-

sion pictures including a prizefight from Madison Square Garden and a baseball game at Ebbets Field, Brooklyn, were projected on a 15 x 20-foot screen in the New Yorker Theatre.—Scenes at Camp Upton, Long Island, were automatically relayed by radio to New York establishing a record as the first remote pick-ups handled by radio relay stations. (January 24).

1941—Color television pictures in motion were put on the air by NBC in the first telecast in color by mechanical means from a television studio. (February 20).

1941—RCA-NBC made successful tests with first projection-type color television receiver using mechanical methods. (May 1).

1941—NBC's television station WNBT became the first commercially licensed transmitter to go on the air. (July 1).

1942—First mass education by television was initiated by RCA-NBC in training thousands of air-raid wardens in the New York area. (January 23).

1943—NBC televised major sports and other events at Madison Square Garden for wounded servicemen in television-equipped hospitals in the New York area. (October 25).

1944—NBC announced plans for nation-wide television network to be completed possibly by 1950. (March 1).

1945—RCA demonstrated projection-type television home receiver featuring screen approximately 18 x 24 inches. (March 15).

1945—Films of Japanese signing surrender documents on board *USS Missouri* were telecast by NBC station WNBT, New York. (September 9).

- 1945—RCA Image Orthicon tube of supersensitivity was introduced as solution to major problems in illumination of television programs and outdoor pickups. (October 25).
- 1945—NBC's expanding television program service included these outstanding events: President Truman at Navy Day exercises in New York; coverage of the New York Herald Tribune Forum, and climaxing record coverage of the year's major sports events by televising the Army-Navy football game, professional football games and college contests.
- 1945—Greatly improved black-and-white television pictures and color television in three dimensions featuring live talent were demonstrated by RCA at Princeton, N. J. The color system was mechanical; the black-and-white all-electronic. (December 13).
- 1946—Airborne television as developed during the war by RCA and NBC in cooperation with U. S. Navy, U. S. Army Air Forces and the National Defense Research Council was demonstrated at Anacostia Navy Air Station. (March 21).
- 1946—First world's heavyweight championship fight to be seen on television featured Louis-Conn at Yankee Stadium, New York, televised by NBC and transmitted to Washington, D. C., via coaxial cable. (June 19).
- 1946—Post-war television receivers introduced by RCA Victor Division. (Sept. 17).
- 1946—Color television pictures on 15 x 20-inch screen produced by all-electronic means were demonstrated publicly for the first time by Radio Corporation of America at RCA Laboratories, Princeton, N. J. A simple radio frequency converter was announced that enables black-and-white receivers to reproduce



in monochrome the programs of color television stations operating on high frequencies. The converter also enables all-electronic color receivers to receive the programs of low or high frequency black-and-white transmitters. This will make it possible to introduce all-electronic color without causing obsolescence of black-and-white television receivers. (October 30).



