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CONTROL OF CONTRAST WITH COLOR DEVELOPERS

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6 Claims. (Cl. 95—88)

This invention relates to color photography and more particularly to the development of color images by means of color developers. It relates specifically to the control of contrast of the color images with such color developers.

It is understood that the kind of color developers which I have in mind are those which develop a silver image associated with a color image. Such developers and processes in which they are used are well known and still others have recently been disclosed in my co-pending applications, Serial No. 536,659 filed May 11, 1931, No. 555,748 filed August 7, 1931 and No. 559,346 filed August 25, 1931 matured into Patent No. 1,897,866 of Feb. 14, 1933. These developers comprise reducing agents, which, of themselves, yield colored insoluble oxidation products when they act upon exposed silver bromide, and also developers containing a coupling agent that combines with the oxidation product of the reducing agent to form a colored insoluble substance.

When a color developer is used to produce a color image forming a part of a two or three color subtractive picture, it is often necessary to control the contrast or "gamma" of the color image. An obvious method is the one used in the development of ordinary silver images, namely, the alteration of the time of development or the dilution of the developing solution. This method, however, results in a variation of the degree of development of the exposed silver bromide. Under certain conditions, however, particularly in color processes, it is necessary to develop the exposed silver bromide to completion, or to a degree fixed by the nature of the process, and to fix or control independently the contrast or "gamma" of the color image.

One means of accomplishing this result is partially to develop the latent image in a color developer, and to complete development in a non-staining developer, or vice versa. This method, however, involves development in two separate solutions.

The non-staining developer may be of any familiar type such as any of the common formulæ known as M—Q. Numerous examples of color developers and of processes in which they may be used and to which the present invention is applicable are to be found in the applications referred to above. It is to be understood that whenever in these or analogous processes, a color forming developer is described, there may be used a two step developer.

In such processes, the development as a whole must sometimes be carried to completion. The first step would, however, be controlled in duration. If the first step is in a color forming developer, it would be carried to such a point that the desired color contrast is obtained. The second step would then be carried to completion in a non-staining developer to assure that all exposed grains were developed. If the first step is in the non-staining developer, the development would be carried only to such a point that when a following color forming development is carried to completion, the desired color rendering will be obtained.

It is, of course, impossible to lay down any specification as to relative times of the two steps since these will be determined by the particular emulsion and the factors of the developers that affect contrast and development.

This method may be utilized to control the color rendering, color intensity, color ratio or balance and contrast.

What I claim is:

1. The method of developing a color photograph which comprises completely developing a latent image in a silver halide layer, such development being partially in a color developer and partially in a separate non-staining developer the extent of the color development being so controlled as to yield a desired color rendering.

2. The method of developing a color photograph which comprises developing a latent image in a silver halide layer first in a color developer for a definitely timed interval and then in a non-staining developer.

3. The method of developing a color photograph which comprises developing a latent image in a silver halide layer partially in a color developer and partially in a separate non-staining developer, the extent of development in each developer being controlled in accordance with the desired color rendering, and the second development being carried to completion.

4. The method of developing a color photograph which comprises first partially developing a latent image in a silver halide layer in a non-staining developer and then developing it to completion in a color developer, the extent of the first development being so controlled in duration that the color development will give a desired color rendering.

5. The method of making a color record that comprises completely developing a latent image in a silver halide layer, such development being partially in a developer that yields a colored

compound and a silver image and partially in a non-staining developer yielding only a silver image, the extent of the color development being so controlled as to yield a desired color rendering.

6. The method of making a color photograph which comprises completely developing a latent image in a silver halide layer, such development being partially in a developer that yields an image comprising silver and a colored compound and partially in a separate non-staining developer yielding only a silver image, the extent of development in the first named developer being controlled in duration to produce a desired color rendering.

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