



Conserve O Gram

August 2007

Number 11/14

Using The Cuvette Technique To Store Vertebrate Microfossils and Other Small Natural History Specimens

Introduction

In vertebrate paleontology many specimens, such as isolated teeth, are less than 6.5 millimeters in size. Proper curation of these types of micro-objects is essential. Using the cuvette method to store small items, such as micro-vertebrate paleontology specimens that measure less than 6.5 millimeters, increases both their protection and accessibility. This method:

1. Minimizes mishandling, breakage, or misplacement of specimens.
2. Facilitates handling of the specimen so all surfaces are available for examination.
3. Carries the catalog number with the specimen without the use of an adhesive.
4. Maximizes collection space.

The cuvette storage method is not sensitive to humidity and provides rigid protection, unlike gelatin capsules or small plastic bags.

Paleontologists have used gelatin capsules, small plastic bags, glass vials with specimens attached to pins in the cork, traditional acid-free specimen trays and other storage containers to hold micro-vertebrate specimens. Each method has its strengths and weaknesses. This *Conserve O Gram* illustrates another way to house specimens measuring less than 6.5 mm.

Small, tightly sealed plastic cuvettes made of museum quality, non-gassing polyethylene, developed for use in centrifuges, are widely available. They come in a variety of sizes and those 6.5 mm in diameter and 2.5 cm or more in length make efficient “user friendly” storage containers (Fig.1). The cuvette storage system described here addresses a number of the concerns listed above.

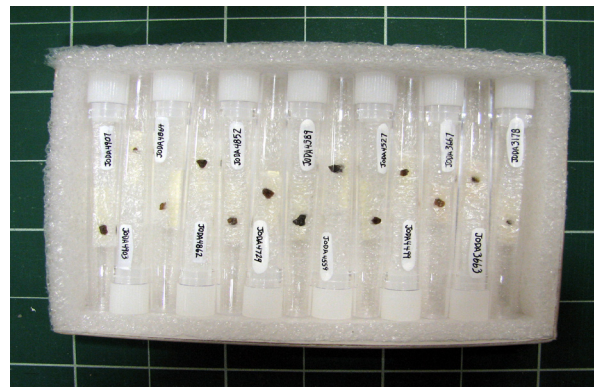


Figure 1: Cuvette method of storage.

1. The specimen is held securely and cushioned within the cuvette by polyethylene foam. The polyethylene serves to secure the specimen in place while still displaying the diagnostic surface of the object. The cuvettes themselves are held securely by friction in their specimen trays along with their labels. A sealed cuvette is water-resistant and keeps specimens associated with their numbers and labels.

2. The cuvette is labeled for easy manipulation within the collection, and the polyethylene containing the specimen is also labeled if a researcher needs to remove a specimen from its cuvette. This keeps the catalog number and data closely associated with the object.
3. The specimen is held in place by friction, thus eliminating the need for adhesives. This consideration is becoming increasingly important as sophisticated chemical analyses are becoming more common in the field of paleontology.
4. All surfaces are free for observation within the cuvette.
5. The ratio of object size to container size is maximized, which increases available collection space.

Materials needed:

- Cuvettes
- Ethafoam™, Velora®, or other archival polyethylene foam ¼ inch padding material
- Leather hole-punch
- X-acto™ knife or electric hot knife
- Acid-free heavy paper
- Archival pen
- Adhesives such as Vinac B-15, Butvar B-72, or Acryloid B-72
- Archival white striping material
- Archival clear coat (Acryloid B-72)
- Specimen trays
- Museum quality polyethylene bags

Assemble the specimens to be mounted and arrange them in a logical order, such as by taxon or catalog number. Prepare the number of cuvettes needed by applying a white stripe

(with striping material listed above) that will later display the specimen number (See COG 1/4). The placement of the white stripe will depend on the length of the cuvette and where the specimen will be placed in its polyethylene “stick”. See *Museum Handbook*, Part II, Appendix J: Marking. These sticks are pieces of polyethylene foam that cradle the specimens within the cuvette (Fig. 2). A sand box can provide a temporary holding area for the cuvettes while the stripes dry.



Figure 2. A polyethylene stick in its cuvette demonstrating a firm fit.

Caution: Select the right polyethylene foam for the object size. Some teeth may be smaller than the average size of the air cells within the polyethylene sheeting. These small teeth could “get lost” in the open cells lining the sides of the cavity created for the tooth. Most grades of Ethafoam™ have large air cells, while Volara® or Plastazote® has very small cells. Keep a variety of polyethylene foam on hand to fit the foam to the task.

