THE HANDSCHIEGL AND PATHÉCHROME COLOR PROCESSES*

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Summary.—*This paper describes two old and much used color processes. In both of these the colors are applied as tints to the black-and-white prints. Handschiegl used the imbibition method and Pathéchrome the stencil system. Both systems have been used to produce release prints in commercial quantities.*

As worked by Handschiegl, his process is not what we usually term a natural color process. The most successful use for his system is in applying tints of color to the customers' own make of black-and-white prints. Good scenic prints and excellent work on titles are produced, but the method is most frequently used for giving "spotting" effects, such as in showing a red cross on the side of an ambulance, Will Rogers blushing in *The Connecticut Yankee*, or in fire scenes, which are also well adapted for coloring by this system.

In nearly every instance the customer furnishes the prints in the customary black-and-white stage. The color is applied mechanically, differing in this respect from hand coloring methods. The color tints, when blended, produce very beautiful effects.

Handschiegl started in the photoengraving and lithographic business and was very skilful at blending colors and producing satisfactory matrices. As this skill was largely individual, it died with him. The making of the master positive, from which the matrices were made, received Handschiegl's personal attention. They are obtained by printing back and forth until the parts to be colored stand out from the balance of the picture. The next step is the "blocking out" process, done by hand. This consists in painting out the parts not wanted or in shading those that are needed. From this master, the prints or matrices are made. The matrix print is developed in the usual way, then bleached in a bath that hardens the gelatin surrounding the silver particles, leaving the

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** Duchrome Film System, Hollywood, Calif.

clear portions soft as is possible. The bleached print is then immersed in a saturated solution of the dye in water, say, about two pounds of dry dye to five gallons of water, is next passed through blowers or wipers for removing surplus dyes and finally to a drying set of rollers. From such a matrix about two impressions of the same density are made and the matrix is again dyed. The life of

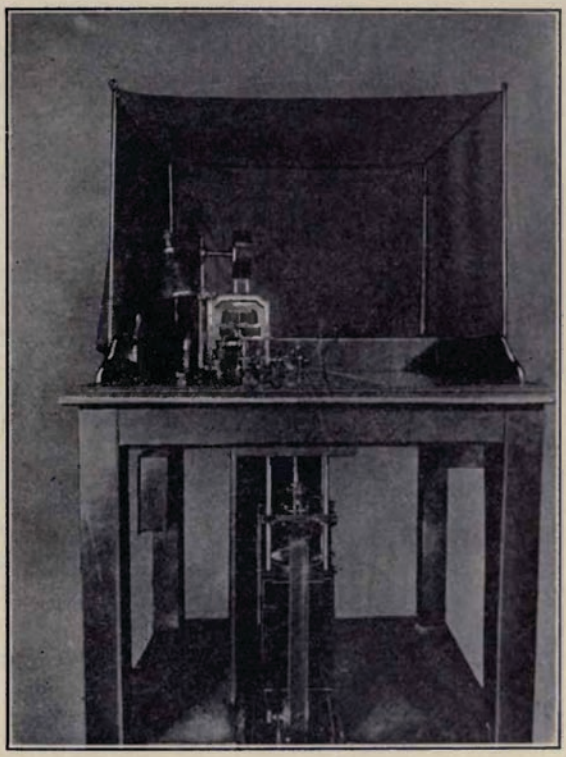

FIG. 1. Pathéchrome stencil cutting machine.

the matrix is 40 runs. The dyes used are acid dyes and not especially of Pinatype nature.

The machines for "imbibing" the dyes have three impression drums of about 12 inches in diameter with sprocket teeth that are not full fitting. Each machine has three drums, enough to use three colors in one passage through the machine. At each of the three drums provision is made for drying the matrix while the

positive continues over two or three of the impression wheels, according to the number of color tints required. The positive receiving the impressions passes from one color to the next, all three colors being applied one over the other and the blank is not dried until finished.

