

LIGHTING

Lighting for Medical, Dental and Scientific Photography

The unique features and versatility of the Exakta make it the preferred camera for scientific photography. In addition to having the proper camera and accessories, however, suitable lighting is of particular importance.

A brief summary of the essentials may help you get a start in the right direction. Ingenuity and experimentation will be required as each lighting problem arises.

Dental Photography. The basic lighting requirement for oral photography is a minimum of shadows. Flat lighting from two lamps, one on each side of the camera, is preferable. Because most dental photographs are taken at close range, provision should be made for keeping the heat from the lamps at a minimum. Units can be constructed to permit the use of dimmed lights during the viewing and focusing operations. When the exposure actually is made, the lamps burn momentarily at full intensity but give off comparatively little heat. If purchased, such units range in price from \$70 to \$110, depending upon their features, which may include special mounts for the camera, handgrips with fingertip control of switches and flexible adjustments of light position.

For the beginner or the person with a very limited budget, a simple lighting set-up, such as the Foldomatic, will prove quite satisfactory. The Foldomatic costs about \$10 and has flexible arms for varying the position of the bulbs. An inexpensive clamp can be purchased so the unit may be fastened to the table or mounted on a tripod. The lights can also be plugged through a cut-off switch to permit dimming during the preliminary stages of picture taking.

General Medical Practitioner. Such individuals encounter a tremendous variety of injuries and diseases. It is impossible, for practical reasons, to have one single-setup that will guarantee a perfect picture in each case. It is also unlikely that a general practitioner would have the time or facilities for taking all the highly specialized types of medical photographs that may be required.

To be able to take a satisfactory picture under average conditions, the type of equipment suggested for dental photography provides a reliable set-up. In special instances, it may prove helpful to have a small spot-light available to highlight a particular area or to use as a side light for creating shadow in order to outline a raised area or scarred tissue.

The Eye Specialist. Modern electronic flash is ideal for external photographs of the eye. Its chief advantages lie in the fact that it is a cold light source which cannot cause heat injury to the eye; its great speed is faster than blinking and other movements of the eye; rapid recharging of a unit permits several exposures in quick sequence. Two small electronic flash units are preferable to one large one. If both units are mounted on either side of the camera as suggested with the Foldomatic, the illumination on the subject will be more even.

The Dermatologist. Since many skin conditions are irritated by heat, the

electronic flash unit is preferable to floodlamps unless a device is used for dimming them until the moment of exposure. To obtain enlarged details without moving the camera and lights too close to the patient, a telephoto lens can be used. Particularly with the patient who is nervous or has a photophobia, the telephoto lens will make it possible to record a small area of skin without having to approach the patient closely.

Photography of Natural and Surgical Cavities. For photography of the throat, internal organs and cavities exposed during surgery, the problem of lighting is more complex. The transmission of light into the cavity without interfering with the line of vision and the axis of the camera lens is the main difficulty. The light is frequently projected onto a series of mirrors and focused into the cavity. The main mirror may also have a circular hole in its center to allow photographs to be taken through it.

Surgical Photography. Compact camera and lighting set-ups are essential in the operating room. Since it is usually impossible to approach the surgical table for close-ups, the telephoto lens is most convenient. An elevator tripod or high ladder can help raise the camera to a height sufficient to give proper perspective. As a rule, lights cannot be placed very near the operating table for sterility reasons and because of the excessive heat from ordinary photographic bulbs. Baby spotlights, or if possible, a permanent installment of additional fluorescent lighting can help overcome this difficulty. If you are using tungsten type color film, take care not to mix flood lamps with sunlight or daylight type fluorescent lighting.

Photography of the Internal Organs. The Gastroentologist, Proctologist or other specialist examining internal organs has a problem directing sufficient light down into the organs to make a good photographic exposure. Since most of these cavities are visible only with the aid of special instruments, the camera has to be connected to the instrument. The light provided by the instrument for visual observation is not, however, sufficient for photographic purposes. Time exposures are not practical because of the continual movement of the organs. Some special units have been devised. They consist of a "midget" camera and electronic light source. The apparatus is small enough to be passed into the body through instruments and exposures are taken automatically.

Tabletop Photography. For the photography of inanimate objects, either flat lighting or side lighting to create shadows can be used, depending upon the subject matter and purpose of the photograph. Polarizing filters may help cut down reflections from shiny objects or specimens. In some instances, it may be necessary to immerse the object in a container of water to cut down reflections even more. In cases, where heat might damage the specimen, a water cell can be placed between it and the light source. The water will absorb the heat without the necessity of using heat-absorbing glass. For the photography of insects and other living subjects, either regular or electronic flash may be preferable.

Copying. The main requirements for accurate copying are a very sturdy stand so that the camera will not vibrate if time exposures are made; a camera such as the Exakta that permits accurate checking of focus and field; a lighting set-up that illuminates the copy uniformly. Lights should be placed on either side of the camera and at about a 45° angle to the copy. Spot lights are generally not recommended for copying. Floodlamps or fluorescent lights diffuse and spread light more evenly. Electronic flash units in suitable reflectors also can be utilized.

For the copying of X-rays, a transmitted light source must be used. A viewing box or "shadow box" can be adapted for this technique. Light bulbs should be placed behind the opal glass in a manner that will give even lighting over the entire area.

A new technique, recently introduced by Kodak, suggests the use of a double exposure method. While the Exakta is designed so a double exposure cannot be taken unintentionally, double exposures can be taken when required.

(To make a second exposure on a frame without touching the shutter-winding lever, thus not transporting the film, wind the fast exposure knob counterclockwise until it clicks. This means that the shutter is cocked again and a second exposure may be made by releasing the shutter.)

Photomicrography. Lighting sources range from ordinary floodlamps in parabolic reflectors to specially designed units with electronic flash. For the average requirements, a 250-watt tungsten filament projection bulb, a ribbon filament lamp or the low voltage tungsten filament lamp will suffice. The G. E. photomicrographic lamp as well as the carbon arc and the Western Electric zirconium arc are more specialized sources of intense lighting for photomicrography.

Outdoor Nature Photography. With poor lighting conditions, either regular or electronic flash can be used to supplement natural light. The Exakta is synchronized for regular flash at all speeds.

With electronic flash, a setting of $1/25$ or $1/50$ of a second is recommended. The exposure actually is made by the electronic flash which may be $1/3000$ of a second or faster. The setting of $1/25$ or $1/50$ of a second is slow enough so the light can be recorded on the film and fast enough to prevent secondary or "ghost" images. Aperture should be set according to the guide number of the regular or electronic flash. In bright sunlight, however, the camera settings are made in regular fashion and the flash is used only as a fill-in light.