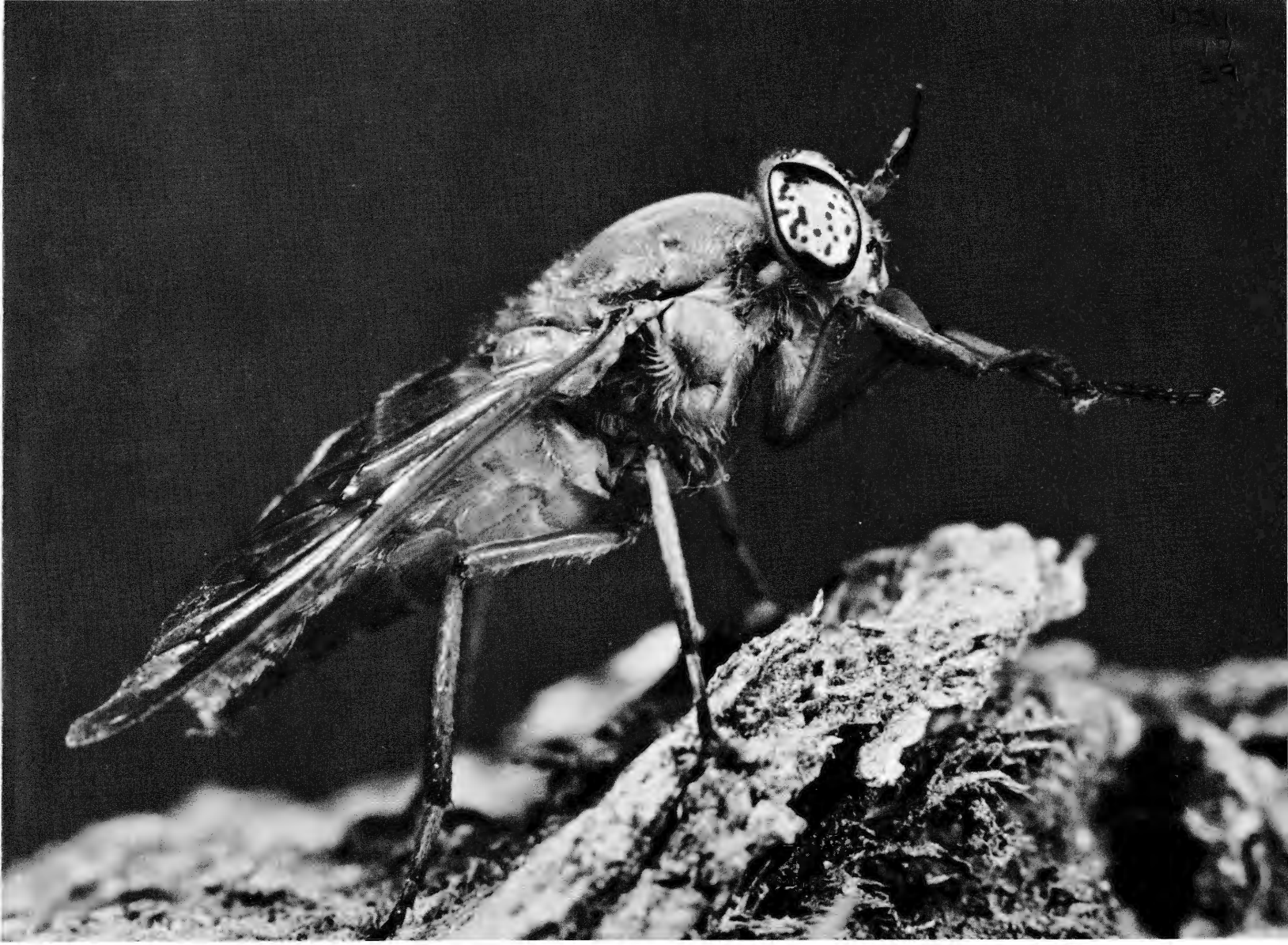

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INSECT PHOTOGRAPHY

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Taking pictures of insects can be discouraging if the right techniques and equipment are not used. Many books on how to take pictures are written for the professional photographer or serious hobbyist, but few give directions on how to take pictures of insects. Procedures in this publication are presented with the entomologist, hobbyist, and extension specialist in mind—persons who may not be professional photographers.

EQUIPMENT YOU WILL NEED

The following equipment will provide the things you need for good insect photography.

CAMERA: A single lens reflex (you see the picture through the lens and focus on the viewing screen) is required since a number of interchangeable lenses are available and a wide range of magnifications can be easily obtained. Some cameras have interchangeable viewing screens suited to a variety of picture taking requirements. Using a plain mat (ground glass) or a plain mat with cross hairs makes it easier to focus at high magnification. Avoid split image rangefinders as they are difficult to use for this type of photography. Personal preference may dictate the use of other types of screens.

