

CLASSIFICATION **CONFIDENTIAL** **CONFIDENTIAL**
 CENTRAL INTELLIGENCE AGENCY REPORT
 INFORMATION FROM
 FOREIGN DOCUMENTS OR RADIO BROADCASTS CD NO.

50X1-HUM

COUNTRY USSR DATE OF INFORMATION 1950
 SUBJECT Scientific - Radio, television
 HOW PUBLISHED Monthly periodical DATE DIST. fb Oct 1950
 WHERE PUBLISHED Moscow NO. OF PAGES 2
 DATE PUBLISHED May 1950 SUPPLEMENT TO REPORT NO.
 LANGUAGE Russian

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SOURCE Radio No 5, 1950, pp 45-47

SOVIET COLOR TELEVISION

I. Boloshin

[Figure referred to is appended.]

Soviet scientists and inventors have contributed many useful ideas and methods of construction to the interesting field of color television. As far back as 1925, one of the pioneers of television, I. A. Adamian, suggested a system of color television and in 1929, the well-known inventor in this field, Yu. S. Volkov, took out a patent on an electronic system of color television. Thus, Soviet inventors proposed systems of color television when high-quality television, in general, was only a daring fantasy to foreign specialists. [Author then discusses well-known principles of color television and some of the systems in use, such as the mechanical system employing a rotating color disk.]

In the sequential system it is possible to apply purely electronic means to the division and synthesis of colors. The above-mentioned patent taken out by Volkov specified exactly such a system. The Volkov system specified a receiver with optical synthesization of colors. The screen of the cathode-ray tube is divided into three parts. In one part the image is reproduced through a red filter, in the second, through a blue filter and, in the third, through a green filter. The corresponding parts of the screen have red, blue, and green luminescence, or are covered by color filters if they have white luminescence. All three images are projected through separate lenses on a common screen where they are combined into one color image. [The author next discusses a system of color television using three independent simultaneous operating single-color systems.]

The development of color television has added to the problems connected with projecting an image on a large screen. The fact is that, as a result of significant losses of light in color filters (the brightness is reduced to about one-tenth in a disk-system), projection systems with lenses and mirrors are rather inadequate. Scientists are now working on another projection method which promises a complete solution of the large screen problem both for black-and-white and for color television. This method was first put forward by a Soviet scientist, Academician Chernyshev. It is based on the so-called light valve systems, which utilize

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the coloring effect of transparent crystals of certain alkali metals under electron bombardment. The transparency of the crystals at any given point depends on the current intensity of the electron beam, while the color depends on the screen material. The image formed by the electron beam (like a positive slide or frame of a camera), with the aid of a strong light beam from an external light source, is projected on a large screen. After each frame, the image can be effaced by an electric field.

The type of light valve tube employed can be seen in the appended figure. The tube screen is formed by an extremely fine layer of crystals. Both sides of the screen are coated with transparent metallic films to which is applied the voltage for "decolorizing" the screen. The usual system of deflecting and focusing the electron beam is used. To ensure projection of the image on the screen, the axis of the electron projector is fixed at a certain angle to the optical axis of the tube.

A colored image may be obtained in this system by introducing a rotating color disk or using a tube with a three-layer screen. Under electron bombardment, each of the layers is colored by one of the basic colors. The depth of the beam's penetration into the first, second, or third layer can be varied by switching the accelerating electric field. Because of the many technological difficulties involved, color systems of this type have not as yet been put in practice, but there is no doubt that "light valve" systems have excellent prospects of producing color images on a large screen.

The solution of a number of remaining engineering problems will facilitate the early introduction of color television in broadcasting practice.

[Appended figure follows]

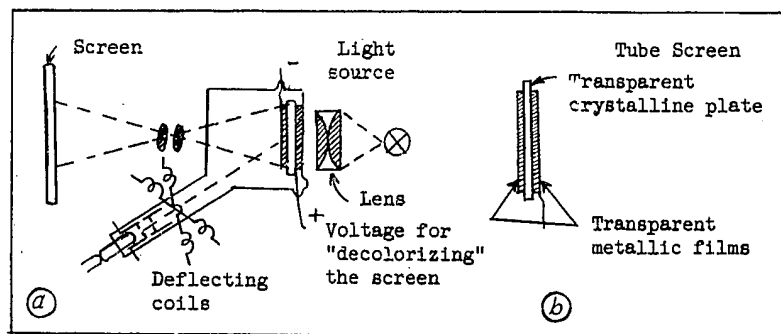


Diagram of Tube Operating on Light-Valve Principle

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