RCA TK-60

This black and white camera was introduced in 1953 and uses a 4 x 4 1/2 inch image format. It has a tubular lens.
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COLOR TV—THAT ISN'T

OPTICAL ILLUSION CREATES COLOR IMPRESSION IN VIEWER'S MIND

By LAURENCE R. GRIFFIN

Can an ordinary black-and-white TV receiver reproduce a color image? "No," you say. Wrong! Believe it or not, the answer is a resounding yes—provided the telecast is in "electronic" color using the Color-Tel subjective color process.

Developed by James F. Butterfield, Sherman Oaks, California, electronic color is a remarkable TV broadcasting technique using relatively unknown optical principles to transmit a monochrome picture that appears to be in color when viewed on an ordinary black-and-white TV receiver. Actually, no color appears on the TV screen—it exists only subjectively in the brain of the viewer. Although most viewers see colors, there are some viewers who do not—for reasons not completely understood. On the other hand, normally color-blind people frequently report being able to see the electronic subjective color display.

Light. Light waves are a form of radiant electromagnetic energy of which the visible spectrum is only a small part spanning the apparent color range from red to violet. Each color has a distinctive wave length, from violet at 16 millimicrons of an inch, to red at 32 millimicrons of an inch. Outside of this very narrow band of frequencies lie the optimally invisible radiations that include ultraviolet, infra-red, and x-rays. When light strikes the retina, a light-sensitive nerve membrane covering the lateral horn wall of the eye, composed of three layers, the retina contains two types of special sensory bodies called cones and rods. These nerve cells respond to light stimulation by "telegraphing" a pulsing sequence of coded information along the optic nerve to the brain's sight center in the occipital lobe of the cerebrum cortex. All color perception occurs in these cones and by evaluating the varying frequencies of the nerve impulses, the cortex is able to distinguish what hues are acting on the retina.

Slightly over 15 years ago, Butterfield reasoned that, if the frequencies of the nerve codes for specific colors could be mathematically analyzed, it would be possible to feed the cortex synthetic color data. This could be accomplished by stimulating the cones with flickering pulses of white light, keyed to match the known nerve frequency for a given hue. If the theory was correct, such flickering white light would then appear to the viewer to have color.

Television camera equipped with a Color Translator transmits pictures which appear to the viewer to be in color on a standard black-and-white receiver.
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