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PHOTOMACROGRAPHY USING COMMON EQUIPMENT

THE ENLARGER AS A MACRO CAMERA

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roducing effective and interesting photomacrographs doesn't require elaborate and expensive equipment. In fact, you can use the enlarger as a photomacrographic camera and get very good results. Consider for a moment that every time the enlarger is used for printing, the enlarger magnifies a small subject (the negative), projecting it down to a sensitized product. Using that concept as a starting point, it's easy to transfer darkroom techniques used in traditional enlarging to photomacrography for semi-transparent subjects.

ENLARGERS

All enlargers will work for this purpose, however an enlarger that is capable of accepting at least the 4 x 5 format will work best. For subjects smaller than 1 x 1.5 inches, a 35mm format enlarger will work just fine.

The enlarger works effectively as a camera for subjects that are transparent or semi-transparent. Subjects that are totally opaque will not allow light to pass through. Subjects such as leaves, insect wings, fabric, prepared microscope slides work well using this technique.

FILM

You can use most negative or positive films to produce images using this technique. Some emulsions will work better than others. Typical criteria for a film would be very fine grain, with good resolution, a panchromatic

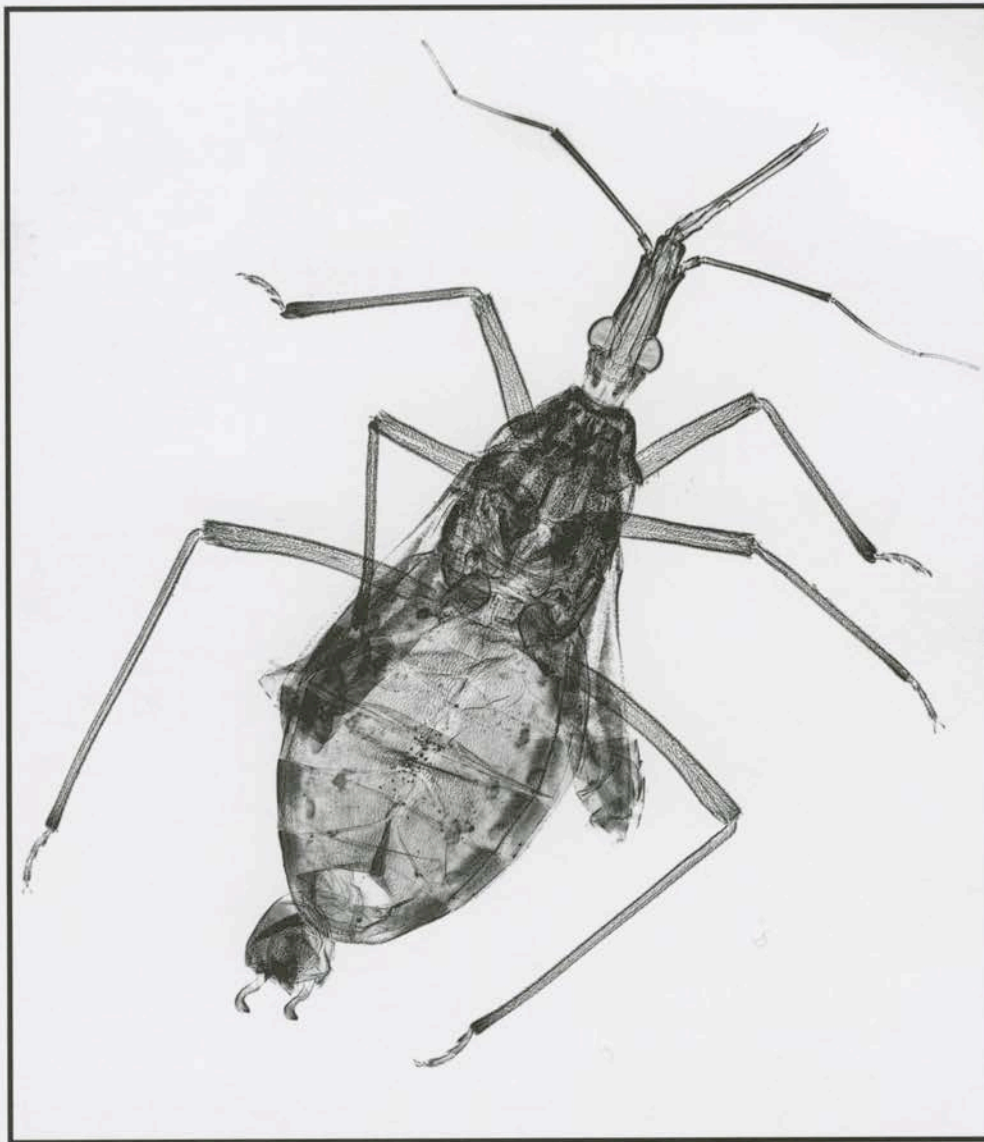
spectral response, medium to low speed (ISO 12 -100), and a medium contrast potential that is easily adjustable through processing. An example of this would be ILFORD FP4 PLUS. Remember, using the enlarger as a macro camera will necessitate working in total darkness.

Sometimes you will need even more contrast. A common remedy to this problem is to use high contrast film like ILFORD Ortho Plus Film, processed in Multigrade developer 1+9. It is orthochromatic and will render the red regions of a subject as absolute black as a consequence of no response in the red spectrum. The film, however, can be handled under a red safelight.

