Photographic Notes

Having seen many color slide presentations of leprosy work and other representations from around the world and having received many black and white photomicrographs accompanying manuscripts for this JOURNAL, it is evident that many leprosy workers are, perhaps of necessity as well as interest, do-it-yourself photographers.

Our personal experience now encompasses about 45,000 color slides and large numbers of black and white photographs made directly as well as reproduced from color slides. The subjects range from photomicrographs at all available magnifications to multiple medical and pathologic subjects as well as to landscapes, art and cultural observations. Unrecorded numbers of charts, graphs, titles and illustrations have also been photographed. Most of this experience, but by no means all of it, relates to 35 mm film work.

From these experiences a few not commonly recognized observations may be of interest.

Color film. Currently there are many acceptable films with good color reproduction. Their choice, in terms of color characteristics, is essentially a matter of personal preference and purpose. Since the individual eye interpretations of color are not the same and since color varies with the light falling on the subject, there is no absolutely "correct" color rendition. Also in color photomicrography all tissue staining is essentially a variable and sometimes only partially controllable artifact. Except for comparative purposes, exactly reproducible color rendition is not necessarily worth striving for. Reasonably acceptable rendition is often adequate if accompanied by clean color contrast and color impact. This is particularly true of material used for lecture purposes.

For lecture purposes one additional quality, that of color uniformity, is pleasing. Frequent shifts from one film color representation to another can give an uneven effect. If the same film is used throughout, the color "flows" uniformly, with impact and without variational distraction.

Color film durability. Given the above considerations, a paramount factor in the choice of color film is the keeping quality of the processed slides. Here there is, in our experience, very little choice. About 1940, we saw an amateur movie made in Africa, the first half of which had been shot on Kodachrome film. Apparently the available supply of Kodachrome was then exhausted and the remaining half of the film was shot on another color film. The whole was spliced together and therefore had been kept under identical conditions and projected equally. At the time of our viewing the Kodachrome portion retained its brilliant image while the other half of the film presented images in a uniformly muddy purplish blue hue.

In 1949, we carried Kodachrome and another 35 mm color film with us to Hong Kong. The latter was used first, processed locally and provided beautiful color slides. However, after about 18 months in that semi-tropical and often moist and hot climate, the slides were a total loss as far as color was concerned. Other slides on the same type of film but left in Chicago were found to be color intact 6.5 years later and survived in that climate for some time longer.

In the early 1950's, our university department in Hong Kong had the same experience with loss of color slides, and assuming that it was a matter of Kodak Co. quality superiority, the department against our advice switched to Ektachrome color film. In about three years there was the beginning of color loss and recourse was then made to Kodachrome film.

To our knowledge there are three basic characteristics of Kodachrome film which account for its durability.

1. Kodachrome is a three layer color film in which all its color ingredients are incorporated into the film during its manufacture. Development is essentially a subtractive process by which the excess color is removed leaving the color balance dictated by the film exposure.

In the other color films with which we have had experience, development is an additive process by which the color dyes are coupled to the film in processing.

2. Kodachrome can be processed only in Kodak licensed plants where quality control is rigid. Other films processed locally in many areas are subject to quality variation due to aged solutions or other variables introduced by the processor.

3. Kodachrome film has a resistant lacquer coating added on the developed film at the processing plant. This is not available to other film in most processing establishments.

Problem of mold growth on film. The lacquer coating on Kodachrome is quite resistant to mold. Unless the mold has been allowed to grow for some time it can usually be wiped off with there being no apparent underlying color loss. On film not so coated, the vegetative mycelia of the fungi readily penetrate into the film and the color in that area is lost, leaving unsightly discolored spots.

In order of importance, there are four major factors responsible for mold growth: moisture (e.g., of air), lack of air circulation, darkness, and warmth. Of these, moisture is by far the most important, and the other factors can generally be ignored if the film is kept dry. This can readily be done by packing the slides around bags of dried silica gel in tape-sealed containers. Alternatively, for convenience of access, cabinets with rubber sealed doors can also be kept dry with silica gel. The silica will need to be baked dry periodically.