LENSES:
50-55 mm macro lens with a 1:1 adapter
35 mm wide angle
50 mm (normal lens)
105 mm (telephoto)
200 mm (telephoto)
300 mm (telephoto)
Close-up lenses: 3, 2, 1, ½ Diopters
Vivitar 70-210 mm Series I VMC (telephoto, zoom lens and macro)

OTHER ITEMS:

Bellows
Lens reversing ring
1-3 tripods
Focusing rail
Cable release
Felt cloth or paper in 12-inch square pieces in various colors
Waist level viewer
Extension tubes

FLASHES:

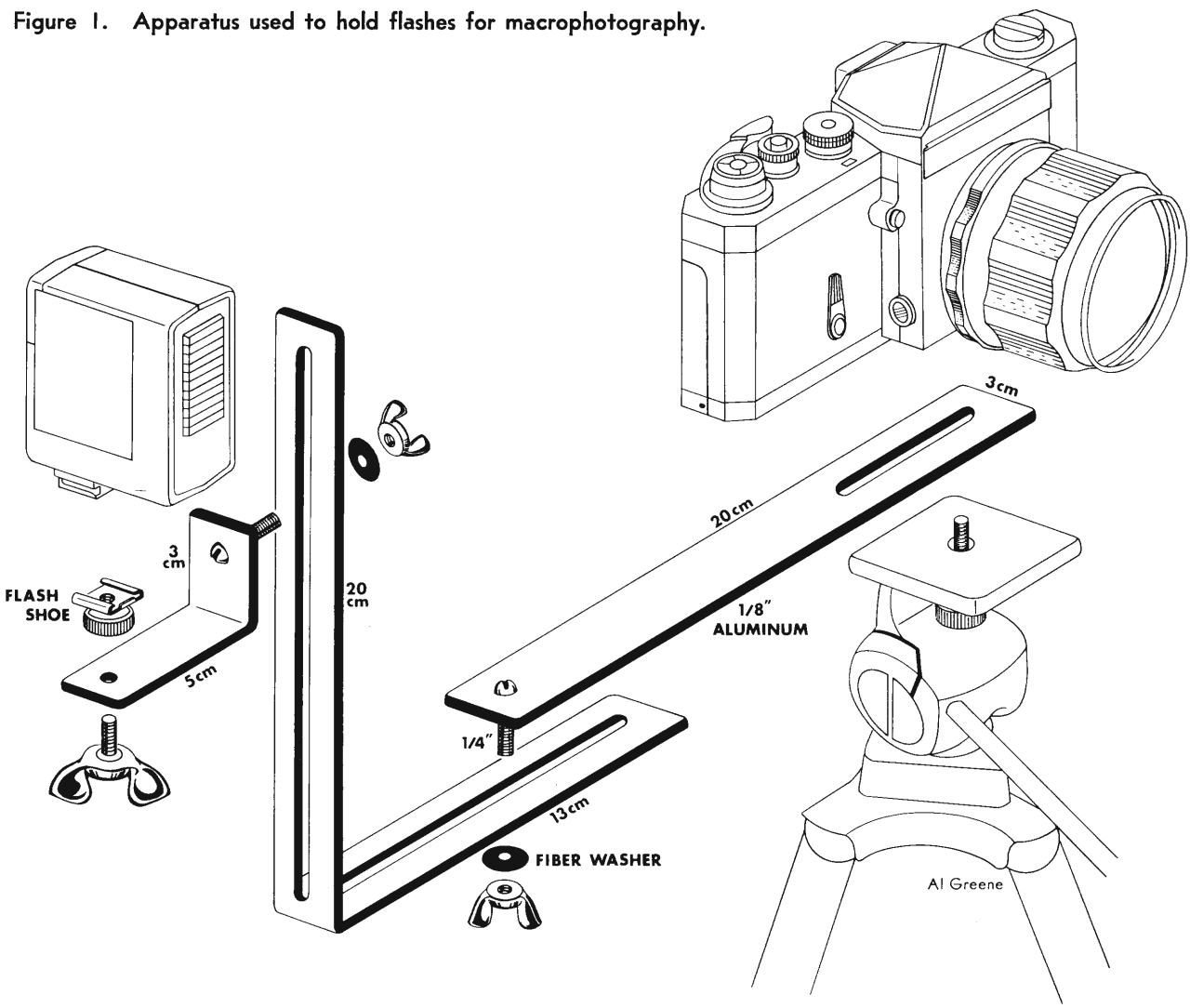
Two small electronic flashes having a guide number of 25 or more for film of ASA 25 and a color temperature of 5600° K (produced by a number of manufacturers such as Bauer, Braun, Honeywell, Kako, Metz, Rollei, Vivitar).
Multiple (usually 3) prong flash connector
Flash extension cords

For large insects, flowers, and similar subjects, use of close-up lenses or extension tubes is the least expensive and simplest way to take pictures. However, the most useful lens for photographing insects is the macro lens with a 1:1 adapter. (Macro lenses are available for Canon, Exakta, Fujica, Konica, Leicaflex, Mamiya-Sekor, Minolta, Miranda, Nikon, Olympus, Pentax, Ricoh, Topcon, Yashica.) This lens will allow you to fill the frame with large insects.

