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Of Protocols and Perissodactyls: Building on past experiences for smooth transitions to new projects

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Of Protocols and Perissodactyls: Building on past experiences for smooth transitions to new projects

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FORT HAYS STATE UNIVERSITY'S
STERNBERG MUSEUM
OF NATURAL HISTORY

Abstract

During the Late Miocene, significant changes in plant and animal life marked the evolution and spread of grasslands across continents. Fort Hays State University's Sternberg Museum of Natural History holds an extensive fossil vertebrate collection from the Minium Quarry (Figure 1), a Kansas locality that has proved important for understanding these biotic shifts. Most fossils from this locality were collected ~35 years ago, with quarrying only resuming in the past few years. Despite the significance of this collection, only 1717 specimens had been curated with ~3600 additional fossils needing assessment, curation, and preservation. In 2022, the Sternberg Museum was awarded an Institute for Museum and Library Services grant to address the long-term preservation of this collection. The Minium Quarry Project (MQP) builds on paleontology collection improvements initiatives that started in 2016 to institute a relational database and advance digitization and data-sharing efforts by the Sternberg Museum. Similarities with previous projects have allowed us to test, update, and build on past efforts to expedite progress towards project goals.



Figure 1. The original Minium quarry was opened in Summer 1985. Initial fieldwork was funded by National Geographic, but there were no long-term plans for fossil care and archiving.

Introduction: Project Goals

The MQP is a three-year project (Table 1) that addresses five critical needs for long-term preservation: (1) specimen assessment and inventory; (2) storage environment improvement; (3) specimen stabilization; (4) specimen digitization; and (5) checking and cataloging specimen data and metadata.

Table 1. Key tasks and timeline for the MQP

Task	Year 1	Year 2	Year 3
Collection assessment	✓		
Inventory	✓		
Curation of uncurated specimens	✓		
Housing/rehousing specimens	✓		
Fossil stabilization		✓	✓
Specimen digitization		✓	✓
Field note digitization			✓
Online exhibit			✓
Social media updates	✓	✓	✓
Data management	✓	✓	✓

Building on past experiences

The MQP highlights the value of building protocols to easily train workers and maintain consistency between projects. Most notably, we were able to take advantage of previously written protocols for curation, data entry, 2D digitization, and 3D digitization. Additionally, we could utilize existing hardware and software purchased from other grants (Figure 2).

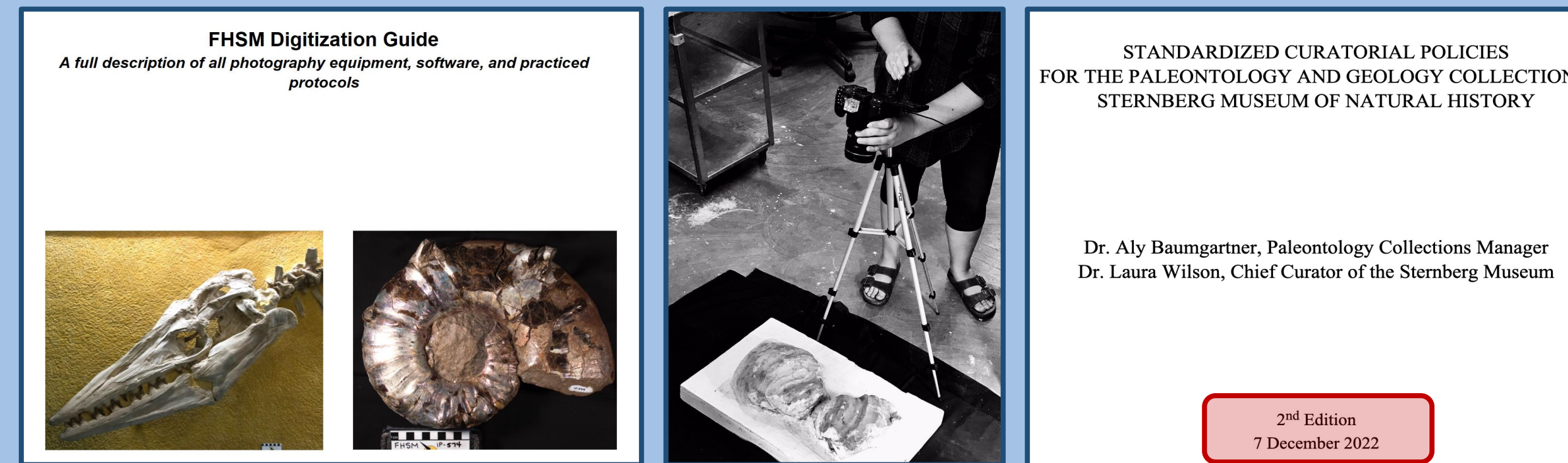


Figure 2. Protocols for 2D and 3D digitization and archiving data in the relational database were written during previous collection improvement projects. Training new staff revealed the importance of making sure documents are regularly updated and field tested for efficacy.

