A SIMPLE METHOD OF MAKING PHOTOGRAPHIC RECORDS UNDER STERILE CONDITIONS

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The great value of permanent graphic records of surgical procedures and of pathological conditions exposed at operation has long been recognized. Drawings and photographs are not only a valuable part of the hospital record but are especially useful in collecting material for classification, study, and teaching. Harvey Cushing made pen and ink sketches as a part of each operative note, and these are studied today with the greatest of interest by the fortunate members of a later generation who have access to the records of his patients. Not all surgeons are so gifted, nor are the services of an artist usually readily available, but the development of photographic methods now makes it possible to record the important findings at most operations without loss of time. Routine use of photography is seen in very few clinics, however, and good photographs form a part of relatively few operative notes. We wish to point out the special requirements in surgical photography and to present a device that offers a simple solution to the problem.

Certain unalterable factors may make surgical fields difficult photographic targets. The exposure is often limited, and the point of chief interest may be deeply situated where lighting is poor. The color of the tissues may be rather uniform and structures in many surgical fields are in constant motion so that long exposures are impractical. Apparatus brought within several feet of the operative field must be entirely sterile, and finally, the perfect field for a photograph may appear suddenly and may be available for only a very short time.

Photographers usually make pictures of small objects by extending the lens of a view camera beyond its normal position, providing adequate depth of field by using very small apertures in the iris diaphragm. To make such exposures with lighting comparable to that of the ordinary operating room an exposure time of several seconds is required. The limitations of this technique are evident: a trained photographer must be available; the camera must be mounted firmly in a position above the operative field; slight loss of detail due to motion must be anticipated. Despite these drawbacks the best surgical photographs have been made in essentially this way.

The modern development of fine grained films, both black and white and full color, makes it possible to provide useful detail in a negative as small as the 35 mm. frame. The use of this type of film has allowed the development of a series of cameras having much greater flexibility than the ordinary larger ones. The basis of this difference lies in the greatly increased depth of field that characterizes lenses of short focal length in contrast to ordinary photographic lenses. Thus in ordinary photography a diaphragm opening of f-4.5 may provide a depth of field of several feet when a nearby object is photographed with a 50 mm. lens. A similar diaphragm opening in a camera having a focal length of 150 mm. and exposing a negative 3½ by 4½ inches in size will produce a photograph having a depth of only a few inches. This discrepancy becomes greater as the subject is approached more closely and the miniature camera is at a great advantage when the subject is as small as a surgical field.

Small objects can be photographed with miniature cameras by adding simple positive lenses called "portrait attachments." A photograph of a field about 6 inches square can be made at a diaphragm opening of f-6.3 with a depth of focus of about 2 inches. When such a field is illuminated by the light of an operating room, an exposure time between 1/50 and 1/10 seconds will give negatives of correct density with films of various speeds. The camera can be

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