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What COLOR Does to TV p. 100

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Wilbur Shaw Reports on

NEW SPORTS CARS

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What COLOR Does to TV

THE STUDIO More lights, placed lower, is major change on CBS color set where Director Frances Buss (left), Ed Sullivan, Patty Painter discuss script.

Everyday color television is on the air, adding pleasure for the audience —and some problems for producers.

By Kendall W. Goodwyn

YOU'LL see more on your TV screen, whether it's big or small, when you've converted to color. But putting the color into the pictures poses new problems that producers and engineers are busy solving now.

Shows already being telecast and others being planned prove what color does to television. What it does is good. More than simply adding beauty and realism to a gray picture, it makes possible scenes and whole shows that black-and-white would miss.

Take the impressive program that inaugurated commercial color TV this summer. In one sequence of a ballet, the dancer relinquished her bouquet of red roses for one of black roses, signifying death. In black-and-white, the whole scene would have been meaningless.

And the regular, everyday programs that followed the big "Premiere" hour on the Columbia Broadcasting System, while not so lavish with high-priced talent, have also demonstrated what color can do. Naturalist Ivan T. Sanderson shows you the brilliant feathers of exotic birds or explains why Nature gave unusual tropical plants their strange shapes.

Color Helps You Identify Objects

This fall there will be plays, children's programs, football games. Outdoor sports events come through very effectively in color. And you can always tell which team is which just by the colors of the uniforms.

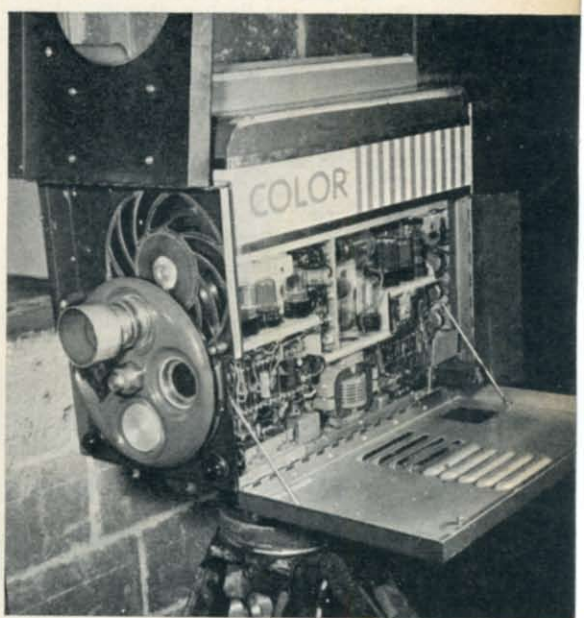
Science demonstrations are another natural subject for color television. Already one series is being prepared with the cooperation of Kenneth M. Swezey, well known to POPULAR SCIENCE readers for his regular home-experiment articles.

Working independently of CBS with science expert Dr. Gerald Wendt and two young producers, Harvey Cort and Milton Subotsky, Swezey is providing the material for short movies that explain the everyday applications of science.

Color Films Can Be Used

Color television can reproduce 16-mm. color film, such as Cort and Subotsky use, or 35-mm. films. The shows now being

THE CONTROLS An extra panel (extreme right in photo above) adjusts the color-wheel motor and color balance in each camera. The technician's hand is on the knob that sets the amount of red in the picture. Adjacent knobs control blue, green.



THE CAMERA Only when covers are opened can alterations that convert camera to color be seen. Twelve-segment filter disk (above lens turret) spins on long shaft running through camera to motor in rear. Viewfinder shows black-and-white picture.

Scene from "How an Airplane Flies"—one of science films being made for color TV—shows how air blown between apples creates low-pressure area that sucks apples together. Color in such shows heightens interest, lets you actually see chemical changes, wildlife beauty.

Color slave unit developed by Crosley for its receivers can be attached to current models by making two simple connections. Slave shows 12½-inch color picture magnified from its own 10-inch tube. It also has separate controls for brightness, focus, hold and contrast.

telecast by CBS, however, are not films, but "live."

Are they harder to put on than black-and-white? "We've adapted ourselves to color very quickly," says Frances Buss, the comely young woman who directs the Ivan Sanderson show. "Stage settings are hardly different from the black-and-white ones. Those are normally colored anyway, you know. Costuming may be easier—we only have to consider how colors blend, not how they reproduce as shades of gray."

