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METHOD OF PRODUCING MULTICOLORED RELIEF PICTURES

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5 Claims. (Cl. 95—5)

This invention relates to color photography and more particularly to the production of colored photographic prints.

An object of this invention is to provide a simple, improved method of making colored photographic prints by hand coloring.

A further object is to provide an improved photographic material particularly adapted for the preparation of hand colored photographic images.

I have discovered that a colloidal relief image such, for example, as a washed gelatine relief image, produced by differential hardening of a light sensitive gelatine film, when applied to a white, opaque, water-resistant backing or support is ideal for my novel hand coloring, and when subjected to hand coloring according to my invention will produce a finished print having the same light and shade and color tone effects corresponding to the original subject, and the colors when applied will be absorbed by the hardened gelatine of the relief image in such a way as to give the effect of a direct color photograph. The print will show clean, white highlights, bright local color where the color was brilliantly reflected from the subject, and real shadows wherever the form of the subject turns away from the direct rays of light.

This is not accomplished by covering the image with opaque paint but by applying a dye thereto which is absorbed by the hardened gelatine relief image in varying amounts at various locations according to the local depth of the gelatine, thus giving great depth of color and tone by reason of the pellucidness, i. e., the transparency or translucency without affecting the finest details of the print such, for example, as the woven surface of a fabric.

By this method it will be apparent that any black and white photograph can be made into a colored print in which the play of light and color will practically duplicate that on the original subject.

The colloid relief image of the subject can be obtained in any way desired. I prefer, however, to employ a material specially prepared in accordance with this invention. This comprises a coating of an unhardened silver bromide gelatine emulsion on a single weight paper base. This emulsion should be treated so that it will not become hardened and insoluble with age. Chloral hydrate may be used for this purpose.

In carrying on the present invention such a material, or its equivalent, is exposed to light under a negative of the subject which it is desired to reproduce in color and then developed in any suitable developer in the usual way. The developing agents are then removed by washing for about ten minutes at not over approximately 70° F.

The gelatine is then hardened by bleaching in bichromate until the image turns brown. This operation hardens the gelatine differentially according to the depth of the silver image, producing an image of hardened gelatine on the surface of the emulsion and leaving a layer of soluble gelatine between that and the paper support.

This gelatine image is then transferred to a white, opaque, water-resistant support such, for example, as a sheet of white, opaque Celluloid. The paper is laid face down on the Celluloid and squeezed into intimate contact with it, after which they are left in a cold temperature for approximately five minutes while the gelatine image adheres to the Celluloid. Then they are washed in water of about 110° F. for a short while after which the paper can be peeled off. The soluble portion of the gelatine is then washed away until the hardened gelatine image on the Celluloid support is clean. The brownish color is then cleared in hypo, washed and dried.

The desired gelatine relief image on the desired support can also be obtained as follows:

I first make a black and white bromide print of the subject on paper, or the like. A gelatine layer on a suitable backing, such as is provided, for example, in a carbro tissue, is then soaked in sensitizing chemicals to sensitize the gelatine layer, after which the bromide print is pressed firmly face to face on the gelatine layer in order for the silver image of the bromide print to tan the gelatine and form a differentially hardened gelatine relief image corresponding to the bromide print.

The gelatine on its backing of tissue, or the like, is then peeled off the bromide print and the tanned gelatine image transferred to a preferably white, opaque, water-resistant surface which is to form the surface on which the finished colored print is to be made. This transfer is accomplished by firmly pressing or squeegeeing the face of the tissue upon, for example, a piece of white, opaque Celluloid. The whole is then immersed in hot water upon which the unhardened portion of the gelatine image begins to melt or dissolve away. The tissue or other backing for the gelatine is then peeled off the image which adheres to the Celluloid and, when all of the soluble gelatine has been washed away,

an image of hardened gelatine is left adhering to the Celluloid surface. This is then dried.

The hardened gelatine relief image obtained by either of the above processes, or by any other, is then treated to make each detail clearly discernible, preferably by bathing in a bath of black or other dye until it has the appearance of an ordinary black print on white paper. This dyeing is necessary to render the image discernible and permit the accurate application of color thereto, and further takes part in the production of the final result, reproducing the play of light and shadow which gives depth and modeling to the image as hereinafter more fully described.

