REPORT OF THE COLOR COMMITTEE*

Summary.—*The Eastman perforation, although adopted by the Society as a standard for positive and negative film, has certain disadvantages for use in connection with color processes and for background projection. The reasons for these limitations are analyzed, and a proposal is made that the important advantages of the Eastman filleted rectangular shape be retained in a perforation, the dimensions of which are the same as those of the Bell & Howell perforation. Such a perforation would fit existing Bell & Howell registering pins.*

The use of a photocell having most of its sensitivity outside the visible spectral region imposes an added burden to those working upon color sound processes. Search is urged for a cell that would have all the advantages of existing caesium cells but with its chief sensitive response in the visible range.

The term "Direct Color Developer Process" is recommended for a color process wherein non-diffusing color-formers in the emulsion (multiple-layer) combine with the oxidation products of the developer to form insoluble dyes. A process of this type was introduced recently by Agfa.

Perforation Standards.—Prior to 1930, the industry was using what is known as the Bell & Howell perforation for both negative and positive stocks. The overall dimensions of this perforation are 0.110 inch wide by 0.073 high, and the shape is such that the rounded ends of the perforation lie upon a circle.

In the fall of 1930, the Society adopted a new standard perforation for positive film only, the shape of which is a filleted rectangle of dimensions 0.110 inch by 0.078. This shape and size are usually referred to as the Eastman perforation, because it was introduced by the Eastman Kodak Company some years earlier. This new standard for positive film has been adopted by the black-and-white industry generally; however, it has not been adopted by any commercially operating color process. All color prints being commercially produced today have the old Bell & Howell standard perforation. The reason is, of course, the necessity in present-day color processes of transferring accurate register from negative to positive by means of registering pins. This means that at least the overall dimensions of the perforations in negative and positive must be the same.

In November, 1934, the Society adopted the Eastman perforation

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as standard for negative as well as for positive stock but there is no indication, either here or abroad, that this new standard for negative stock will actually be accepted; in fact, it appears that it will not be accepted. There are several reasons for this. For example, steadiness in background projection requires transfer of registration of pictures with respect to sprocket holes from the negative to the print, and the use of registering pins in the projector. It is universal practice in the black-and-white industry to use Bell & Howell perforations even in the positive prints used in this type of work. Much of the negative material used in background projection comes from "stock shots," all of which, of course, already have the Bell & Howell perforations. A third reason is that the confusion that would result during the change-over period might result in cases wherein film containing the small perforations encounters large-size pins either in camera, printer, or projector. In such a case, jamming and damage to the film would result. While it might be possible to re-perforate the old negative to the new standard, and, further, so to organize the period of transition as to minimize trouble, the fact remains that the industry has taken no step to adopt the Society's recommendation on November, 1934. The Society now finds itself in the rather unfortunate position of having approved, in November, 1934, a standard that the industry has refused to accept in practice. From the point of view of the present-day color processes, even the standard adopted in 1930 for positive stock is impracticable.

The reason for adopting the increase in the vertical dimension in the case of the Eastman perforation was to allow additional clearance on projector sprockets to compensate for film shrinkage; but this difficulty has been minimized in the intervening years by the introduction of film bases of less shrinkage than those that were in use at the time the Eastman perforation was promulgated. Furthermore, the sound revolution has caused a very great increase in the care taken in mechanical maintenance of equipment in the theater projection room.

Now it is believed, and such tests as have been made substantiate the belief, that the very definite and important advantages of the filleted rectangular shape can be retained in a perforation whose dimensions are the same as those of the Bell & Howell perforation and will consequently fit upon existing Bell & Howell perforation registering pins. Such a solution of the problem has previously been urged by Mr. Howell.

While the cost of a change of standards is always great, it never

grows any less with time, and there is, of course, a not inconsiderable current expense to maintain two standards. In view of the fact that such standards as have previously been adopted have been found to be impracticable both for black-and-white and, especially, for color, the Color Committee feels that the Society, through its Standards Committee, would do well to examine carefully the possibilities and advantages of a new universal standard perforation that would be practicable.

Photocell Sensitivity.—The Color Committee would like to call the attention of those working in sound to the fact that the use in the projector of a photoelectric cell such as the caesium cell, having most of its sensitivity outside the region of the visible spectrum, requires that color processes deal not only with the visible spectrum but also with the added region in which the photocell is sensitive. This imposes a further burden upon those working in color. Their problems would be considerably simplified were the sensitivity of the photocell confined to the visible spectrum. The sound men themselves would gain an advantage also in such a case, due to a simplification of the design and accurate focus setting of the optical system in the reproducer. We do not mean in any way to urge a return to the potassium cell that was in use prior to the advent of the caesium cell but rather to urge the search for a cell having all the advantages of the caesium cell but with its principal sensitivity within the visible range. In other words, the Color Committee believes that the ideal photocell for the projector has not yet been developed and it would urge the sound men to seek it.

Further Classification of Color Processes.—A further classification of types of color processes is needed to take care of the process recently introduced by Agfa. In this process, non-diffusing color-formers reside in the several emulsion layers. When the film is developed in a coupler-developer these color-formers combine with the oxidation products of the developer to form insoluble dyes. The phrase, "direct color," has been considered as descriptive of this process, but such a phrase might also apply to a bleach-out process. The recommended phrase, therefore, to describe the new process is "direct color developer process."

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