EXPOSURE

Films typically exhibit more sensitivity than papers. As a result, methods may be necessary to reduce the brightness of the enlarger. Common exposures for film might be found to average between 1 sec and 1/1000 second. These times will be too short for the enlarger timer to handle. Reducing brightness by closing the aperture is not a viable option for this type of work because of image degradation as a result of diffraction.

One common method to reduce exposure is to use neutral density filters. These filters can be used to reduce the enlarger brightness, and are placed in the bellows directly on top of the lens. By raising the head, access to the rear of the enlarging lens can be achieved and the filters can be placed there. If neutral density filters are not available, a polarizing filter will



Assassin bug, x6 in negative, FP4 Plus, 4 seconds at 5.6, 1 stop brightness reduction, D-11 developer straight, 4 minutes @ 68 degrees

function adequately for this purpose and two polarizers used together allow various amounts of brightness adjustment.

CONTRAST OF THE NEGATIVE

One last consideration and potential problem using this technique involves tone reproduction. Producing images with the enlarger as the camera will typically include an input (subject brightness) range less than adequate for full tone results. The brightness range often found in this application is typically 8:1 or 16:1 which is only about a 3 - 4 stop range. Consequently, most subjects photographed using this technique will require extended development times to produce a negative

with a higher contrast. This can be achieved by adding approximately 25% to the development time.

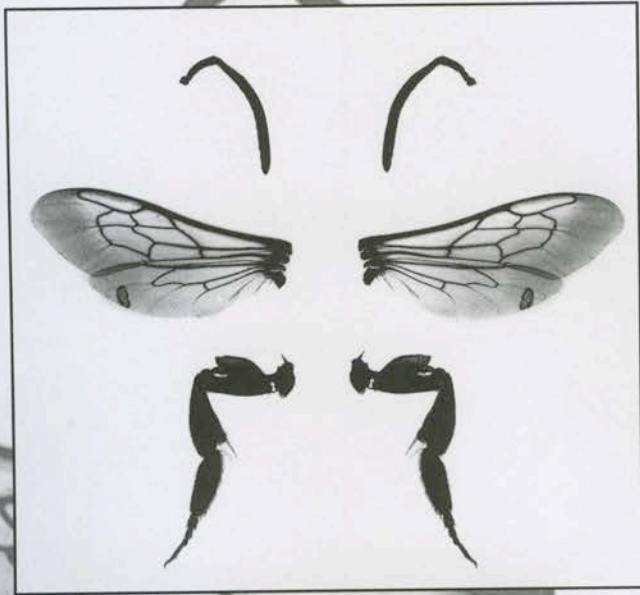
EASELS AND FILM MANAGEMENT

Cut film holders work especially well to hold the film secure, however a jig will need to be devised for registration and focus. You can focus on a sheet of white paper on one side of the holder and load the other side with the film. When using an enlarging easel, a dummy sheet of film will be needed as a focusing aid as with above. More importantly though, the surface of easels are often painted yellow or white for ease of composing and focusing. This is great for enlarging papers, but not so good for film. Better results are achieved with the

use of a piece of exposed and developed paper or film with its black Dmax underneath the film when exposing. This technique will minimize back reflections and back scatter from the easel which will lower contrast. Lower contrast will influence the appearance of sharpness and resolution.

LENS AND APERTURE

The lens is a very important component. An enlarging lens might have a negative influence on results when used for traditional printing, however when magnifying smaller structural details using this technique, a poor lens' performance will be enhanced. Consequently, a good flat field enlarging lens is ideal. Flat field lenses render edge to edge sharpness with no distortion.



Bald faced hornet, x4 in negative. Ortho film, 3 seconds at 5.6, 1 stop brightness reduction, D-11 developer straight, 6 minutes @ 68 degrees

Small apertures will produce diffraction. Diffraction is the bending of light caused by an opaque edge. The result of much diffraction will be a loss of resolution or fine detail. For this reason, the use of the lens' "optimal" aperture becomes paramount for fine detail rendering. Often this aperture is located two stops from the maximum opening.

SUBJECT PREPARATION

Subjects that are semi-transparent are ideal for this technique. The simplest method is to place them in a glass negative carrier. If a glass carrier is not available, a modified carrier can be created by using thin pieces of glass similar in size to the negative carrier. Tape the glass firmly closed. Care should be taken to keep the glass surfaces as clean as possible. You can also use a 35mm glass slide mount with a mounted transparency carrier for the enlarger.

NEGATIVE EXPOSURE TESTING

Compose the image on the film holder or easel. With the image crisply focused, make a test for exposure. If using a cut film holder, the dark slide can be slid across the film to make a series of exposures on the film. Process the film and evaluate it. For final exposure, you can dodge and burn as needed.

CONCLUSION

This procedure will allow students to produce photomicrographs of transparent as well as semi-transparent subjects. Since an original negative is being generated using this method, critical care must be taken with each step. Small errors here and there will compound themselves and the resultant images could appear "quite" soft. However with care and attention to detail, high quality results are easily obtainable.

Editor's Note: This article was edited to fit the space allotted. If you would like a copy of the unabridged version, which includes detailed info on contrast indices and magnification formulas, send an "e" mail message to Mr. Peres at: mrppph@rit.edu

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