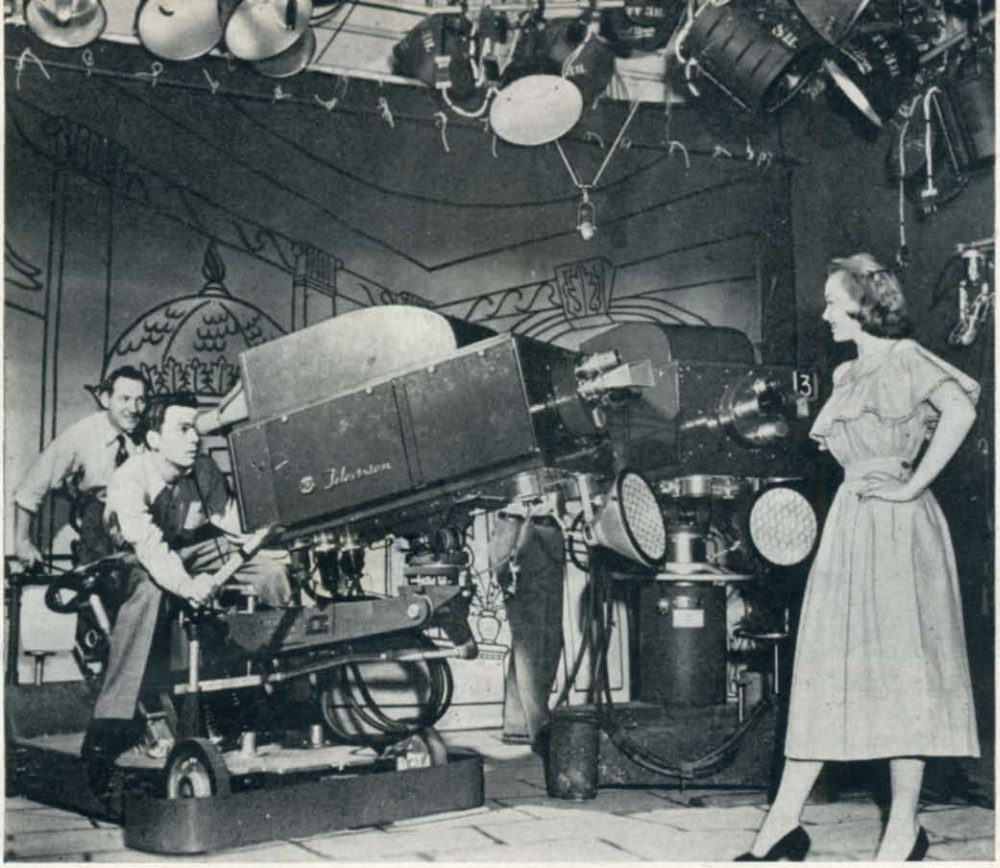
Four Times as Much Light Needed

Another TV showman who expects color programs to be easier to handle is Worthington Miner, producer of such well known black-and-white presentations as "Studio One." He suggests, "An entire chorus of a song, for example, may be carried on a single setup in color without a sense of monotony . . . Camera setups might be reduced 25 to 30 percent . . ."

Studio engineers, too, find the change to color simple. Ted Lawrence, color-quality supervisor for CBS, points out, "The camera is basically a standard model. We've made some electronic changes and added a color disk and a small electric motor to turn it. The camera disk has 12 filter segments, instead of the six segments used in receivers, so that we can use a slower motor.

"We have to use about four times as much illumination because the red, green and blue filters on the camera absorb light," Lawrence adds. "Many lights are placed low, in order to keep the illumination—and the color—even. We usually have several reflectors at head height.

"Fluorescents? Sure, we can use them. Their uneven color spectrum doesn't bother color television the way it does color photography. Partly that's because the shaders can adjust the mixing controls to make, in effect, almost any type color 'emulsion' we need."



RCA COLOR Despite Government decision setting up CBS method as only regular color TV system, RCA began tests of its rival technique this summer. RCA color has advantage of "compatibility"—existing receivers require no modification to pick up colorcast in black-and-white. New Yorkers who have thus received monochrome views of RCA's colorcasts have found the quality excellent. Newspapermen who witnessed demonstrations of RCA color receivers this summer also praised the color tube's performance.

The "shaders" are technicians who keep the picture quality in adjustment. For color work, they have three extra knobs marked red, green and blue that vary the strength of the primary colors to maintain true-to-life colors in the final picture.

