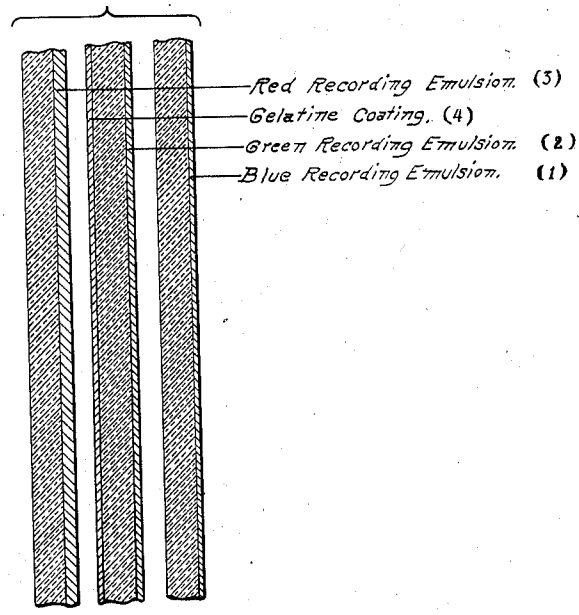
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TRI-PACK FOR USE IN COLOR PHOTOGRAPHY

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Tri-pack for Color Photography on All Three Plates of which the Same Basic Emulsion is used

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TRI-PACK FOR USE IN COLOR PHOTOGRAPHY

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This invention relates to tri-packs used for color photography and of the type in which the blue-recording layer is in front and the red-recording layer is at the back, and in which a blue-absorbing filter is interposed between the front layer and the intermediate green-recording layer.

It has hitherto been customary to use a slow emulsion, for example, a chloro-bromide emulsion, for the front layer, a silver halide emulsion of moderate speed for the intermediate layer and a fast silver halide emulsion for the back layer. It is well known that for any emulsion a curve, known as the characteristic curve of the emulsion, can be drawn between densities as ordinates and logarithms of the exposure as abscissae, and that such a curve will be a straight line for a substantial portion of its length. It is this straight-line portion of the curve which determines the region of correct exposure for the emulsion.

If now the characteristic curves of the three emulsions hitherto employed in a tri-pack of the above type be drawn, it will be found that their straight-line portions are of widely different slope, the slope of the curve for the blue-recording emulsion in general being the steepest, and that for the red-recording emulsion the least steep. It will also be found that these curves intersect one another in pairs so as to enclose between the three a small triangular area approximately to a point. It is only when the exposure is such that the abscissa corresponds to a point within this small area that the densities of the silver deposits on the three layers constituting the pack will be such as to give on development correct balance between the three negatives. As this area enclosed by the three curves is extremely small it will be appreciated that in practice there is only one exposure which will give satisfactory balance between the three-part negatives; and it will readily be understood that this is a grave disadvantage.

According to this invention the three emulsions in a tri-pack of the above type are so selected that the straight-line portions of their characteristic curves are substantially parallel and close together along a considerable part of their length; so that the latitude of the tri-pack as regards exposure is of the same order as that of an ordinary black and white film. Preferably, the emulsions are so selected that the straight-line portions of their characteristic curves are substantially coincident over a considerable part of their length.

According to a feature of the invention, the same basic emulsion is used for all three layers of the pack, the speeds of the front and intermediate emulsions being adjusted by decreasing the amount of silver halide per unit area, for example, by dilution with gelatine.

It has already been proposed in tri-packs of the kind hitherto employed in the art, in which the speeds of the three emulsions are adjusted to the values necessary for correct balance by selecting an emulsion of different type for each layer, to reduce the amount of silver halide per unit area of the front and intermediate layers in order to decrease the amount of diffusion of light by these layers, and hence to improve the definition of the image on the rear layer of the pack. It has, however, been discovered by the present inventor that an increase in the transparency of the front and intermediate emulsions also results in a reduction of the effective speed of these emulsions, so that there is no need to use an emulsion of different type for each layer of the pack, but a single emulsion instead can be employed, for by suitable dilution of the emulsion when it is required for use in the front or intermediate layer of the pack it is possible to equalize the strength of the image on each of the three layers.

