R. C. A. Shows All-Electronic Tube As Key to Color Television in Home

By T. R. KENNEDY Jr.

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WASHINGTON, March 29—A new all-electronic three-color television picture tube, proclaimed as the "key" to future practical reception in homes of color television, was demonstrated publicly here today for the first time by engineers of the Radio Corporation of America.

Performance of the tube in the demonstration was described by the R. C. A. as showing beyond doubt that the only missing link to general use of color television had been discovered and developed.

A program in natural color transmitted from the Wardman Park Hotel over WABW on Channel 4 was intercepted over three direct-view television receivers installed for the occasion in the National Broadcasting Company studios in the Trans Lux Building.

One of the receivers, a standard black and white image set, reproduced the color program in black and white. The two other sets, incorporating the new color tubes, received the same program in color.

This was said to demonstrate the complete "compatibility" of the new color system on present-day video channels "without danger of obsolescence" of equipment now in use in sending stations and some 5,000,000 receivers in homes. These receivers would be able to get color programs in black and white, R. C. A. stated.

Following the fifteen-minute color program, which was received in black and white by many Washingtonians over regular image sets without their knowing it came from a color studio pick-up, Brig. Gen. David Sarnoff, chairman of the R. C. A. board, acclaimed the system as "miraculous, both from the scientific and artistic standpoints."

Declaring the tube was "an outstanding development of our time" and pointing to practical all-elec-

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tronic color on the air, he continued:

"We are on the threshold of a new era in television—the era of color. We can see ahead to the commercial development of practical and simplified color receivers. Our generation is assured of clear and natural color television programs."

Dr. Elmer W. Engstrom, and others of the R. C. A. laboratories, described the tubes on which the color system works and called the feature of complete compatibility a "major engineering triumph"—one on which the television industry "can go forward in the future on present-day channels without fear of stalemate."

Those who own or plan to buy present black-and-white receivers "need have no fear," Dr. Engstrom said, "that their sets will be made obsolete by the widespread adoption and use of the new color tube." He explained that compatibility meant that both transmitter and receiver could "operate in complete harmony" with existing black and white television.

To see programs in color, however, present sets obviously must be adapted to use the new color tubes, or a new receiver initially designed to operate with the system must be used, he added.

Dr. Engstrom emphasized that the color system at present operated on the full standard of 525-lines, the same as is standard for black-and-white images.

The program shown in the demonstration was one of singers and dancers in colorful costumes. It was apparent to the group of fifty-odd newspaper men and others who were guests of the R. C. A. that full or nearly full 525-line definition was being achieved. The color images, however, although more or less of excellent color quality, seemed difficult to focus in the sending studio.

Dr. Engstrom explained later that focusing was not the difficulty but that it could be blamed on the little inequalities of adjustment within the handmade tubes which will be corrected in time.

General Sarnoff said that R. C. A. would not want to keep the three-color tube for its exclusive use, but would seek to make it available to the industry as soon as possible.

Inquiry as to the eventual cost of receivers using the system evoked from Dr. Engstrom and others that it might be "twenty to twenty-five per cent more than comparable black-and-white sets."

The two receivers employing the three-color tube were about the same size as ordinary current standard black-and-white image models.

The color show will be staged again tomorrow for representatives of the industry, and on April 6 for the Federal Communications Commission.

Two types of the new color tubes were shown. One employs a single electron "gun" to "paint" the pictures. The other employs three separate electron guns, each one "geared" magnetically to actuate each of the three primary colors on the tube's face and blend them into a clear likeness of the original scene.

In each tube the single or triple guns that spray electrons on the sensitized end of the viewing tube are made progressively to activate fluorescent materials representing the three primary colors—red, green and blue. The information on how to do this is transmitted as part of the signal from the sending station.

In other words, a key code sent out as part of the color information tells the color tube in the receiver what to do, and when. Inside each color tube a multiplicity of dots of phosphor [a substance that emits light when excited by radiation] representative of the primary colors are arranged in microscopic groups of three. The total number of color groups presently employed on each tube's inside face number about 351,000, or 117,000 for each color.

Behind the tube's face is a metallic "masking screen" containing 117,000 minute holes of about the same size as the dots of each color phosphor. These holes are arranged so that they overlap equally each three color group. As the electron rays "scan" the end of the tubes the phosphors are excited and caused to give off the color and color intensity dictated by the incoming signal at any one instant.

In the single-gun tube the electron beam describes a small circle covering the three phosphors. In the three-gun tube, each gun contributes its own impulse for the desired color, with the incoming signal "turning the signal on and off at exactly the right time." The single-gun tube receiver employs ten more secondary tubes than the conventional black-and-white receiver; the three-gun tube cathode-ray set requires nineteen more.

When no color signals are being transmitted the electron guns paint only a black-and-white image.

C. B. S. Urges Own Color System

Frank Stanton, president of the Columbia Broadcasting System, declared here last night that the new R. C. A. tube "can be used with the C. B. S. color television system more simply than with any other color television system." The C. B. S. system employs a mechanical scanning disk to inject the basic colors at both the transmitting and receiving in contrast to R. C. A.'s all-electronic system. laboratory plans afoot.

"I do not know how close to commercial reality this new tube is," Mr. Stanton said, "but I hope that the public will not have to wait until the tube is perfected to enjoy color television. C. B. S. has demonstrated, to the public as well as the experts, that it has a color system that works now, and inexpensively."

Among the other television concerns interested in tri-color television of the all-electronic type in a single cathode tube is the Allen B. DuMont Laboratories, which has laboratory plans afoot.