Smooth Transitions to new projects

Because of a gap of time since the last large-scale collection initiative, a pandemic, and near-total staff and student turnover, this project has also emphasized the need to keep protocols current (Figure 2). When we started training a new group of students on digitization and data management, we found many of our existing protocols were outdated due to software updates, changes in institutional security demands, and hardware upgrades. This slowed training new staff, negating the benefits of developing protocols in the first place. Now, protocols are reviewed annually to ensure they maintain accuracy and efficacy. This will be coordinated with our annual inventory for consistency.



Figure 3. Before (left image) and after (middle and right images). Thousands of fossils were collected from the Minium Quarry, but most were abandoned in moving boxes, paper bags, and filing cabinets with no long-term curation plan. Field notes are missing in some cases.

Despite previous collection improvement projects implemented by the paleontology department, aspects of the MQP have provided new challenges and opportunities. This assemblage has characteristics of an abandoned collection requiring critical assessment of material (Figure 3). For the first time, we must address which fossils should and should not be curated into the research collection on a large scale. To address this, all specimens are photographed and documented, even if they will not be retained in the final collection. Additionally, this is our first project that includes the stabilization of fossils already stored in the collection. Because Minium Quarry fossils are not well-consolidated, each specimen in the collection needs to be assessed for consolidant and/or cavity mount needs (Figure 3).

Project Takeaways

- Protocols are well worth the effort to develop and can reduce the time starting and training staff/volunteers for a new project.
- New projects require new protocols (Figure 4) and old protocols may need editing or adjusting (Figure 2). When new problems arise, document solutions to avoid or address the problem in the future.

Minium Quarry Grant Project

By Dr. Aly Baumgartner

Workflow

1. Unpack numbered field specimens and organize by bone number
2. Group by quality of preliminary identification
 - a. 3 groups: fully identified (both taxon and element), partially identified (either taxon or element), unidentified
3. Confirm identification
4. Group specimens into keep and discard
 - a. See standards below
5. For specimens to keep, assign catalog numbers then store using appropriate storage techniques
6. Follow the protocol for documenting numbered specimens in the discard group before discarding
7. Unpack unnumbered boxes/bags of fragments and organize by square number
8. Follow the protocol for documenting unnumbered fragments before discarding
9. Assess previously cataloged specimens and rehouse, as applicable
10. Photograph cataloged material using digitization protocol

Figure 4. The MQP has shed light on the need for protocols to address backlog, maintain specimen and data quality, and initiative new collection improvement projects even after funding has ended.

- Be strategic about grants.
 - Wrapping other projects within grants is a great way to capitalize on increased person power.
 - Have a plan for sustaining progress after funding ends.
- Learn from past mistakes, especially with how to avoid problems that create abandoned collections or make it difficult to re-start projects after a hiatus.
 - Create guidelines for collecting fossils: which fossils are worth collecting (Figure 5)? Which are better left in the field? Where will the collected fossils be stored until they can be prepared? How will these specimens be organized and stored? Are there time, money, and people to prepare the fossil? Etc.
 - Make sure staff and volunteers are trained to keep rigorous field notes and ensure that field notes are curated and accessible to collections staff.

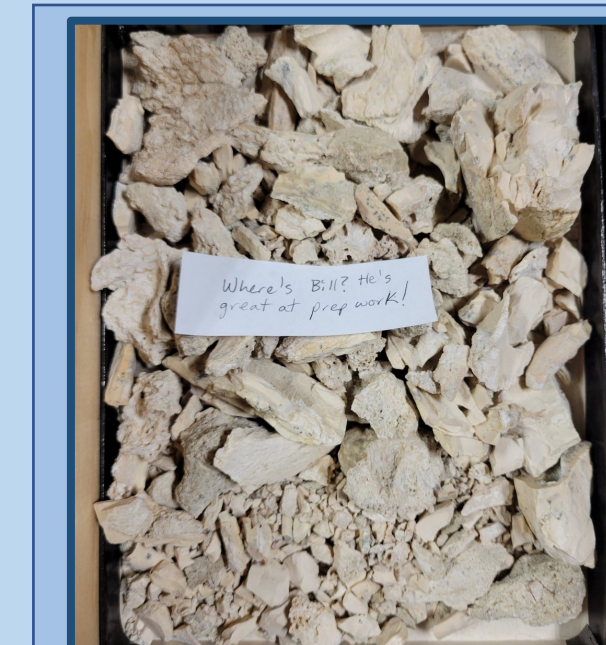


Figure 5. For the love of collection managers, not everything needs to be collected - like unidentifiable bone fragments (left) and rocks (right).



Acknowledgements

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