Next, using an X-acto™ knife or electric hot knife, cut the polyethylene sticks. It may be useful to produce a jig, a rigid form used as a cutting stencil, to help cut the sticks.

Cut the sticks just under a quarter inch wide and with less taper than the tube to provide

the best fit. When the specimen is placed in a cavity at the end of the stick it is lightly pinched within this cavity and held very securely in whatever position is desired. If the stick is cut slightly longer than the length of the tube, it has to be compressed gently into the tube in order to close. The stick will expand out again when the lid is removed. This provides a convenient handle for grasping the specimen holder. A pair of tweezers or forceps can be used to grasp the stick for future removal from the cuvette.

Caution: When working with cataloged specimens, make sure to keep the specimens associated with their correct identification numbers. Work on one specimen at a time or lay the specimens in rows, and maintain their order as they are being prepared.

Next, the leather hole-punch is used to create snug cavities in the polyethylene sticks to cradle the specimens. Many art stores, hobby or leather craft stores have hole-punch sets in several small sizes.

For the smallest specimens, a hot metal rod or wire may be used to melt a cavity of the proper size. The cavity should be small enough to gently hold the specimen with the diagnostic surface, such as the occlusal surface of a tooth, facing outwards (Fig. 3).



Figure 3: A foam stick with the object securely held in the desired position.

Remove the specimens from their sticks temporarily. Write the catalog numbers on acid free cardstock or heavy weight paper. Write them so that the height of the font is narrower than the width of the foam sticks. Using archival glue, see sources below, attach the numbered paper onto the underside of the sticks so that the labels bridge the specimen cavities. Set them aside to dry for about 2-5 minutes.

These number strips associate the catalog number with the specimen and also help to reinforce the foam stick. This prevents the sticks from bending at the point where the cavity has been made.

Once the glue has dried, place the specimen into the cavity of the numbered stick, and gently slide the stick into the cuvette. Orient the stick in the cuvette so that the specimen is visible and not obscured. Cap the cuvette, and using the archival pen, write the catalog number on the white stripe on the cuvette's exterior. Cover the stripe and collection number with a clear coat of Acryloid B-72 lacquer and let dry.

Arrange the cuvettes in a polyethylene foam-lined specimen tray. Depending on the number of cuvettes, size of the specimen trays, and thickness of foam, the orientation of the cuvettes may vary. Arrange the specimen labels in the same numeric order as the cuvettes and tuck them between the specimen tray and the polyethylene where they will be firmly held, or place them in a plastic bag of the proper size. The cuvettes should fit snugly and securely in their trays (Fig. 1).

Discussion

The cuvette system allows for storage of speci-

mens horizontally or vertically. The most efficient use of space involves vertical storage in a system resembling a test-tube rack, such as a block of high-density polyethylene foam with pre-drilled, standard sized holes cut in it to hold the cuvettes. When cuvettes are stored horizontally, it is easy to read the catalog number in each. Cuvettes that are stored vertically should be numbered so they are easily visible from the top to someone browsing the drawer.

See also NPS COGs 11/2, 11/6, and *Museum Handbook*, Part I, Appendix U, Care of Paleontological and Geological Collections.

Sources

Polyethylene foam manufacturers:

<http://www.dow.com/ethafoam/prod/>

<http://www.zotefoams.com/>

<http://www.voltek.com/>

Archival adhesives:

Butvar B-76 <http://www.butvar.com/en/home.aspx>

PVA B-15

<http://www.mcgean.com/Pages/SC205.htm>

See: NPS *Tools of the Trade* for:

Acryloid B-72 lacquer

Acid-free pens,

Polyethylene sheet foam

Adhesives and Consolidants Wall Chart

http://www.spnhc.org/opencms/export/sites/default/spnhc/publications/linked_documents/leaflet2_chart.pdf

Matt Smith

Museum Technician

John Day Fossil Beds National Monument

The *Conserve O Gram* series is published as a reference on collections management and curatorial issues. Mention of a product, a manufacturer, or a supplier by name in this publication does not constitute an endorsement of that product or supplier by the National Park Service. Sources named are not all inclusive. It is suggested that readers also seek alternative product and vendor information in order to assess the full range of available supplies and equipment.

The series is distributed to all NPS units and is available to non-NPS institutions and interested individuals on line at <http://www.cr.nps.gov/museum/publications/consveogram/cons_toc.html>. For further information and guidance concerning any of the topics or procedures addressed in the series, contact NPS Park Museum Management Program, 1849 C Street NW (2265), Washington, DC 20240; (202) 354-2000.