If you want still higher magnification, place the macro lens on the end of the bellows. With the bellows fully extended, an insect about 1.5 mm long will nearly fill the frame. Reverse the lens (attach to the bellows backwards by means of a lens reversing ring) at extreme magnification for maximum resolution (sharpness of detail).

The 105 mm telephoto with three close-up lenses will give nearly as much magnification as the macro-lens. With close-up lenses, the 35 mm wide angle permits macro-photography of large caterpillars, grasshoppers, and other long insects. The telephoto lenses, used in conjunction with

Figure 1. Apparatus used to hold flashes for macrophotography.



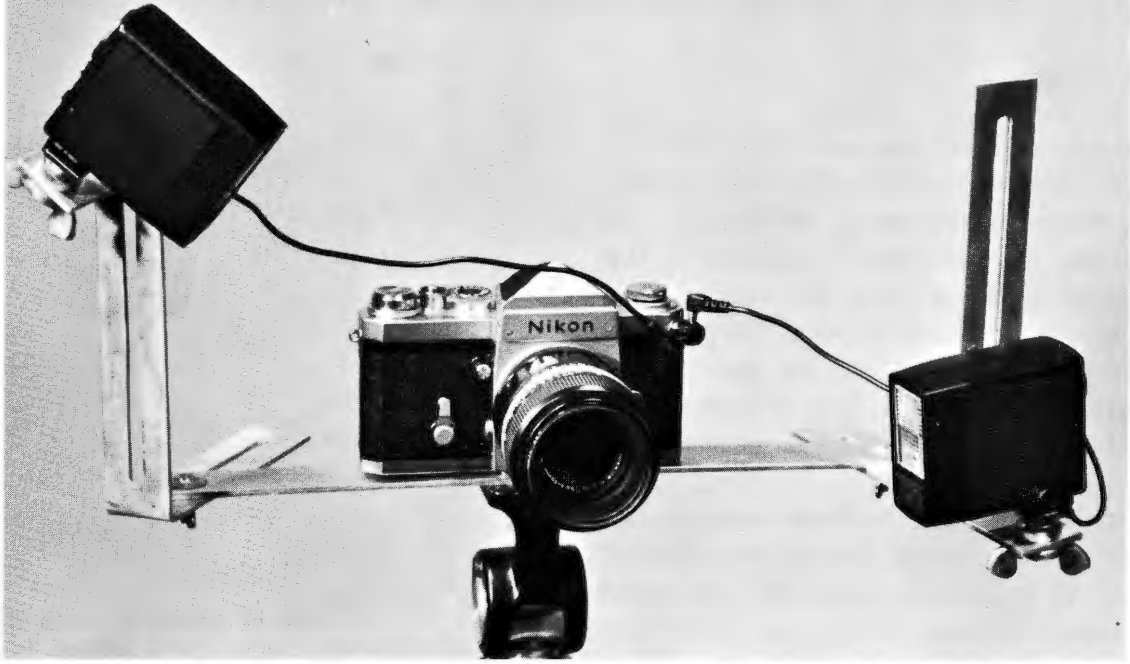


Figure 2. Camera with flash holders and electronic flashes ready for use.

bellows, permit life-size magnification without getting so close to the insect that it is disturbed and may permit more effective lighting, a better angle of view, and better proportion.

USING FLASHES

The apparatus illustrated in Figure 1 holds two small flashes. It is adjustable to an infinite number of positions and, by experimentation, the correct position for the flashes can be arrived at quickly. Always use f-16, 22, or 32 to obtain maximum depth of field. Vary the distance from flash to the subject to obtain the correct exposure. When the lens is to be used for extreme magnification, as with bellows, reduce the f-stop to 5.6 or 8. Closing the diaphram to f-16 or 22 causes light to scatter and may result in an unclear, fuzzy picture.

Locate the flashes 15-20 cm from the subject. Position them to enhance or eliminate shadows (Figure 2). A single flash can provide good results if you place it directly over the insect or above the camera and point it at the insect.

Some inexpensive, small flashes produce a very cold light (6000°K) which results in a "bluish" (cold) picture. A Wratten 81 A filter placed on the lens will cancel some of the blue cast, giving a warmer (red) picture. Covering the flash with tissue paper will diffuse the light and reduce unpleasant shiny spots on the specimen.

