MAGIC THREE

By LLOYD R. WHITTINGTON, '39

THE lingering, haunting blush of a summer sunset, elusive to brush; the green freshness of Spring's first outburst, evasive to pen—these have been confined in the past to quick, fleeting experiences in our lives. Creative reproductions of such moments by writers and artists can never quite render them in their true value as we have felt them. Then too, what snap-shot enthusiast has not experienced a re-living of portions of his life—pleasant events, the old swimming hole, gatherings of friends—as he glanced through his album? Or what traveller has not felt himself spiritually carried back to a beautiful Canadian lake he has visited, as its scenery is thrown upon the theater screen? Such instances illustrate the power of the camera to portray accurately and to revive clouded memories where the brush is likely to fail miserably, since its purpose is to create rather than to reproduce. Now, aided by full, natural color, the camera makes it possible to preserve and enhance our appreciation of such experiences.

Science tells us that there are seven fundamental colors— red, orange, yellow, green, blue, indigo, and violet. By a process of blending these colors, a great variety of shades—about 230 in number—can be produced.

Shortly after the discovery of these facts by the famous physicist Newton, a clear-thinking young fellow by the name of Clerk Maxwell advanced a suggestion to which we must attribute the birth of color photography.

Even more surprising than the fact that 230 hues can be formed from seven was his declaration that the same 230, or at least a great percentage of them, can be obtained by blending just three individual shades together.

Upon this basis, Maxwell further proposed an experiment for reproducing an object in natural color by photographic means. Three separate photographs were to be taken of the same object, each exposure to be made through a colored, transparent screen, or filter. The colors used were red, green, and violet, since Maxwell's theory stated that these colors, properly mixed, would produce all other colors.

Through this process, three negatives were made which, although black and white in appearance, actually contained a latent photographic record of the image—that is, a record which could be converted into a colored image. This principle is similar to that of a sound track in talking pictures. The film contains a full record of the sound, but the sound is not perceptible until special treatment is given the record. By placing transparent, positive prints of the negatives in "magic lanterns" and projecting their images in superposition upon a screen, each image passing through its respective filter, the first successful color image was produced.

Photographic color-reproduction has come a long way from the crude experiments such as the preceding account. Pages of our better periodicals are filled with direct-color photographs; movie theater-goers enjoy short and full-length features in breath-taking color at a rapidly increasing frequency, while theater managers themselves are gratified to be able to give color to patrons without additional equipment of any kind.

The most welcome stage in the evolution of Maxwell's three magic colors, however, is the simplification of color processes to a degree which enables their utilization by amateur photographers.

It is now possible for the most inexperienced owner of a home-movie outfit to load his camera with comparatively inexpensive color film, make an exposure in a manner identical to that employed in black and white photography, and receive from the processing laboratory a beautiful natural-color print, ready for projection in the ordinary method.

Processes for still-photography have not yet been placed within such easy reach of the amateur, but a recently announced method of producing color transparencies (not opaque prints) is quite as simple as the treatment of a monochromatic (black and white) photograph. Darkroom manipulation is the same, the only difference between the processes being in the use of a screen during the exposing and viewing of the picture. If a color print on paper is desired, it is necessary to make three individual negatives.

Whether or not the reader feels that he must limit his dealings with color photography to the viewing of a Mickey Mouse cartoon from a theater seat, he should have at least a general understanding of the elementary principles of common color processes in use today.

All methods of photographic color reproduction are based upon Clerk Maxwell's theory of splitting the spectrum into three colors, and all processes may be classified in one of two groups, namely, the additive process, and the subtractive process. We shall limit our discussion here to the consideration of moving picture processes, since the principles involved are of a more fundamental nature than those of the producing of opaque prints. These same principles, however, are directly applicable to the making of opaque prints.

An additive process is one such as the experiment described earlier, in which three latent images representing the red-value, the green-value, and the blue-violet-value of the object are made, then projected simultaneously through filters identical to those with which they were made.

The subtractive process also requires three simultaneously exposed negatives, but the dormant colors are brought out on the final print by dyeing the positives with colored pigments. These three images, when combined, form a full color image which is visible to the eye and which may be projected in exactly the same manner as monochromatic film.

Although these principles are the basis for all color processes of still and motion photography, years of intensive research by commercial concerns have led to numerous simplifications. For example, "Kodachrome," a popular, subtractive-type film produced by Eastman, places three emulsions, each of which has been rendered sensitive only to one of the three essential colors, together with their filters, on a single base in such a manner that the complete color image is contained in one strip of film. The prepared negative film may be compared to a tiny three-layer cake, the three emulsions being represented by the layers of cake, and the gelatine filters by frosting between the layers. Since this is a subtractive process, the real color image can be observed in the finished print.

With improvements and simplifications in color processes being continually brought forward, it is impossible to predict the unlimited possibilities in the future of color photography. Let it suffice to say that this newly-found instrument will not cease its relentless drive towards popularity and usefulness until it has placed itself, along with the familiar "Brownie" and roll-film, within the grasp of the most unskilled snap-shot enthusiast.

——"Are you really content to spend your life walking around the country begging?"

——"No indeed, lady. Many's the time I've wished I had a car."

I tried to kiss her by the mill,
One starry summer night.
She shook her head and sweetly said,
"No, not by a dam sight."

He—There are two periods in a man's life when he doesn't understand a woman.

She—When are they?

He—Before he is married and after he is married.