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Acetate Peels from Iowa Carbonate Rocks

Wayne I. Anderson
University of Northern Iowa

Mary Hogan
Sheffield-Chapin Community Schools

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Wayne I. Anderson
Department of Earth Science
University of Northern Iowa
Cedar Falls, Iowa 50613

Mary Hogan
Sheffield-Chapin Community Schools
Sheffield, Iowa 50475

Introduction

Iowa's rock record is noted for its abundance of carbonate rocks. These carbonate rocks, limestones and dolomites, contain interesting textural features and an abundance of fossils. The fossils can often be removed from the rock matrix and studied. The fossils can also be studied in cut and polished slabs of rock or by making thin sections of the rock. Thin sections are prepared by cutting a thin slice from the rock and gluing the slice on a glass slide. The rock slice is then ground-down with abrasives to a thickness of .030 mm., covered with a coverslip, and studied with a microscope.

Rock thin sections are best studied with a petrographic microscope, a tool that is probably uncommon in most Iowa schools. Acetate peels provide some of the same information that thin sections provide and they can be made from carbonate rocks quickly and relatively inexpensively. The acetate peels can be examined microscopically or projected as standard 35 mm slides. This article describes a procedure to make acetate peels from limestones.

Materials

To make acetate peels you will need:

1. Dropper bottle, two ounce size, filled with acetone.
2. Dilute hydrochloric acid, one percent concentration.
3. Small wooden or cardboard tray containing several tissues of the Kleenex-type or a small container filled with sand.
4. Paper towels.
5. Two glass plates hinged with tape along one side. Binders for 35 mm slides are ideal for this purpose, particularly binders that accommodate glass covers. (I have obtained 35 mm slide binders with glass covers from Ward's Natural Science Establishment, Rochester, NY).
6. Pieces of cellulose acetate film, .0015 or .0020 inches in thickness. The pieces of acetate film should be somewhat larger than the pre-

pared rock surface that is to be used. (Acetate is generally available in rolls at university book stores, art supply houses, or engineering supply houses.

Procedure

1. Cut a slab of limestone with a rock saw to expose the rock or fossil feature that is of interest to you.
2. The limestone slab should be polished with a fine aluminum oxide powder, if available. This will remove any saw-marks from the specimen. Polishing is accomplished by use of a lapidary wheel or by rubbing the specimen over a plate of glass that contains a film of water and aluminum oxide powder.
3. The limestone is next etched for about 15 seconds in a *dilute* solution of hydrochloric acid (about one percent concentration).
4. Rinse the surface of the specimen thoroughly with water. (Use distilled water if available.) Allow specimen to dry.
5. Prop the rock specimen in a tray so that the prepared surface is up and in a level position. (A container filled with sand works well for this.)
6. Flood the surface of the prepared slab with acetone from the dropper bottle and *immediately* place a square of acetate on the *wet* surface. If the surface of the slab is not covered with a continuous layer of acetone, the acetate film will not adhere to it, and the peel will not be a success. This step works best if two persons work together, one applying the acetate solution and the other applying the acetate film. Opposite edges of the acetate film are held with the thumb and forefinger of each hand, and the film is bent downward into a "U" shape. The bottom of the "U" is placed midway on the polished surface and the trough of the "U" is then rapidly pulled taut by a downward and outward motion of both hands.
7. After the film is placed on the rock surface, it must not be pressed-down or touched. If you don't succeed in laying the film smoothly on the surface on your first try, you must allow the film to dry for several minutes before it can be pulled-off.
8. Allow the film to dry for about five minutes and then remove by peeling the film off slowly from one corner of the specimen. Take care not to tear the acetate film.
9. The peel will warp and wrinkle when it drys. Peels are studied most conveniently if they are placed immediately between two glass plates. Special mounts for 35 mm slides (two inches by two inches) are available with glass covers. These are ideal for mounting peels and have the added advantage of being ready for projection in a slide projector.
10. If the peel sticks too firmly to the rock slab, you'll need to grind the slab down and repeat the above procedure. Normally, a prepared

rock slab can be used to make several peels before it will need to be repolished or re-etched.

11. The prepared peel can be studied in reflected light under a microscope or the peel can be projected as a two inch by two inch slide. I prefer the projected slide approach because many features are more readily visible when projected, and the projected slide can be used to point-out features to an entire class.
12. The acetate peel can also be used as a negative to make photographic prints. An example of such a print is shown in Figure 1. This print of *Hexagonaria* sp., a common colonial coral in Iowa, was printed on a standard darkroom enlarger for six seconds with a number four filter and an f-stop of 16.

Figure 1.

References

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