We have in our slide collection a large number of Kodachrome slides of pathologic material made in the 1940's, some as early as 1941. They sojourned in Hong Kong under the conditions just described and were used many times. Now, 25 years after their preparation, they show no sign of color degeneration and are still in regular lecture use.

Exposure of color film. Remarkably, photography and travel magazines seem not to carry the information that the use of color film requires a change in its ASA rating depending of the latitude at which it is used.

Thus, Kodachrome 25 has an ASA rating of 25 and performs well at this rating north of about 25° latitude. Roughly, south of this latitude it performs better if the exposure meter is set at ASA 18-20. Likewise, Kodachrome 64 rated at ASA 64 performs better at about ASA 50 in southern areas. Some photographers make the compensation of increasing the exposure by about one stop. This has been checked out many times using both the same combination of camera and exposure meter as well as using different camera-exposure meter combinations.

Of course this change in ASA rating applies only to photography in daylight and does not apply to artificial light or electronic flash lighting.

The reason for this is not quite clear. However, shadows tend to be heavier in southern latitudes. Also, darker-skinned individuals photograph better at this increased exposure setting. Also the light and atmospheric conditions seem to have a qualitative difference not adequately registered by the usual photoelectric meters on cameras or even by good quality separate meters.

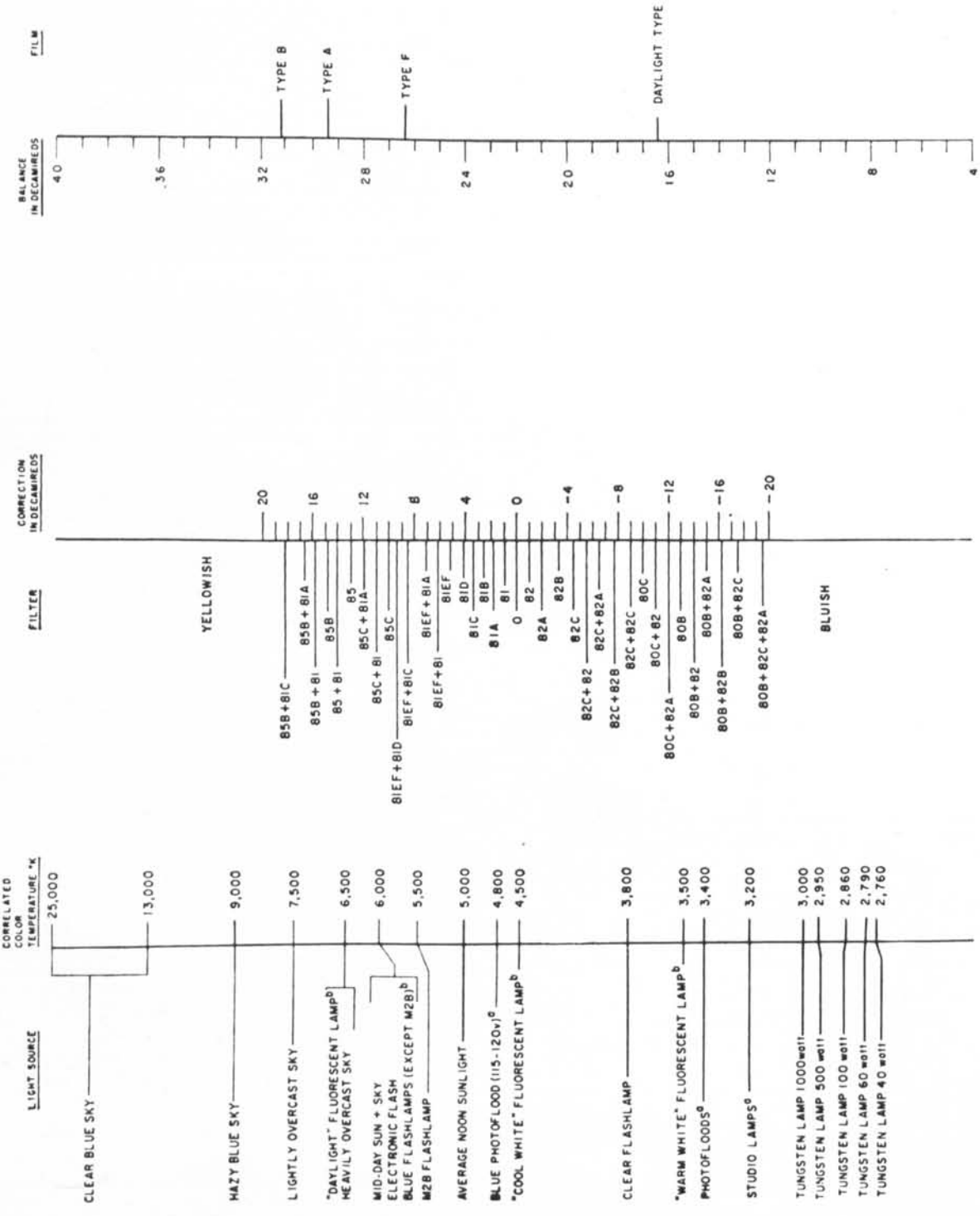
Routine use of filters. We routinely keep both a polarizing and a skylight filter on our single lens reflex 35 mm cameras. By using the polarizer according to the instructions accompanying it the color saturation of the

