

Facts of the Color TV Dispute

By JACK GOULD*

IF THE television-viewing public is bewildered and bothered by all the many facets to the color controversy, it has every right to be. Seldom has a dispute embraced so many complex issues, each one of which has the makings of a good row in itself. These issues cover extraordinarily complicated engineering factors, economic problems, fundamental concepts as to the role of government vs. free enterprise, and, last but by no means least, the individual who is, or expects to be, watching television.

Under such circumstances, pat and glib statements as to what the color controversy means to John Doe are unwise. The best that can be done is to take up the controversy step-by-step:

What the FCC is: The Federal Communications Commission was set up by Congress to deal with the involved engineering problems upon which it was impractical to legislate.

The commission's fundamental responsibility is to see that broadcasting

is conducted in "the public interest." Its power lies in the license which a station must have to use a wavelength that belongs to the public as a whole.

What the FCC did about color: The commission conducted lengthy hearings to investigate the merits of several color systems, of which the most publicized have been those of CBS and RCA.

The FCC finally decided that the CBS system gave pictures which were sufficiently perfected to be introduced commercially. That the pictures are extremely good and far superior to black-and-white cannot be denied; they are. This all-important point has been rather seriously overlooked in the general controversy to date.

Until there are additional demonstrations of the CBS color, it must be acknowledged that the general public has not seen with its own eyes what the FCC has indorsed. Despite the manufacturing industry's unfavorable reaction to the FCC approval, the public's reaction to watching CBS color has yet to be registered.

As for the RCA system, the commission decreed that it was inferior in quality and not easily operated by the average layman. It also expressed doubt that certain technical difficulties could be overcome.

The FCC's primary objective has been to bring about the introduction of a service in color. It generally has been less concerned with the maintenance of a service in black and white, upon which most manufacturers have placed major emphasis since the commission's approval of CBS color on Oct. 11.

Why the FCC action causes such strong reaction: CBS, which is not a manufacturer of either receiving or transmitting equipment, played a lone hand in the color hearing. The overwhelming preponderance of engineers and set manufacturers were against the CBS system on both technical and economic grounds.

The causes underlying the conflict are these:

The CBS color system: Basically, the CBS system is technically incompatible with the television that is broadcast today. To receive a CBS color picture in black and white on a present set, it is necessary to have an adapter. To receive a CBS color picture in color on a present set it is necessary to have first an adapter and then a converter. The adapter alone would run to about \$35; the adapter and converter, at least \$100 and very possibly substantially more.

An adapter is a device which electronically alters the circuit of a set so that it can accept in black-and-white a picture transmitted by CBS in color. Without the adapters the color image appears on a present set only as meaningless lines.

The converter is the device which introduces the actual color. Its physical appearance and operation have been major points of controversy. Under the CBS system, the primary TV colors of red, blue and green, are injected by a filter disc which is spun at high speed by a small motor. This disc is placed directly in front of the camera and receiving tubes.

The disc is a limiting factor on the picture size. Since only half of the disc passes in front of the tube at a given moment, it must be roughly twice as large as the picture. From the practical standpoint the disc is limited to about 25 inches, which gives a picture of 12½ inches, already an outdated size in today's sets. With a magnifying lens it can be brought up to 16 inches, a more popular size.

It is possible, however, to use the rotating discs with larger screens, such as the 19-inch, etc. But the maximum



A spinning color wheel must be put in front of the screen in the CBS system.

picture still will be 12½ inches before magnification.

The CBS system, however, is not dependent on the spinning disc as such. When the primary colors are introduced by electronic means, this means can be incorporated in the CBS system, thus eliminating the disc.

Apropos the CBS converters, one manufacturer in favor of the Columbia system is planning a device which would enclose an adapter, converter and separate tube in a single cabinet. This separate cabinet would hide the unattractive spinning disc.

The RCA Color System: This system is designed to be compatible with present television. To receive an RCA color program in black and white on a present receiver no adapter is necessary. The same transmission will produce a black-and-white image on a black-and-white receiver and a color image on a color receiver.

To receive an RCA color program in color on a present black-and-white receiver a converter must be employed. The heart of both the system and this conversion process is an electronic tri-colored receiving tube which injects red, blue and green. The tube would provide both color and black-and-white pictures, electronically projecting on the screen whichever of the two types of transmission happened to be employed by a station.

