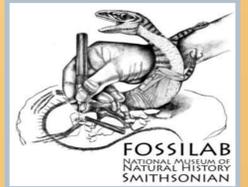


# REPURPOSING THE PURPOSEFUL: RE-TRAINING VOLUNTEER PREPARATORS IN VERTEBRATE MOUNT DISMANTLING AND CONSERVATION



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## Abstract

The Smithsonian Institution National Museum of Natural History (NMNH) is undergoing the renovation and redesign of its nearly 31,000 square foot paleontology exhibit halls. In addition to many Smithsonian staff and contractors, museum volunteers serve an essential role in the dismantling and conservation of hundreds of mounted and bracketed vertebrate fossil specimens previously on exhibit. Specimens allotted for volunteer work are not slated to return to public display. These specimens must be removed from their armature, repaired and conserved, and reincorporated into research collections both physically and in digital documentation.

NMNH Paleobiology volunteers have been educated and trained in many aspects of general paleontology, fossil preparation, and collections work through the NMNH Paleontology Training Program and/or a specialized 11-day preparation training course. Most volunteers perform fossil preparation activities in the publicly-viewable preparation lab called the FossilLab. A group of approximately 20 FossilLab volunteers have shifted from research-driven preparation projects to assist with the fossil hall renovation. The adjustment from their former tasks to their current ones was facilitated through a series of training sessions led by staff from the NMNH Paleobiology department and Vertebrate Paleontology Preparation Laboratory. This training incorporates hands-on specimen work with demonstrations in personal safety and protective equipment, documenting processes and materials used, and ways to resolve unique specimen issues through critical thinking. Volunteers work in a temporary FossilLab facility located in an interim NMNH paleontology exhibition, providing excellent opportunities to communicate with and educate public museum visitors. Overall content of training sessions was developed using professional fossil preparator core competencies as developed in 2012 through the Society of Vertebrate Paleontology Preparators Grant, as well as input and feedback from the participating volunteers. The materials and demonstrative setups produced for this training can be useful to other institutions training volunteers for similar tasks.

Training activities have resulted in the expansion of volunteer skill sets and competencies, allowing them to assist NMNH staff in the ongoing care of paleobiology collections and the fossil hall renovation project.

## FossilLab Volunteer Preparation Laboratory



Figure 1. The original FossilLab facility located in the NMNH Fossil Halls.

FossilLab opened at the NMNH in 1985. The purpose of the facility is to serve as a fully functioning preparation lab, where the public can witness work on a wide variety of projects and interact with lab workers. The lab was originally occupied by professional preparators, but transitioned into a space for volunteers. Between 2009 and the present, approximately 60 volunteers have received formal and informal training in fossil preparation, and have assisted in NMNH projects. Of those, 30 volunteers remain currently active in FossilLab – an indicator that the lab's facilities, flexible scheduling, and thorough training have resulted in long-term retention of dedicated volunteers.

After the closure of the Fossil Halls for renovation in April of 2014, FossilLab was relocated to a new facility, constructed in a space that will serve as an interim paleontology exhibit until the new Fossil Halls are completed in 2019. Unlike the original FossilLab, the new installation lacks running water, compressed air, and HVAC infrastructure to accommodate dusty work. The shift away from traditional fossil preparation tasks coincides with an increased need for volunteer assistance associated with dismantling the Fossil Halls, with tasks including the housing of previously exhibited specimens in a collections environment, and the dismantling of composite mounted vertebrate skeletons. Volunteers were introduced to the new training and projects available for them during a meeting and walkthrough of the closed exhibit halls. They could then choose to opt in or out of new training sessions based on personal interest.



Figure 2. Current FossilLab facility, located in a temporary paleontology exhibit space at NMNH.

## Training in Archival Specimen Housing



Figure 3. Hands-on training workshops held to introduce volunteers to proper anatomical skeletal arrangement, and methods for building archival housing structures in specimen trays.

Volunteers are spearheading the effort to house several thousand previously exhibited fossil specimens for storage in collections. To convey best practices and allow for demonstration of techniques, training sessions were held with small groups of volunteers, supervised by NMNH Vertebrate Paleontology Preparation Laboratory, Paleobiology Collections Management, and FossilLab staff. The structure and content of the training was derived primarily from workshops offered at past SVP meetings, headed by Amy Davidson of the American Museum of Natural History (AMNH).

Training focused on a series of sequentially-taught topics, with the goal of volunteers gaining an understanding of the following:

- Agents of deterioration influencing storage of collections, including damage from vibration and impact, handling, and gravity.
- Needs of curators and researchers when accessing specimens and associated labels.
- The use of archival materials to ensure physical and chemical stability of specimens and labels.
- Critical thinking in arrangement of specimens within storage environments, and the construction of those environments.