Transmitted Like Black-and-White

Once the colorvision signal gets past the studio control room, it is handled in the same way as black-and-white. Telephone wires carry it to CBS "master control," which pipes it to the local transmitter and may also feed it to the coaxial cable or microwave relay for networking. The ride on the coaxial cable doesn't harm it.

While the people who produce TV shows oh and ah over color, the people who produce TV receivers moan and groan. Now that CBS color is here, they say, the public has stopped buying their sets, which cannot receive CBS color without internal changes.

The big manufacturers have bitterly fought Columbia's color system. But now one major company, Crosley, has announced a color slave—a separate cabinet with picture tube, color wheel and circuits that can be plugged into Crosley receivers. However, the unit is not yet in production.

Color TV Is Here to Stay

Other manufacturers, hints industry gossip, are about to include built-in adapters in sets in production. These will enable the receivers to get color programs in black-and-white and will simplify later conversion to full color.

CBS, through its recently purchased set-manufacturing subsidiary, will have color receivers in the stores this fall. Dozens of smaller electronics firms are scrambling to get on the bandwagon. So there's sure to be equipment to bring to the public the beautiful full-color television that, after many years of false starts, is finally on the air.

END

MECHANICS and HANDICRAFT
REG. U. S. PAT. OFF.

TV Color 'Sampler' Costs Only $8

Until I'd seen TV color, I didn't know how good it can be. This simple rig—using only scrap-box parts—brings color to a TV set.

By Herbert Pfister

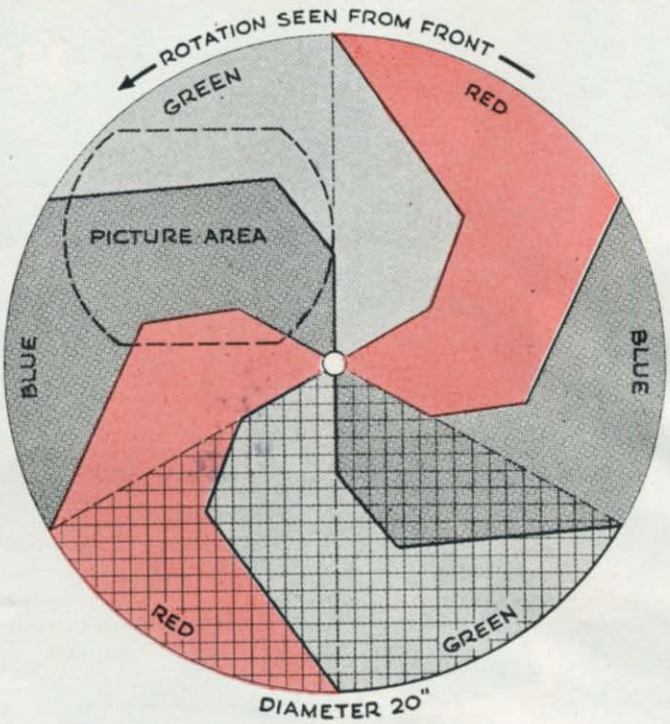
WE'RE already enjoying the color shows at my house, and I've only spent $8 for these previews of the future.

I'll want a better color TV set some day, but this rig has the great merit of simplicity. It's strictly mechanical, because I'm in the kindergarten when it comes to electronics.

So POPULAR SCIENCE's editors asked me to tell you how to build one like it.

Your wife will probably object to having the setup in your living room permanently, but she'll be as delighted as you are with the color pictures.

The synchronism isn't automatic—

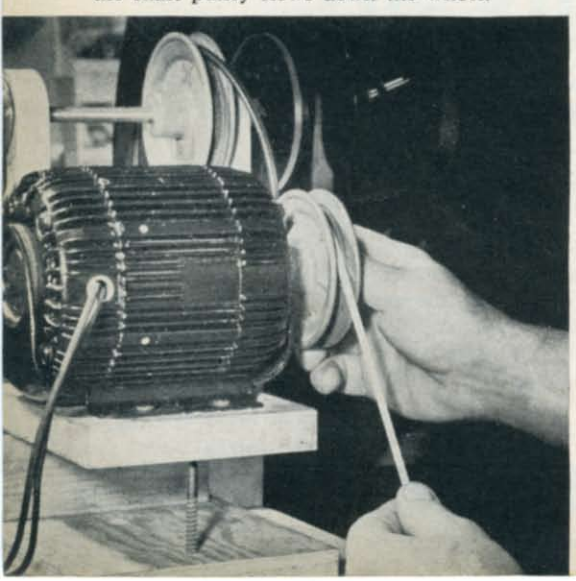


Making the wheel. I started with a 21" square of Lucite 1/16" thick. After sawing it to a rough circle, I centered it on the threaded shaft, clamping it between washers and nuts. Then I cut it to a true circle by holding a chisel to the edge while it ran. Cut-outs of colored cellophane, taped to the plastic, completed the wheel.

you hold a flexible-cable speed control, touching it whenever the picture is about to drift out of "sync." This isn't hard; with the wheel speed set right initially, it will stay on the nose for many seconds, and a touch of the hand control brings it back.

