

Abstract

Part of the collections of the Paleontology Division of the Museum of Texas Tech University is in the process of documentation and preparation due to past lack of accountability. To undertake the documentation of the remaining fossils is vital to the division because it provides more accurate information about what objects are found in the physical collections and the collections database. The problem is approached by preparing the fossils for identification via cleaning of sediments, reassembling pieces with approved adhesives, and assigning catalog numbers to each fossil for digital documentation. A small number of fossils, apparently hastily reassembled, exhibit epoxy that discolors and is irreversible. Results of the process include improved accessibility to the collections and additional space for objects. The most important point gathered from the documentation process is a need for further accountability with the Paleontology Division collections to maintain integrity of the fossils and accessibility of information.

Issues Encountered:

The dilemmas encountered in this project were comprised of common collection standards and practice concerns, such as unprepared objects resulting in inherent documentation needs. Concerns, specific to this project, were the former use of adhesives and unprepared specimens. Outdated adhesives, like Epoxy, cross-link, discolor and become irreversible, creating an impediment to future fossil preparation. The status of unprepared material lends itself to less clarity about these specimens. As cataloged objects, these specimens become accessible to researchers, even though the specimens' provenience information and scientific value were extant.

How Were the Issues Remedied?

The problems were remedied by applying current best standards and practices to the fossil specimens. Matrix, which is the surrounding rock or sediment in which the specimen is embedded, was removed from the fossils and appropriate consolidants were applied when needed (NPS Museum Handbook: Part 1, Appendix 2, 26). Careful removal attempts were made on the old adhesives. An air scribe was used to remove the adhesive, barring harm to the object. The same step was applied when adhesive was on sterile matrix surrounding a fossil. Fossil specimens were evaluated for their quality and completeness by the Curator. Finally, the specimens were cataloged with their accompanying information and then appropriately rehoused in the Paleontology Collection. Completed catalog records were together with the fossils' provenience data, therefore increasing the fossils' availability to researchers.

Introduction

In the spring of 2019, a collection of Triassic fossils from the Paleontology Division of the Museum of Texas Tech University was assigned for preparation and cataloging. The specimens consisted of an assortment of Triassic-era animals that had previously been field collected by the Paleontology division. The selection was mainly composed of skeletal material from *Shuvosaurus*, with a small number of specimens from other animals such as metoposaurs and phytosaurs.

As the project was pursued, it became clear that collection practices in the past affected the fossil specimens. It was necessary to remediate while also maintaining the integrity of the collection objects. Inherited collection management concerns are common in all museums, and a consideration that museum professionals face when entering the field. This poster will address the inherited issues faced, the steps taken to resolve them, and final thoughts about the project.

Methods

To stabilize the fossil specimens, the following steps are followed:

1.) EVALUATION

A specimen's value to the collection is evaluated by how it can contribute to the collection's scope. The specimens not selected for retention in the collection are handled appropriately by the Curator, Assistant Curator, or Collections Manager, and are then considered outside the scope of this project. Once a decision is made about retention in the collection, an accepted specimen is transported to the Preparation Lab for stabilization.

2.) PREPARATION

In the field of Paleontology, preparation is the process of readying a paleontological specimen for exhibit, curation, or research use (NPS Museum Handbook: Part 1, Appendix 2, 22). The process can include the removal of rock or sediment surrounding a fossil (matrix), reassembling fragmented pieces, or applying a consolidant to a specimen (NPS Museum Handbook: Part 1, Appendix 2, 22). In this project, the fossils were prepared by removing matrix. This removal was performed through the use of an air scribe, which is a small hand-held air hammer that abrades away matrix material (Ratkevich 1998, 418). Once matrix is removed, the specimen would be examined for fractures and fragmentation. If there is a fracture or piece broken from a specimen, the piece was adhered to the larger fossil portion with Paraloid B-72, which consists of a non-yellowing acrylic resin suspended in acetone (Davidson and Brown 2012, 100).

3.) CATALOGING

Once a specimen is stabilized, it goes through the cataloging process. This includes assigning a catalog number and recording collection dates, collector names, specimen type, taxon, and site information. Once a fossil is cataloged, the catalog data is recorded in a FileMaker Pro database for easy retrieval. This step is important for individuals who need to access data on these specimens for research.

4.) STORAGE

Each specimen is properly re-housed in the Paleontology Collection employing best standards and practices by placing it into archival storage, along with other recently cataloged objects. This storage included placement into an archival box lined with foam to prevent stress on the object. The specimens would then be categorized by Era, Period, Order, Family, Genus, Species, Excavation Site, and Site Number.

From left to right:

Figure 1: Specimen samples that were prepared for the project. The objects include a *Shuvosaurus* rib and vertebrae, in addition to a phytosaur tooth.

Figure 2: Containers of Paraloid B-72 that was used to help stabilize the fossil specimens.

Figure 3: Example of preparation via air scribe.



Conclusions and Future Thoughts

As the fossils were stabilized and cataloged, it became clear that techniques for collection practices have changed and improved over time; what was acceptable in the past does not often apply anymore. Previously, certain materials were considered viable for use in museum collections, but with a better understanding of the long-term effects of certain chemicals and materials, and evolving best standards and practices for museum paleontological collections, the current methods have changed the preparation and documentation processes for fossil specimens. Examples of these changes include use of improved adhesives such as Paraloid B-72.

The current evaluation and stabilization processes for the fossils provides additional space in collections storage and increases their accessibility. Evaluating the specimens allows for further prioritization of a fossil's value to the Paleontology Collection. Stabilization provides a means for accessibility via cleaning and repairing of specimens, otherwise they cannot be handled by or loaned to researchers. This demonstrates accountability through a judicious use of resources and preparation of collections.

The specimens receive analog documentation with their catalog numbers that are linked to a digital database record in FileMaker Pro. Preparation and cataloging improve accessibility to the objects, which in turn demonstrates a commitment to collections accountability on the part of the Paleontology Division. Relevant fossil specimens became cataloged specimens, including sections of *Shuvosaurus*, Phytosaur teeth, and even a small portion of *Technosaurus smalli*. This addition of specimens proved valuable to the Paleontology Collection because of the research value the fossils provide.

The issues presented by this project were solved because of available personnel resources. For institutions that may be short on staff, there still remain opportunities for continual improvement through a persistent evaluation of objects, careful assessment of acquisitions, and a continuous research of the changing best standards and practices for museum collections. Further backlog can be prevented through having a set Collections Plan for future acquisitions, while a Collections Management Plan can address existing backlog in a collection. Evolving plans such as these can allow understaffed museums to reach desired goals for a collection.

Collections practices have changed greatly over time, which makes it challenging for museum staff to consider what is best for an object. What may have been considered best practice in the past likely does not apply in the present and this challenges museum professionals to do the best for the museum collection they oversee. Collections backlog is a universal experience for museum professionals, but as this project has demonstrated, there are opportunities for continual improvement. There are ways to address the issues that affect specimens, and improve their accessibility, while demonstrating the understanding and application of best standards and practices. Projects like this serve as great educational experiences for understanding the challenges of collections management for emerging museum professionals.

References:

"NPS Museum Handbook Part 1". National Parks Service: Appendix U: Curatorial Care of Paleontological and Geological Collections, 2005, pg. 22.
Ratkevich R. Air tool preparation of fossils. *Rocks & Minerals*. 1998
Davidson, Amy, and Gregory Brown. "Paraloid B-72: Practical Tips for the Vertebrate Fossil Collector." *Collection Forum*, Vol. 26 1-2, 2012, 99-119.

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