The first portion of each training session consisted of a lecture, during which participants were given a packet of information, illustrations, and further reading to serve as a reference both for the day's training and in the future. Lecture content was a general overview and walkthrough of techniques for arranging and housing specimens in trays.

The training then shifted to hands-on work, for which volunteers were split into two teams, and switched between tasks. One task focused on the arrangement into trays of a full skeleton of a modern *Canis familiaris*. This challenged volunteers to apply their knowledge of anatomy and use critical thinking to plan how skeletal parts could be arranged and grouped. For the second task, each team used a group of casts from various parts of a modern bear skeleton. Archival housing structures were created for each bone, going through each step of the process from selecting a properly-sized tray, carving foam cradles for specimens, lining cut foam areas with polyester fiber cloth, and including cardstock 'corner guards' to prevent impact damage to vertically exposed portions of specimens.

After the training sessions were held, the *Canis familiaris* skeleton and rehousing materials were made available to volunteers to practice as part of their normal volunteering activity. Staff were available to provide feedback and guidance on an individual basis. This portion of training lasted for several weeks, allowing staff to assess the skill level of individuals, and target suitable projects for them.

Feedback from volunteers indicated that the training was well received, with a request for more emphasis on demonstration of techniques for constructing housing in trays. Since the completion of training, rehousing of specimens both from dismantled exhibits and collections storage has become a fixture of FossilLab activities, with volunteers working to improve organization and storage environments across many areas of the NMNH Paleobiology collections.



Figure 4. Results of volunteer efforts in rehousing Oligocene mammal specimens from the NMNH White River Group fossil collections.

## Training in Dismantling of Display Mounts



Figure 4. Plaque mounted skeleton of *Mesohippus* sp. (left), and freestanding mount of *Orohippus pumilus* (right). Both mounts were dismantled and specimens rehoused by FossilLab volunteers.

Several composite mounts of vertebrate fossils previously on exhibit will not return to the renovated Fossil Halls. To return to collections as research material, these specimens need to be removed from armatures and display structures, cleaned and conserved, identified as to specimen number, reunited with any associated material stored in collections, and housed in archival storage environments. These tasks are being undertaken by FossilLab volunteers and contract workers, supervised by Paleobiology VP Prep Lab and Collections Management staff.

Training for volunteers in the dismantling of vertebrate mounts began with a large demonstration session. Volunteers were shown examples of various types of armature design, the use of chemicals for softening adhesives, and tools for removing hardware. Collections Management staff demonstrated use of forms and ID tags for the communal recording of data and collection of photographs, as well as the organization and tracking of specimens as they were dismantled. Finally, volunteers worked alongside VP Preparation Lab staff to begin dismantling for themselves.

Dismantling work in FossilLab is done as a group, where on a daily basis a pair of workers is assigned to complete tasks and take documentation. The work from the previous day is reviewed and continued by the next day's team. Pair assignments were made based on aligning work schedules and the ability for team members to work together in a complimentary way.

From a supervisory perspective, the success of this dismantling work depended on several factors:

- Availability of staff to answer volunteer questions, check over work, and provide access to collections data and material associated with specimens incorporated into the composite mounts.
- In particular, time required from Collections Management staff is significant. Work includes locating and correcting records in the NMNH digital and physical databases, research into the history of the mounts, recovering information for specimens throughout the dismantling process, locating and transporting associated material to FossilLab, updating specimen records to include data collected during dismantling, and providing space to rehouse collections.
- Knowledge of the work habits, skill levels, and personality of each volunteer, in order to pair them best with work partners and ensure their skills are suited to particular tasks in the dismantling and rehousing process.

From a volunteer perspective, a positive work experience and effectiveness in accomplishing tasks were aided by:

- Assistance from staff to quickly answer questions arising throughout the dismantling process.
- The ability to provide feedback and shape the process; for example, making edits to the format of communal worksheets to allow for easier recording of data.
- The ability to bring personal experience from trades, hobbies, and previous employment into the process.



Figure 5. Group training held to introduce specimen dismantling processes, and demonstrate techniques (left). VP Prep Lab staff demonstrate dismantling on the plaque mount of *Mesohippus* sp. (right)



Figure 6. A team of FossilLab volunteers works to dismantle the mount of *Orohippus pumilus* (left). The dismantled skeletal elements were conserved prior to being housed in archival tray storage (right).

## Conclusions

Approximately 15 of the current FossilLab volunteers are now working on mount dismantling and rehousing projects. Success in imparting new skills to the volunteers of FossilLab has been achieved, owing to a combination of:

1. Significant planning and development in advance of training schedules, materials, responsibilities, and workflow by NMNH staff.
2. Continuing allotment of staff time and resources to tracking project progress and supervising volunteers on an individual level.
3. Allowing volunteers the opportunity to contribute feedback and suggestions to better shape workflow.

The authors offer to share training materials and our experiences should they help facilitate similar training of staff and/or volunteers at other institutions.

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