Accura Enteco Kodak Tiffen Walz	Ednalite	Harrison and Harrison	Enteco Hasselblad Lifa Rollei Tiffen
85B	Chrome B	C-5	R13
85	Chrome A	C-4	R11
85C	Chrome F	C-2	R8
81EF	CTY6	C-1	R5
81D	CTY5	C-½	R4
81C	CTY4	C-¼	R3.5
81B	CTY3	C-¼	R3
81A	CTY2	C-⅛	R2
81	CTY1	C-⅛	R1
Skylight	Chrome Haze	U.V.-Haze	R1 or 1.5
82	CTB1	B-⅛	B1
82A	CTB2	B-¼	B2
82B	CTB3	B-½	B3
82C	CTB4	B-½	B4.5
80C	80C	B-2	B8
80B	80B	B-4	B11

Various manufacturers label filters differently. Those listed in left-hand column above are used in the Nomograph; others are approximate equivalents.

COLOR FILTER NOMOGRAPH

Here's how to select the proper filter for almost any combination of color film and light source. Place a straight edge across the Nomograph so that it lines up with the color film and light source you're using. Read the proper filter at the point where the straight edge crosses the middle column. Dotted line example shows that for Type B film and 60-watt tungsten source, the proper filter is an 82C; or (see opposite page) CTB4, B-½, B4.5.



exposed slide is significantly increased, reflections are subdued or eliminated, and the transparencies are accordingly more brilliant. Now that through the lens photometric exposure measurements are common on 35 mm cameras, the problem of the change in exposure required by the polarizing filter is automatically taken care of by the metering system.

The polarizer may have to be removed when photographing through airplane windows since polarization of the window tends to give a rainbow-like color superimposition.

Photographic lenses. *Macro-lenses.* Several high-priced and some medium-priced single lens reflex cameras now offer either 40 or 50 mm macro-lenses. We now elect to purchase and use the macro-lens in place of the standard 50 mm lens. It is true that the macro-lenses tend to be slower rated, at around f 3.5 to f 4, but this is easily compensated for by available higher film speeds.

The macro-lenses have the supreme advantage of permitting focusing directly on small objects such as an eye or a flower without the fuss of accessory close-up lenses or extension tubes. Finishing an extreme close-up photograph, one can turn around and focus directly on a mountain range, such as the snow covered Himalayas, or other broad landscape. All intermediate ranges are easily covered.