Building an automatically synchronized wheel is tougher. That calls for a tone generator, a fistful of tubes, a saturable reactor and some special circuitry.

Adjusting speed. You can bring the ratio between motor pulley and shaft pulley to just about the right speed by padding the pulleys with strips of masking tape. Building up the motor pulley turns the wheel faster. Adding to the shaft pulley slows down the wheel.



What you need. First off, your receiver must be color-adapted—modified so you can switch to the special scanning rates used in color broadcasts (see PS, Dec. '50, p. 121 and July '51, p. 97). You'll also need a constant-speed motor, a homemade or commercial color wheel, and some pulleys, shafting, belts and scrap-box findings.

Wheel. Factory-made 20" color wheels (suitable for use with a 10" receiver) are currently available for about $18. I made my own, taping colored cellophane to a 1/16" clear-plastic disk. The drawing shows the hook shape and color sequence required for present transmitting standards. I laid out a cardboard cutting pattern to help me trim uniform, properly shaped color segments. If you have trouble finding cellophane sheets of the right hue and saturation, theatrical floodlight filters or photographic filters are okay. Or you can buy filters made expressly for color TV by Eastman Kodak.

Motor. Profit by my experience and steer clear of AC-DC motors—brush sparking will make your picture go blooey. Use a split-phase or repulsion-induction motor, preferably 1/10-hp. or better because the belt, pulleys and big disk soak up plenty of

power. A ¼-h.p., 1,750-r.p.m. shop motor will do, though it's a bit big.

Mounting. This will depend on your TV set. With the color sequence and rotation shown, the viewing area is the upper left quadrant as seen from the front. I put the wheel support and motor on a separate platform out front, but they could be located above or under the set.

The wheel shaft turns in ball bearings that are a light press fit in counterbored holes of wooden arms. One end of the shaft is threaded for clamping nuts that hold the wheel between two plastic washers. The wheel must turn freely and run dead true.

Speed. Color fields are transmitted at the rate of 144 per second. Multiplied by 60 seconds and divided by 6—the number of segments in the wheel—this gives you 1,440 r.p.m. as the necessary wheel speed. Choose motor and shaft pulleys to drive the disk at this speed. (Pulley diameters should have the same ratio to each other as exists between motor speed and 1,440 r.p.m.).

The motor I used ran at 1,550. Standard V-belt pulleys don't come in the right sizes to belt this speed down to exactly 1,440. I used an approximate ratio, a 3½" pulley on the motor and a 4" one on the shaft, and then adjusted it by adding strips of masking tape in the pulley grooves.

I use an endless sewing-machine belt of round cross section, having found that even a small V belt added too much extra load. A round rubber vacuum-cleaner belt is another possibility.

Braking the wheel. Adjust the spring-loaded brake so it applies just a little more pressure than you need. Then only a little thumb pressure is required to make the wheel run at the right speed. The brake cable is an auto choke cable fitted with a wooden pistol grip.

Brake. I get best results by belting the wheel to turn a bit over 1,440 r.p.m. and then applying light brake pressure to pull it down to "sync." A loop of leather riding in an extra pulley on the wheel shaft is tightened by an auto choke cable fitted with a wooden pistol grip. The cable is spring-loaded to apply more braking pressure than you need, so that a light touch of your thumb holds the wheel in "sync."

Adjust the pulleys with tape to run the wheel a little fast, and adjust the brake to drag the wheel down a little too slow in the hand's-off condition.

With some practice you'll find it isn't hard to hold the synchronism and color phasing pretty reliably. END

Color Unit Can Be Bolted to Housing of Small Set

MY LITTLE girl was so delighted with color TV in our living room that she wanted more of the same on the 7" set in her room. The one I built for her is like the big unit, except the brake is a little different. This brake is hinged at one end. A piece of leather is cemented to the other end. The leather rides against a wooden disk mounted on the shaft behind the wheel. A piece of cord with a spring on one end provides wheel-speed control.—*Herbert Pfister, New York City.*