

## IMBIBITION COLORING OF MOTION PICTURE FILMS.

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**A**BOUT eight years ago Mr. Max Handschiegl began the coloring of motion picture films by a system generally known by the term 'imbibition.' Mr. Handschiegl's previous experience had been in the engraving business in St. Louis and other places and he sought to apply the knowledge gained in that field to the coloring of films. In a broad sense he has utilized the printing press method of inking from a matrix or similar surface.

Imbibition merely means the transfer of a dye from one surface or body to another. He uses a color plate, corresponding to the engravers' cut or block, which is in gelatine on a celluloid base and which may be a smooth surface with dye selective areas or a matrix with raised portions.

Probably the best known of his early work was in the De Mille picture "Joan, the Woman." The procedure in such an example is for the producer to supply a positive print. From this original print, by various means, which involve printing, etching, or hand blocking, a photographic registering print is made that contains only the sections of the picture that are to be colored. If more than one color is to be transferred, then a separate plate is made for each of the colors. Fire scenes are made as a rule with a single color but the majority of the films colored by this process are done with three colors. A knowledge of the blending of three colors and the engravers' experience with the three-color printing inks is of great value.

*This system of coloring is used exclusively for productions already completed.* After a production has been cut and edited, the scenes that are to be colored should be joined into one reel, a positive print made with the same perforations as the negative, which also should be printed on a registering printer, and from this print the "color plate" is generated. Once the color plate is made in this manner, the prints for distribution may be made with different perforations, as the coloring machines can register independently of the perforations.

The preparation of the 'color plate' is the result of hand operations. This takes time and careful work as each frame in the reel must be gone over by hand. There is no room for careless work. The

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final result can be only as accurate as the hand blocking-out. These blocked-out prints are known as 'key plates' and once made will continue in service till the subject is worn out. As an example, some prints were made during September this year for which the 'key plates' and 'color plates' were made 5 years ago. The 'color plates' can be used until worn out or ruined by some accident. There does not seem to be any limit to the number of prints that can be pulled.

Some of the better known productions that have used this system of coloring are: "Joan, the Woman," "The Red Light," "Greed," "Irene," "The Volcano," "The Flaming Forest," "Phantom of the Opera," "The Merry Widow," "The Big Parade," "Sally," "Seven Keys to Baldpate," "The Viennese Medley," "The Splendid Road," "Mike," "Lights of Old Broadway."

As a result of working for many years with the subtractive form of natural color photography it was decided that this purely chemical process is incapable of giving satisfactory results under all conditions imposed in practice. Accordingly the idea sprouted forth that if a black and white record made in silver could be used as the base for a color picture that the tints could be applied by mechanical means. This would have the advantage that the 'drawing,' so requisite in all photography would always be assured. In other words, first obtain a good photograph with all the quality possible as is found in good cinema work and as required in present day pictures, and to this picture add the colors.

This has been accomplished and examples will be shown.

The negatives are made in an unusual manner, but any type of color selection negatives will answer. At present the two-color system is utilized, although three or four colors may be used if desired and a camera is used that will give satisfactory negative results.

At any rate the camera used for the examples to be shown makes two records at each exposure, one of which, the red filter record is used to first print on single coated positive stock and form the grey projection print. The positive stock of any manufacturer can be used for the reason that nothing more is required of this film than a good black and white print to which, later, the colors are added.

In all natural color prints that have reached the screen, prior to the present system, and excluding the additive systems, some chemical means of altering the silver salts to colored compounds have been employed. With such methods it is notoriously difficult to maintain uniform results.

In the present system, the method of coloring is similar to lithography. The result is a pure, grainless color or colors applied to the grey projection print. The idea, broadly, is old, for we have the same methods in the quadricolor press prints seen on magazines, calendars, and illustrations of all sorts. The printers found they needed the black or grey key print to add life and snap to their work.

Another important point from the commercial angle is that we are able to give a constant color to the prints. We can keep the color low or high but whichever is chosen the colors will be the same always. Not quite so when toning with dyes. In toning all sorts of changes occur to upset the balance of the colors or the depth of dye absorbed or washed out. These are facts that could be enlarged upon indefinitely.

So far in the discussion we have covered the negatives and making of positive prints. Now as to the making of the color plates, from which the color is transferred to the prints. In lithography, stones are used which repel greasy ink when wet. In the present system, the plates have the same quality, the gelatine repelling the colors in certain sections and having an affinity for them in other sections. Where the color runs into the gelatine, it will likewise transfer the color. As the plates need only to be made once, or at most four times to care for large orders, great pains can be taken in their manufacture, even to the making of corrections, for once made they can be used over and over again. This is the same procedure followed by the lithographer. As film orders seldom run over 350 copies, these plates will do their work to the end.

The presses that perform the work of printing long and continuous lengths of film uniformly and evenly, and maintaining the accurate register required for modern film productions, form the backbone of this most unusual process. Many years have been spent upon their construction and operation by Mr. Handschiegl, although never before have the machines been utilized for natural color work. Many machines have been made, alterations and improvements added until we reached the highly sensitive and successful machines now employed.

The finished film, in full color, is single coated. The single coating containing a black and white record, a blue-green record and a red-orange record. The film is handled and joined exactly as the ordinary positives known to every one in the film industry. The machinery having been constructed for three-color work it is intended that future work will be in that direction.

**DISCUSSION**

MR. CRABTREE: In the original process of Handschiegl how long does it take to block out the positive, and how long to put a thousand feet through the dyeing machine?

MR. KELLEY: I haven't been out there long enough to say how long it takes to make the original plates, but I am told it takes many months because the girls and Mr. Handschiegl have to block out every individual frame. As to the speed of production after the plates are made, each machine will turn out ten thousand feet a day.

MR. NORLING: In blocking out, do you use a pantograph?

MR. KELLEY: No. Some of it is done by etching even with a scalpel. A pantograph has never been used.

MR. JOHN G. JONES: Are you at liberty to tell what method is used in keeping the perforations in register?

MR. KELLEY: The quickest way to find that out is to get Mr. Handschiegl's patents on the machines. The large wheels in the picture have teeth similar to those in a projection machine. The color plate carrying the dye is stretched—it has shrunken considerably—on to the large wheel. The positives are fairly fresh and are stretched also to match the plates underneath. That provides for the up and down register. In addition, the micrometer wheels spring the film in and out so as to obtain side register. In doing outsiders' black and white work, we have to contend with all kinds of perforations—sometimes Eastman and sometimes Bell & Howell.

MR. POWRIE: Do they print the image on with ink and then stain the gelatin or do they print from the positive?

MR. KELLEY: Are you talking about the original Handschiegl process?

MR. POWRIE: Yes, the coloring from engraved plates. They usually print with a greasy ink made from precipitated lakes of dyes on printing paper, but instead of printing in this way I presume they print with a greasy ink using a negative and then stain the gelatin with a solution of dye. Is that correct?

MR. KELLEY: No, it is purely photographic, very similar to Kodachrome.

PROF. WALL: In the micrometer registration is the register on the actual image?

MR. KELLEY: It is on the original image; that is one weakness in it. We must find some different way of registering. It is still very crude.