The macro-lens is also very convenient for photographing charts, graphs, pages of books or other photographs.

Wide-angle lenses. These lenses, particularly with focal lengths of 28 mm or 35 mm, are very helpful. In close quarters they permit the inclusion of a much broader angle of view than does a standard 50 mm lens. Also, when using a flash they effectively increase the area which a given flash can cover by permitting the photographer to stand much closer to the photographic subject. One needs, however, to make certain on purchasing a flash gun that its angle of light coverage is wide enough to suit the wide angle lens in use.

Telephoto lenses. The 135 mm focal length telephoto lens is about the maximum size that the average person can hand-hold without undue shaking or the need for a tripod or other support.

The human eye "sees" a broader angle of view than it consciously concentrates on. The 50 mm lens records the approximate area of this vision. When it is used the photographer is often surprised that there is so much more in the photograph than that which he was concentrating on photographing. The 135 mm lens covers approximately the area that conscious vision concentrates on and the resulting photograph, of say a gargoyle of a roof, is a close approximation of the viewer's memory of it. Additionally, the 135 mm telephoto is very good for distortion free portraiture.

Exposure determinations for photomicrography. Good photomicrographic microscope attachments with automatic exposure determinations are, of course, available and, of course, tend to be expensive and unavailable.

Simple adaptors are available for many 35 mm cameras which permit their use for photomicrography but leave the problem of exposure to educated guesswork or trial and error.

It may be useful to know that the Brockway Norwood exposure meter for both incident and reflected light has a photoelectric light gathering area that almost exactly fits over the standard monocular microscope barrel. Its photoelectric cell is sensitive enough to permit a reading even with oil immersion objective, assuming that a fairly high intensity microscope light is available. This type of meter can thus be used in the laboratory and in the field for general photography. It can also be used for photomicrography, and we used one in this manner for many years before more sophisticated equipment became available to us. With the meter the light transmission of each objective plus ocular combination is used. Exposure trial with film using several exposures will quickly establish the exposure needed for that light level. Thereafter, when photographing specimens on slides, the light intensity is brought to the desired intensity by control of the condenser diaphragm when using color film so that the color temperature of the light is not seriously altered. For black and white photomicrography this is not so important and a reostat control can be used to control the intensity of the light transmitted.

We have had a single exposure meter of this type in use for about 20 years and it still functions well.

Black and white 35 mm photomicrography. A major problem in even well-focused and

exposed photomicrographs, assuming availability of a reasonably good and a properly aligned optical system, is a lack of adequate contrast and sometimes of detail definition. The use of high contrast paper is not always a good or adequate compensatory method.

A variety of special films are available but not always readily available. Kodak High Contrast Copy film is utilized for a variety of copying purposes and is therefore available in many areas. It functions beautifully for photomicrography if developed in an ultrafine grain developer such as the single mix UFG developer produced by Ethol Chemicals of Chicago, Illinois. This film is rated at ASA 64 but in combination with this developer the rating falls to ASA 35. In this combination a development time of 7.5 minutes at 75°F works well. The resulting 35 mm negatives have good contrast, excellent definition and good gradation. The grain is very fine and large enlargements can be made.

Where these materials are available this is a simple method of achieving acceptable to very good photomicrographs suitable for good publication reproduction. It is quite probable that similar combinations of materials from the manufacturers, which may be locally available, may be equally suitable but our experience is limited to the materials described for achieving optimum results with readily available supplies.

These notes are presented because their suggestions have been made in conversations to many personal contacts who seem to have found them helpful.

Finally, the accompanying "Color Filter Normogram" is reproduced with permission from "Modern Photography," October 1962 issue. We have not readily found this information and since finding this Normogram we have found it to be very useful. It was originally designed by C. S. McCamy of the National Bureau of Standards in Washington D.C., U.S.A.

—OLAF K. SKINSNES