At the start of operations the positive which is to receive the

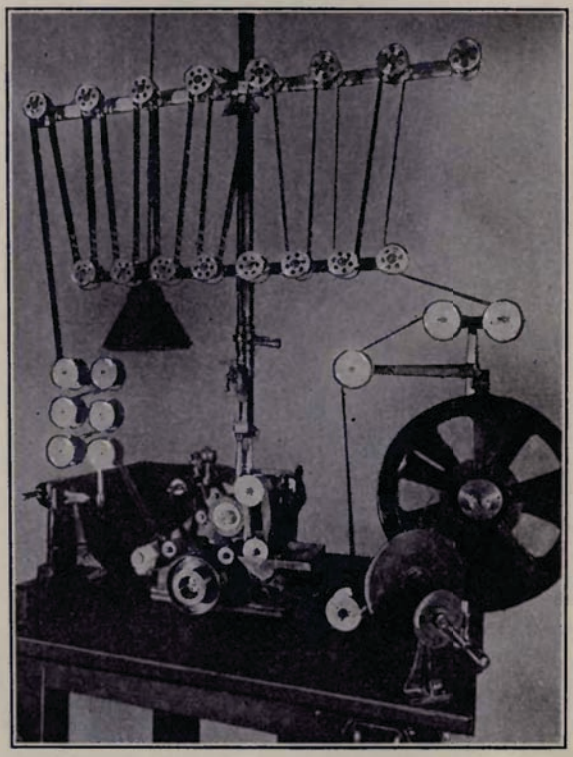

FIG. 2. Pathéchrome coloring machine.

colors is fed through damping means consisting of water and oxgall, receiving considerable wetting. Just before the two films are fed to the impression drum, emulsion to emulsion, each film is fed over a train of sprocket wheels designed to give tension for longitudinal registration, while lateral registration is attained from the adjustable lateral positions given the sprocket wheels. Discrepancies that might occur in registration are negligible, due to the color tints

being imbibed on black silver prints which tends to hide the faulty registration.

Attempts were made to apply color from color-selective negatives using this system. A black-and-white print was made from the negatives taken with a red filter. To this print were applied two complementary colors by means of matrices made from positives of each of the original two-color negatives. This produced some very excellent results, the main difficulty being that anything "black" in the subject received the greatest quantity of dye from the matrix which, when imbibed to the positive print, inclined to splash over where it would show the most.

At the speed of 360 feet an hour these matrices did not produce sufficient color on a blank for the transfers to make strong enough blacks to be used as prints without the keys, but for tinting, gave plenty of color.

The system is what is generally known as Pinatype. Blacks can be produced and the system is capable of making imbibed prints on a blank, but Handschiegl did not set up to do this type of work.

Attempts were made to colortone positive prints one color and then apply a complementary color by imbibition. To tone such a print it was not found possible to use any known color toning system without producing some relief or differential hardness on the surface of the print, even when printed to the back. For that reason it was not found practicable to make color prints in this way.

The use of basic dyes for the imbibition work is not wholly successful, the principal fault being lack of smoothness, and acid dyes were relied upon.

The matrices produce some relief in the surface but not as great as in the wash-out method. Positive prints of a quality suitable for making dupe negatives are the best. These were bleached in a bath composed of a copper salt, and bichromate, the latter controlling the hardness.

There is a great similarity in the finished product of Handschiegl and that of Pathéchrome. Both produce tints applied to positive black-and-white silver prints and both call for hand work in the preparation of the matrices. Both, also, can use the trained experience of lithographers, artists, *etc.*, as many of the colors are produced by overlapping the colors and securing blends.

The Pathéchrome matrices are cut by hand and are not at all produced by photography. A stencil is made from a celluloid strip,

one strip for each color, on a pantograph device which has a vibrating, electrically driven needle that cuts the celluloid away completely in the stencil film. The stencil film is carried under the electric needle while a companion picture film is carried in synchronism with it and projected up to about lantern size, over which the long end of the pantograph arm swings. An object to be traced is followed over the enlarged picture and the needle at the opposite end cuts away the celluloid in the normal picture. Each picture in a series is done in this manner for each of the colors that are to be applied.

The matrix film is then a series of openings through which a color is applied to the finished print. The celluloid to be cut for the stencil is a positive print from which the emulsion is later removed and the film cleaned. The show prints are made on a registering printer in which the feeding pins, in a step movement, draw both the negative and positive forward one frame at a time. About midway of the stroke, one of the feeding pins spreads sideways from the other, thus adjusting the films laterally. The prints are sometimes toned to produce one of the shades to be used.

In the Handschiegl process a photograph reproduces the matrix, while in the Pathéchrome process a stencil cut by hand does the work. In both cases, each frame is worked by hand, for in the Handschiegl method all parts not wanted are blocked out with color, by hand.

Coloring by Pathéchrome is much more rapid than by imbibition. The stencil and positive to be colored are brought into contact over a sprocket wheel while a velvet ribbon wipes a color through the stencil to the positive. This color ribbon is a loop of about one foot in diameter. A series of brushes feeds the dye to the ribbon, so that it does not receive too much of the colored liquid. The film passes through this machine at the rate of about 60 feet per minute.