

## A METHOD FOR THE EXAMINATION OF THE SAME NANNOFOSSIL SPECIMENS FROM THE LIGHT MICROSCOPE TO THE SCANNING ELECTRON MICROSCOPE.

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Techniques are described in the literature for the examination of the same calcareous nannoplankton specimens by both light and scanning electron microscopy. Disadvantages that I have observed with these methods include time consuming coordinate systems, the loss of specimens during the procedure, and the initial examination starting with the scanning electron microscope (SEM) rather than with the light microscope (LM). The initial study of specimens with the light microscope is advantageous because of the much larger LM field of view that enables one to easily locate rare species in the sample. The method described below is the only one that I have found to be satisfactory for routine use. It is similar to the preparation technique described by Moshkovitz (1974, pp. 145-147), in that transmission electron microscope copper grids are used. The method described herein was developed independently, however, and is more easily and effectively implemented. It may be duplicated by proceeding as follows:

With a capillary tube, uniformly spread a drop of centrifuged nannoplankton suspension across a clean 12mm diameter circular cover slip. Allow the suspension to dry slowly by holding it above a hot plate set at approximately 200° F. With sharpened stainless steel tweezers, place four 200 mesh, coordinate-type transmission electron microscope copper grids with the polished side up on the cover slip, being careful not to disturb the dried nannoplankton suspension. Attach the grids onto the surface of the cover slip by "painting" the edges of the grids and the cover slip with Elmer's glue. This step is most easily done by using a 000 brush under a stereo-binocular microscope. When the glue is sufficiently dry, gently press the outer edges of the copper grids to the surface of the cover slip with sharpened tweezers to ensure a firm contact.

Next, place about eight drops of Elmer's glue in a circular pattern on a glass slide. Every drop should be just outside the edge of a 12mm diameter circle (Figure 1). A clean 12mm circular cover slip may be used

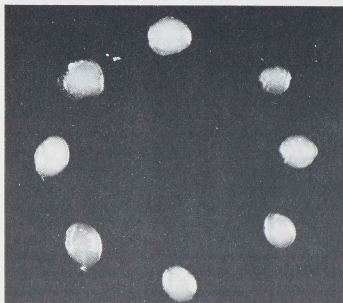


Figure 1: Droplets of Elmer's glue on a glass slide.

for positioning the drops of glue. Remove the clean cover slip, and when the glue droplets have dried, place a drop of immersion oil in the center of the circle of glue droplets. Position the prepared cover slip, with its attached grids facing toward the glass slide, within the circle of dried glue drops, and use the immersion oil as a mounting medium (Figure 2). The droplets of dried glue prevent the cover slip from sliding about on the glass slide as traverses are made across the cover slip during examination with the LM. Normal nannoplankton investigation can now proceed using a coordinate system with the grids (Figure 3). Individual specimens can be identified, photographed, and their location can be recorded for SEM work. Because a Zeiss photomicroscope was used in my work, the reverse sides of the 35mm negatives were used in printing the LM photomicrographs in order for the material in the LM photomicrograph to have the same orientation as the SEM photomicrograph. This step may not be necessary if other brands of light microscopes are used.

When the LM examination is complete, remove the cover slip from the glass slide and clean it in three baths of xylene and a final bath in Dupont TF solvent (trichlorotrifluoroethane). Using fine-tipped tweezers, lift the cover slip from the glass slide

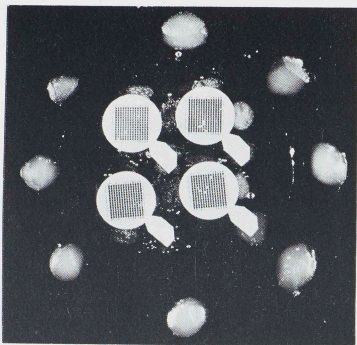


Figure 2: Cover slip with attached prepared grids on glass slide (face down) with immersion oil as mounting medium and held in place by droplets of dried glue.

and submerge it in a small vial or other suitable container filled with the solvents. Gently move the cover slip from side to side for a few seconds in each of the three baths of xylene to remove the immersion oil. Use the Freon TF for the last step to wash away any remaining xylene. In my experience, few, if any, nannoplankton specimens are lost during this process. The glue holding the grids to the cover slip will not be affected by either of the solvents. Next, place the cover slip with the grid side facing upward on an SEM stub, immerse a toothpick or capillary

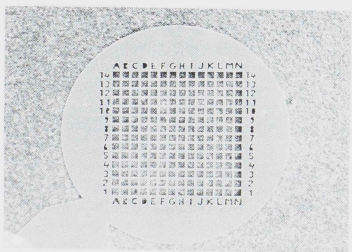


Figure 3: Coordinate-type transmission electron microscope copper grid

tube in polyvinyl paint, and touch three or four areas of the cover slip and stub with the paint to secure the cover slip to the stub (Figure 4). Dry the paint for approximately one hour on a hot plate at 200° F. A 3/8-inch thick steel plate drilled with 3/16-inch holes was used as a stand to hold the prepared stub upright on the hot plate. This last step is useful since the paint can be scraped away and the cover slip removed from the stub for future LM investigation. An 80 Angstrom thickness of metal is an adequate coating for SEM study of the specimens. Using the coordinates and photomicrographs of specimens taken during the LM examination, the same individuals can be easily located and photographed with the SEM. Remember, if a Zeiss LM is used, the position of the grids is reversed left to right from the light microscope to the SEM.

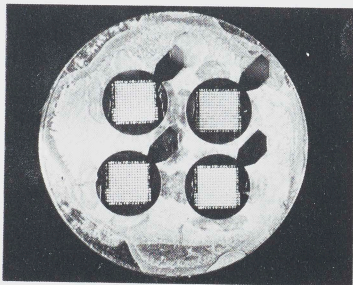


Figure 4: Cover slip with attached prepared grids on SEM stub.

ACKNOWLEDGMENTS

I would like to thank Chevron U.S.A. Inc. for allowing me to publish this article and Dr. W. H. Akers and Mr. W. P. S. Ventress for reading the original draft and offering constructive advice.

REFERENCES

MOSHKOVITZ, S., 1974, A new method for observing the same nannofossil specimens both by light microscope and scanning electron microscope and preservation of types, *Israel Journal of Earth-Sciences*, 23, 145-147.