It is easier to use flashes than any other light source. Even outdoors, flashes are generally used to maintain an f stop of 16 or more, thus providing an acceptable depth of field and also stopping subject motion. The apparatus in Figures 1 and 2 can be constructed in an afternoon with a bench vise, a torch to use in bending the metal, a drill and several bits, a file, and two Spiratone flash holders. Bar aluminum can be purchased at most hardware stores and cut with a reciprocating saw to the desired sizes.

Ring flashes are useful for some macrophotography but usually give a flat (shadowless) picture which is not aesthetically pleasing.

HOW TO HANDLE THE SUBJECT

The best pictures of insects are taken in their natural surroundings. A tripod is awkward and generally useless in the field. With camera magnification and f-stop pre-set, many insects can be approached with the camera hand-held. In this case, the flash holder is attached to the camera by a large wing nut. The short exposure time of the electronic flashes eliminates the effect of camera shake and permits use of f-16 or 22 to maintain depth of field. A cloth pillow or bag filled with styrofoam pellets makes a useful, readily adjusted camera support for the field.

However, it is sometimes difficult to take pictures of insects in natural surroundings and in natural poses. Do not forego pictures merely be-

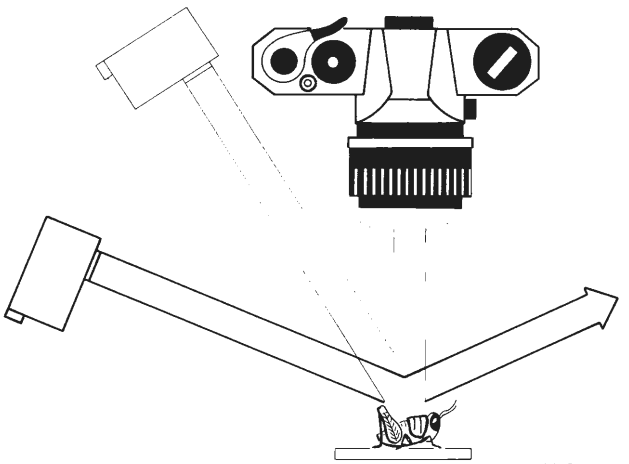
cause the opportunity does not present itself in the field. The main point is to find the insect and then produce an appropriate background. In many cases this will involve clipping a few branches off a tree or shrub and using these as props in your laboratory or home. If the insect is found on grass, flowers, etc., use some of these materials. Use the natural host, if known. Such material also gives an indication of the size of the insect.

Most beginners use too much material. Remember that the camera field of view is small; use only one twig or at most a few. Sometimes it is pleasing to place several twigs or leaves in the background where they will be slightly out of focus and yet give the picture a natural composition.

When using color film, the very best pictures are obtained by using a colored background. While colored paper will suffice, inexpensive squares of felt cloth, obtainable at variety or fabric stores, are more pleasing. Black, blue, and green are generally the best colors, although experience will indicate which is best with your subject. The background is usually held out of focus so that it is contributing only color, but in some instances the background texture may provide a more pleasing picture in focus.

Insects can be difficult subjects. They tend to fly or crawl away just as the shutter is being snapped! While this cannot be eliminated, several procedures may make the task less difficult. If a refrigerator is handy, the insect can be immobilized by cold. If not, ether is the next best substitute (if used sparingly and in a ventilated area). You can then place the insect in position on the vegetation and take the picture when the insect has recovered sufficiently to appear normal but before it regains enough vigor to leave.

Pictures can be taken on or through a reflecting surface if the correct procedures are used. For example, pictures of ants or bees can be taken in laboratory nests through glass lids if the glass is scrupulously clean. Pictures of aquatic insects can be taken from directly above or through the walls of a square glass container.



Al Greene

Figure 3. The angle of incidence equals the angle of reflection. When taking pictures on a shiny surface, place the flashes at a very obtuse angle to eliminate surface reflections. If done correctly, only light reflected from the specimen will enter the lens. When the flash is placed closer to the camera, opportunity is greater for surface-reflected light to enter the lens.

Remember, the angle of incidence of light equals the angle of reflection (Figure 3). Place the flashes at oblique angles to the glass or water surface so fewer reflections enter the camera lens. If the correct angle is not used, reflections will appear as washed-out areas on the picture. Round containers tend to reflect light in all directions; do not use them to hold specimens for pictures. Use of a polarizing filter on the lens will also reduce reflections.

If magnification is high, it is sometimes easier to mark the field of view with pins and take the picture when the insect darts through the field upon which the camera is focused.

Until these techniques are well in hand, the inexperienced photographer should keep a log of his or her efforts. By comparing pictures obtained with the notes taken, poor choices of camera setting, lighting, or background can be quickly corrected.

More experienced camera (and insect) fans may want to purchase Kodak Technical Publications N-12A, *Close-up Photography,* and N-12B, *Photomacrography.*

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