

Use of Fine Grain Positive Sheet Film for Electron Microscopy.* BY RICHARD L. WOOD‡ AND CHARLES C. HOWARD. (*From the Department of Anatomy, University of Washington School of Medicine, Seattle.*)§

Kodak fine grain positive photographic emulsion has characteristics of speed, contrast, and grain size favorable for recording the low contrast electron images of thin-sectioned biological material. In addition, the rendition of detail by this emulsion appears to be of superior quality to that obtained on conventional lantern slide emulsions. By special order, Eastman Kodak provides fine grain positive plates in 2 x 10 inch size for use in RCA-EMU-2 electron microscopes. A high incidence of scratches and other defects in these plates received in our laboratories, however, has made their general utilization impractical. Since fine grain positive film is suitable for use in electron microscopes which are designed for 35 mm. film, we decided to investigate the possibility of employing commercially available fine grain positive sheet film in our RCA electron microscopes.

The continuous method of applying photo-emulsions to cellulose acetate backing results in a uniform thin coating which, with normal handling, is practically free from defects. Fine grain positive sheet film is available in 8 x 10 inch sheets which can be cut into four 2 x 10 inch pieces for use in the RCA plate cassettes. Employed in this manner the cost per exposure on fine grain positive film is approximately one-third that on Kodak lantern slide plates.

The use of sheet film in standard RCA plate cassettes necessitates the construction of simple adapters to hold the film in position. These are easily prepared from 3 mm. square brass strips of proper length by spot welding at the corners. The over-all size of the adapter should be such that it fits in the cassette as does a conventional photographic plate. It may be necessary to adjust the

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spring loading device in the cassette in order to accommodate the metal frame satisfactorily. The accompanying figure shows an adapter as used in our laboratories and illustrates the way the film strip is secured in the cassette. Processing of the sheet film is carried out in the usual manner, except that it has been found helpful to use non-hardening fixer to lessen the tendency for the film to curl. Excessive curling makes handling of the film inconvenient during printing procedure.

The use of fine grain positive sheet film with RCA electron microscopes is considered practicable for the following reasons:

1. The speed, contrast and grain of this emulsion are favorable for recording subjects of low contrast, and the sensitivity of this film to electrons is comparable to that of Kodak lantern slide, contrast.
2. The electron images recorded on this film appear to be superior in sharpness to those recorded on Kodak lantern slide plates.
3. The emulsion is thin, uniform, and remarkably free from defects.
4. When purchased in 8 x 10 sheets the cost per plate is about one-third that of Kodak lantern slide plates.
5. The film may be employed with standard cassettes and is readily manipulated for processing and printing.

Pre-evacuation of sheet film is effective in removing the moisture present in both the emulsion and the backing, and provides for normal pump-down time of the microscope.

Although flexible films have a greater degree of dimensional instability than do glass plates, relative dimensions in images recorded on the two photographic materials appear to be comparable within the limits of accuracy in determining electron microscope magnifications.

Several investigators in this laboratory now use fine grain positive sheet film routinely and are well satisfied with the quality of the negatives and micrographs.

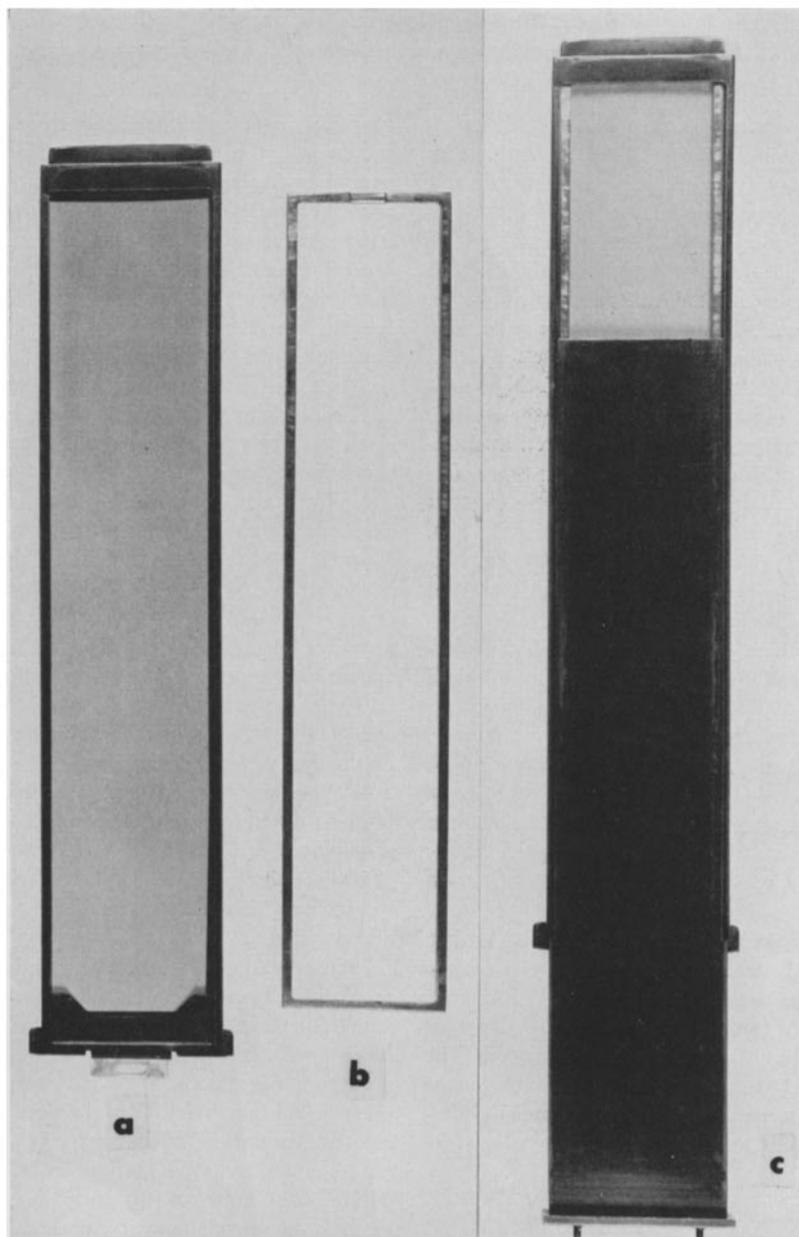


FIG. 1*a*. RCA-EMU-2 film cassette holding 2×10 strip of fine grain positive sheet film. Cassette cover removed. No brass retaining frame. *b*. Brass retaining frame for holding sheet film strip in position in cassette. *c*. Film cassette with sheet film strip and retaining frame in position. Cassette cover partially closed.