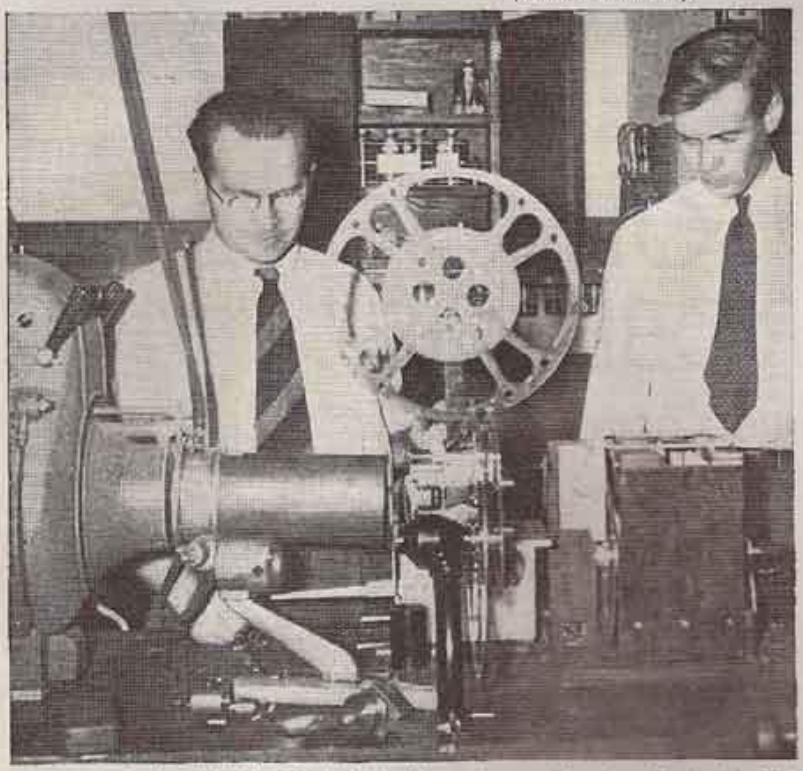
Color Television Demonstrated

(Cover Feature)



Dr. Peter C. Goldmark (left), CBS chief television engineer and inventor of color television, and J. N. Dyer, assistant chief television engineer, at the color television projector.

Television images in full colors were recently demonstrated in the laboratories of the Columbia Broadcasting System, using apparatus developed by Dr. Peter C. Goldmark, 34 year old scientist. The images were derived from Kodachrome 16 mm. movie film at the transmitter, where a color filter disk was inserted between the film and the iconoscope. This filter disk consisted of *two* sets of color filters: red, blue, green; red, blue, green. A similar disk (but naturally of much larger size) was placed in the receiver cabinet between the viewers and the end of the cathode-ray tube. These disks were operated synchronously as the image at the transmitter was sent out. The disk at the receiver is kept in synchronism by means of a framing impulse transmitted through the air, although it operates from the same power source as the receiver tubes. Surprisingly enough, the disk need have a radius no greater than the diameter of the tube, for its shaft is positioned directly at the tube. The film used was taken at 64 frames per second but it is stated that the usual 24 frame film can be used with no additional defects.

There is some question, however, as to whether or not it will be possible to get sufficient intensity of artificial light to afford *live* pickups, when at the same time generating so much heat that the performers will be even more uncomfortable than they are in the present "black-and-white television" studio.

The pictures demonstrated at Columbia Broadcasting System consisted of 343 interlaced lines. Although this is considerably fewer than used in standard black and white television operation, detail was good. However, Dr. Goldmark is working to increase the number of lines beyond the 400 point without having to exceed the 6 mc. band.

Another feature of his system is that the light impulses from the film, after passing through the color filters, are made to fall upon photo-sensitive materials, the output of which can be controlled by *separate* gain controls. This makes it possible for the program director to correct or, if desired, overcorrect, for any color desired.

The picture is completely scanned every 60th of a second instead of every 30th. The following sequences are of interest.

The odd number lines are scanned in red in 1/120th of a second. The even number lines are scanned in green in 1/120th of a second.

At this point the *whole picture has been scanned*, but *there is yet no blue in the picture*. Time thus far: 1/60th of a second.

Now the red on the odd number lines has faded and these same lines are scanned in blue in 1/120th of a second.

At this point the whole picture has been scanned *one and one-half times, but in full color only once. Time thus far: 1/40th of a second.*

Now the green on the even number lines has faded and these same lines are scanned in red in 1/120th of a second.

At this point the picture has been scanned twice but in full color only once and a third. Time thus far: 1/30th of a second.

Now the blue on the odd number lines has faded and these same lines are scanned in green in 1/120th of a second.

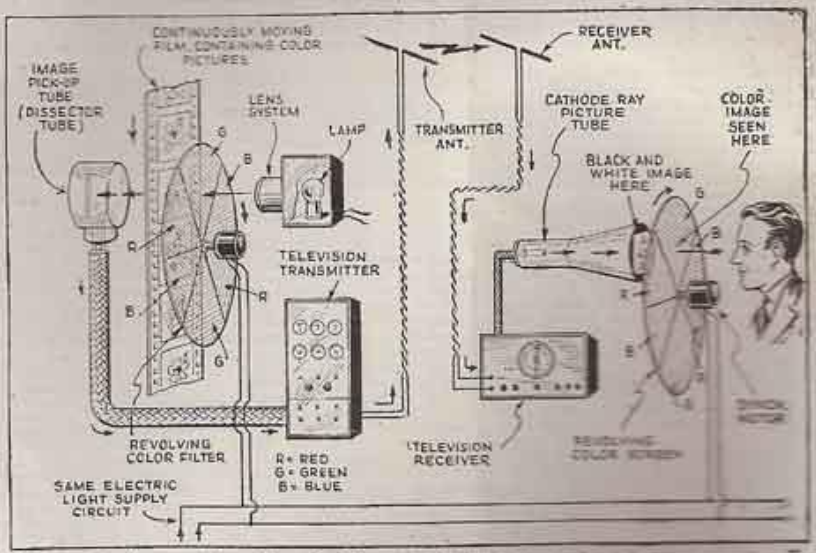
Time thus far: 5/120th of a second.

Now the red on the even number lines has faded and these same lines are scanned in blue in 1/120th of a second.

At this point the whole picture has been scanned three times and in full color twice. Elapsed time thus far: 1/20th of a second.

And now the whole progressive cycle begins again with the even number lines being scanned in red.

When there is no color disk in front of the receiver tube the picture appears as a black and white image.



This special diagram shows the principle upon which the new color television operates. The color film used at the transmitter was made on Kodachrome stock. The color images may be picked up as "black and white" pictures on standard television receivers.