The black or other gelatine relief image is then colored locally by applying suitable dye directly thereto with a brush, or the like. The application of the color dye to the image in each portion of the print gradually removes the black or other dye from that portion of the image and converts it into a colored print. The amount of color absorbed by different portions of the image varies with the differential hardening of the gelatine and consequent depth in each portion of the relief image, with the result that the same play of light and shadow as was present in the original subject is obtained in the print automatically. The highlights formed by the dye-repelling surface, in this case Celluloid, automatically resist the colors and remain clear, the half-tones accept the colors in full brilliance, and the shadows render the brilliance of the colors less and less saturated until they become black. The brilliance of the whole is governed by the amount of black which is removed and this in turn is controlled by the amount of color applied to the dyed black image. The more color applied, the more black is eliminated and the greater the brilliance of the finished print.

Although the dye may be applied in full strength to the surface of the print, it will only be received in amounts corresponding to the depth of the image, and the play of light and shade on any given area of local color will practically duplicate that on the original subject. It will be readily understood by those skilled in the art that the black dye which is added to the image as described above subtracts from white light all spectral colors approximately equally in the record of shade in the image, whereas in the high light areas, since the exposed base is dye-repellant, there is no such subtraction. When the color dyes are applied to local areas so as to replace to a greater or less extent the black dye originally applied, this has the effect of adding the desired color in the local area, since the subtraction of all colors produced by the black is then replaced by the selective subtraction of the color dye, to the extent that the color dye replaces the black dye.

It will be apparent that a hardened image of other colloids can be employed in place of gelatine, and also that other ways of obtaining a suitable gelatine relief image on the proper backing than those described can be employed and it will be apparent that the present invention can be variously modified and adapted within the scope of the appended claims.

I claim:

1. The method which comprises preparing a photographic gelatine relief image, transferring said image to a white, opaque, water-resistant surface, dyeing said image with a removable black dye, and then coloring said print locally with bright color dyes to produce a colored photographic print.

2. The method of producing a multi-colored picture within a single colloid relief image which comprises treating said image throughout with a dark dye adapted to subtract all colors from white light and which is removable from said relief, applying to local areas of said relief, respectively, different dyes adapted to give different selective subtractions of color from white light and adapted gradually to replace the first-named dye in said image.

3. The method of producing a multi-colored picture within a single colloid relief image which comprises treating said image throughout with a dark dye adapted to subtract all colors from white light and which is removable from said relief, and treating said relief to remove said dye gradually from the surface of said relief until thinner portions thereof are substantially clear of said dark dye but thicker portions thereof still retain a substantial portion of said dye, and to replace said dark dye in local areas, respectively, of said relief by different bright colored dyes, whereby each color is displayed in its local area with gradations of color density or tint in the half-tones due to variations of thickness of the cleared relief portions dyed with said color, and gradations of color shade in the shadows of the image, due to blending of the varying depths of the remaining dark dye with said bright color dye.

4. The method of making a color photographic print which comprises forming a pellucid hardened colloid relief image by exposing a sensitized colloid film to an image developing a relief image from the resulting differentially hardened film by removal of the unhardened colloid therefrom, applying an opaque, light-reflecting backing over the side of said relief from which said exposure has been made, and coloring said relief image by treating it throughout with a dark dye which is removable from said relief, and thereafter treating said relief with different bright color dyes, respectively, in different local areas of said image for gradually removing said dark dye from the surface of said relief until the half tones are substantially cleared but some of the dark dye still remains in the thicker portions of said relief, which represent the shadows of said image, and for coloring said local areas with intensity of color, tint or shade depending upon the depth of gelatine from point to point in the relief.

5. The method of producing a multi-colored photographic picture which comprises forming a gelatine relief image, combining said image with a white opaque base, the gelatine being attached, in the resulting combination, to a surface which is repellant to dyes which are absorbed by the gelatine, dyeing the entire relief image with a dark dye which is removable from the gelatine, and coloring different areas of said image differently by applying to the surface of said areas, respectively, different bright color dyes which are absorbed by the gelatine of said relief and remove dark dye therefrom to a substantial depth, whereby the half tones are substantially cleared of said dark dye and vary chiefly in density of color with variations in depth of the gelatine in said relief, while said dark dye still remains in the deeper shadow portions of said relief which vary therefore in shade with variations in depth of the gelatine in the relief.

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