The RCA conversion might cost about \$175, including the labor of the skilled service man required to do the job. This figure, however, admittedly is only a guess.

The FCC-reasoning: The commission has been anxious to authorize color. Its advent is regarded by all parties concerned as inevitable. The FCC wanted to make the move with least inconvenience and expense to the public.

Primarily, the FCC was of the opinion that the RCA and other all-electronic systems would take an unspecified period of time to be brought to the state of perfection of CBS color. Even then, it was not sure that such electronic systems would be free from operating difficulties. By strong implication, at least, it has suggested that the anti-CBS manufacturers were indulging in delaying tactics so that the public first could be sold black-and-white receivers and then color sets.

Accepting these premises—and each is vigorously disputed by the set manufacturers—the FCC was thinking more in terms of what might happen to tomorrow's theoretical 80,000,000 set owners than today's 8,000,000. If it kept postponing a decision, the problem merely might be magnified manifold.

Reasoning of the manufacturers: The manufacturers hold that the FCC is unrealistic and impractical. They offer the analogy that if one wants to improve service on the railroads one concentrates on building a new type of engine; one doesn't change the gauge of the tracks so that none of the present coaches will be useful without "adapting" their wheels to a new base.

In effect, they maintain that the FCC has seriously retarded color because the CBS system does not provide for the simultaneous maintenance of black-and-white service while color is introduced.

From the economic standpoint, they argue, the FCC's protection of the public's pocketbook is largely illusory. The cost of converting an existing set still must be met by the consumer, who even after this additional outlay, doesn't have the latest, most attractive, most efficient set—a new, factory-made receiver.

The manufacturers aver further that protection of the public must be seen from the long-range point of view. CBS color is not going to stop developmental work on a compatible system, they say, and there is a possibility of two transitional upheavals instead of only one. Technically, they add, the spinning disc was tried and discarded in the early days of black-and-white and they foresee the same course of events with CBS color, as even CBS acknowledges may happen. Then a CBS disc converter itself will become obsolete, they note.

In short, the manufacturers insist that the ultimate potentialities of compatible all-electronic color outweigh whatever immediate practical gains the CBS system afford. And they state further that unlike either the FCC or CBS they must cope with all the retooling, competitive merchandising and employment problems which are the lot of a major manufacturer.

Why Present Sets Will Have Extended Usefulness: Both the manufacturers and CBS are agreed on one point: The set now in use will give service for a number of years to come. It will not become a piece of junk to be

put out with the morning trash.

The reasons for this are many, primarily economic. Under the CBS system, it will be necessary to build up a color audience from scratch.

But with production costs constantly mounting, it is not logical to assume sponsors of major programs will sacrifice the present total potential audience of 30,000,000 for the comparative handful of families who at the start may purchase converters. CBS concedes that it will have an uphill fight to take its color system over this transitional hurdle, particularly since many individual television stations are still operating at a loss.

From *The New York Times*, October 22, 1950



Experimental color slave demonstrated by S. W. Gross, president of Telitone.

MATCHING PADS FOR TV SETS

Several TV sets can be operated from a common antenna in strong-signal areas where some reduction in signal strength can be tolerated. Matching pads maintain the impedance match between each set and the transmission line to the antenna. This matching network, described in Stromberg-Carlson's *Current Flashes*, can be used for up to eight receivers having 300-ohm input terminals.

The diagram shows the connections to three receivers. R1 is 220, 390, 560, 820, 820, 1,000, and 1,200 ohms for two to eight sets, respectively. R2 is 470 ohms for two sets, 390 for three, and 330 for four to eight sets. Noninductive carbon resistors should be used. It is advisable to place them at the junction of the transmission lines rather than at the receiver terminals.

The pads have a tendency to reduce front-end radiation for they attenuate signals passing through them in either direction. In many cases, the interfering signal will be reduced to the point where it is not noticeable on the screens of nearby receivers.

The matching pads can be mounted

at such a point on the transmission line from the antenna in strong-signal areas where some reduction in signal strength can be tolerated. Matching pads maintain the impedance match between each set and the transmission line to the antenna. This matching network, described in Stromberg-Carlson's *Current Flashes*, can be used for up to eight receivers having 300-ohm input terminals.

If this arrangement is used in a television showroom where one or more of the receivers may be temporarily disconnected from the antenna, the open ends of the branch lines should be shorted with 350-ohm carbon resistors to prevent a mismatch to the lead-in and other sets.