Alternatively the same basic emulsion is

used for all three layers of the pack, the speed of the front emulsion being decreased by incorporating therein a yellow speed-reducing dye, such for example as auramine; and the speed of the intermediate emulsion being decreased by incorporating therein a green-sensitizing speed-reducing dye, such for example as pinachrome.

Some examples of practical embodiments of the invention will now be given.

Example I

A very fast silver halide emulsion is used for the back layer of the pack and it is sensitized for red light by means of pinacyanol. The same emulsion is employed for use in the intermediate layer, but it is first diluted by addition of gelatine until the amount of silver halide per unit area is only 75% of the normal, and sensitized for green light by means of erythrosin. The same emulsion is again employed for use in the front layer, but it is further diluted by addition of gelatine until the amount of silver halide per unit area is only 50% of the normal. No special sensitizers are incorporated in the front emulsion. A blue-absorbing filter of any of the well-known types is interposed between the front and intermediate layers of the pack.

Example II

The tri-pack according to this example is illustrated in the accompanying drawing forming a part hereof. The drawing shows a sectional view of the three components in their proper order to constitute a tri-pack according to the present invention, but slightly separated and much exaggerated to render the illustration and description more lucid.

The tri-pack comprises the following three elements:—

(1) A front emulsion-layer consisting of a plain photographic emulsion containing a yellow screening dye.

(2) An intermediate green-sensitive emulsion layer, dyed pink or containing a pink anti-curl backing.

(3) A rear red sensitive emulsion.

The same basic emulsion is employed for all three layers, and in order to balance the three emulsions and to ensure that the straight line portions of their characteristic curves will be substantially coincident, the following procedure is adopted.

The speed of the front emulsion layer is decreased by the addition of 40 cc. of a 1% solution of auramine per litre of the emulsion. The emulsion is then coated so that its coating weight is 40% of that of the rear emulsion, which is coated at normal coating weight.

The intermediate emulsion is rendered green-sensitive by the addition of 0.5 cc. per ounce of a 1 : 1000 alcoholic solution of pinachrome. This dye lowers the intrinsic speed of the emulsion, so that it is intermediate between that of the yellow-dyed front emulsion, and the red sensitive rear emulsion. Its coating weight is 55–60% of normal. This layer of the pack is provided with a backing of 6% gelatine (4) of about 1/3000 inch in thickness, containing 10 cc. of a 1% solution of erythrosin per litre. This gives the desired screening effect, so that the rear emulsion will only record the red components of the original subject.

The rear emulsion is sensitized to red light by addition of 0.75 cc. per ounce of a 1 : 1000 solution of pinacyanol. This dye does not reduce the speed of the emulsion with the result that when the latter is coated at normal coating weight, its speed will balance with the speeds of the front and intermediate emulsion.

In this manner the same basic emulsion is used throughout, with the result that if an emulsion with a long straight line portion in its characteristic curve be selected, the latitude in exposure will be very great, and the color balance will be maintained in cases of both over- and under-exposure.

I claim:—

1. A tri-pack for use in color photography, comprising a front blue-recording layer, an intermediate green-recording layer, and a rear red-recording layer, the same basic emulsion being employed for all three layers of the pack and the speed of the front emulsion being decreased by incorporating auramine therein.

2. A tri-pack for use in color photography, comprising a front blue-recording layer, an intermediate green-recording layer, and a rear red-recording layer, the same basic emulsion being employed for all three layers of the pack and the speed of the intermediate emulsion being decreased by incorporating therein a speed-reducing green-sensitizing dye.

3. A tri-pack for use in color photography, comprising a front blue-recording layer, an intermediate green-recording layer, and a rear red-recording layer, the same basic emulsion being employed for all three layers of the pack and the speed of the intermediate emulsion being decreased by incorporating pinachrome therein.

4. A tri-pack for use in color photography comprising a rear red-recording emulsion-layer sensitized for red light by addition of pinacyanol, an intermediate green-recording emulsion-layer, which contains pinachrome, has a coating weight from 55–60% of that of the rear layer, and has a gelatine backing containing erythrosin, and a front blue-recording emulsion-layer, which contains auramine, and has a coating weight about 40% of that of the rear layer.

In testimony whereof I affix my signature.

THOMAS THORNE BAKER.