Orphaned Collections: No Specimen Left Behind

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Abstract

The world that we live in is diverse and new plant, animal, fungal, and bacterial species are discovered every day. Museum collections, like that of the North Carolina Museum of Natural Sciences (NCSM), provide access to specimens that are integral to understanding the Earth's biodiversity. This library of life helps to facilitate data to address the ever-changing environmental, economic, agricultural, and public health problems. Collections are received from all over the world but recently one collection in particular has become the highlight of the NCSM. In 2007 the NCSM received the Museum of Fluviatile Mollusks (MFM) collection that contained over 29,000 lots of mollusks. This collection has begun to address many research questions and has provided new information about distribution, morphology, genetics, and introductions of species.

The North Carolina Museum of Natural Sciences (NCSM), recently granted among the top twenty of the nation's 17,500 museums for outstanding community service, had 1,026,177 visitors last year. When visitors come to the museum they are actually only seeing a small portion of the museum, since the vast portion of the museum is the collections. This doesn't mean that the majority of the museum isn't used. The eight units of Research and Collections collectively houses over 3 million specimens from all over the world. The collection is among the largest and more diverse collections in the southeastern United States and amply documents the biodiversity of North Carolina, from the Blue Ridge Mountains to the Gulf Stream and the depths below. Natural history collections together form a huge library of information about what organisms have lived and are living on Earth. NCSM houses the second largest freshwater invertebrate collection in United States, providing the most complete basis available for study of distribution and taxonomy in the eastern United States. A jar of mussels can reveal the flow of genes across a river basin, what contaminants are in the water, the effects of human disturbances and natural selection, as well as time. The Mollusk collections consist of nearly 2 million specimens that are used for inspiring art, helping to create identification guides, teaching, assisting with environmental policy, research and public outreach.

Figure 1. The Museum of Fluviatile Mollusks, Cleveland, Tennessee.

The NCSM "adopts" many orphaned collections every year. The collections have expanded primarily through the donation of specimens collected by state agency personnel and the donation of private collections. In June 2007 NCSM received the privately held Herbert D. Athearn, Museum of Fluviatile Mollusks (MFM), collection of over 29,000 lots. Through the funding of the National Science Foundation, we have begun entering this collection into our MS Access based relational database. This tremendous collection is comprised of approximately 50% freshwater bivalves.

The MFM represented the largest privately held freshwater mollusk collection in North America. The Museum of Fluviatile Mollusks was located in Athearn's home in Cleveland, Tennessee. Lots were organized by species in wooden trays on rollers within large wooden cabinets, similar to the system used by Museum of Comparative Zoology. As the collection grew, Athearn had to add-on to his house. His home originally had two main rooms, but later he attached another home that he bought from down the road with help from his uncle. Then, another room was added in the 1980's. There were 43 cabinets of mussels, 2 cabinets (plus 138 shoeboxes) of gastropods, and 10 boxes of sphaeriids. Though the focus of his fieldwork was in the eastern United States and Canada it has representatives from 68 other countries. Many collections were from smaller drainages and bodies of water undergoing modifications like the Coosa, Duck, and Elk rivers. Several localities represent the last collections made before the river and its fauna were inundated. Athearn meticulously recorded specimen, locality, and ecology information for each lot. Like young boys trade baseball cards, Athearn exchanged mollusks with other collectors, government officials and institutions, allowing him to gain specimens from different times and localities. Some of these lots date back to the 1800's. By comparing specimens collected across time, scholars can ascertain the amount of faunal change.

Currently the MFM's localities have been entered for all of Athearn's cataloged material and all families, except the freshwater mussel family Unionidae, have been rehoused and databased (his cataloged material only). This collection currently consists of 62 families, 12,957 lots, 557,329 specimens, 6,971 localities…and counting.

Figure 2. The Museum of Fluviatile Mollusks collection was stored in various containers

Figure 3. Athearn meticulously recorded all taxonomic information and locality information, including air mileage and often ecology

Figure 4. NCSM enters all specimen and locality information into their relational Access database

Figure 5. The final product is specimens in archival boxes with an archival label with associated information, organized in taxonomic order for easy retrieval.

Muzeum Powstania Warszawskiego

Specimen riddle: treating a 19th century herbarium to enable substantial analysis.

Magdalena Grenda
Warsaw Rising Museum

THE ITEM: 19th century herbarium of unknown origin

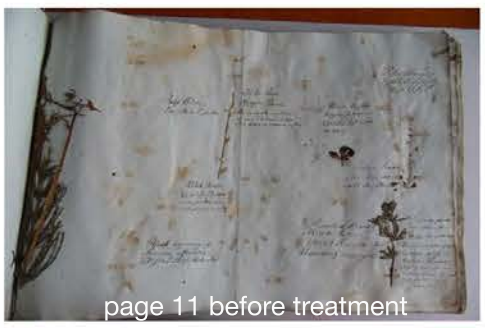
Before treatment

After treatment

THE PROBLEM: poor condition: broken covers, dismantled construction, weakened spongy paper support, numerous tears and losses. over a half of specimens had fallen off their places and could be found in the area of the spine, often disarrayed within pages.
This caused damage to brittle plants, from little cracks to severe breakages or even crushing.

GOALS: to enable digital documentation, substantial analysis, safe handling and exhibition.

THE SOLUTION: conservation treatment! Careful documentation of the item before treatment, disassembly of the binding, separation of loose specimens, permanent consultation of ethnobotanist during conservation:
STEP I: photographing sheet without loose specimens
STEP II: photographing loose specimens taken out of the herbarium (with reference to the page the specimen was found on)
STEP III: photographing the suggested match on each sheet
STEP IV: online consultation with ethnobotanist and final matching decisions
and then: cleaning, paper repairs, reattachment of the specimens, resewing, binding (reconstruction based on the remained fragments).


page 11 before treatment


page 11 after treatment


page 14 before treatment


page 14 after treatment


page 47 before treatment


page 47 after treatment

Acknowledgments: I would like to thank prof. Łukasz Łuczaj for ethnobotanic consultation and Robert Danieluk for the help in documentation.

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Palaeontology at the Radnorshire Museum: the benefits of major collections in local museums

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Introduction

Traditionally, the most important palaeontological collections have been placed automatically in national museums, because of their guaranteed long-term security and accessibility. However, there are compelling reasons to support local museums as repositories for internationally important local collections.

The Radnorshire Museum (Llandrindod, Wales) houses a major collection of local fossils. Comprehensive displays are accompanied by extensive, detailed interpretation, providing a major reference resource, and the displays are a regular venue for local geological societies. The concentration of these fossils in one place also makes the collection more accessible to specialists than if only the best specimens were deposited in national collections, and the collection forms a coherent ecological sample rather than a selection of only the finest examples.

Geological context

Llandrindod Wells (Powys, mid-Wales, UK) is a Victorian spa town next to an inlier of Middle to Upper Ordovician rocks surrounded by largely Silurian rocks. The Ordovician succession records the formation, erosion and burial of a volcanic island complex (Botting & Muir 2008). The area is famous for its trilobites (Lhwyd 1698; Sheldon 1987), and also contains graptolites, brachiopods, echinoderms and bryozoans. Several sites with exceptional fossil preservation have been discovered; these preserve a variety of taxa, including the oldest holothurian, palaeoscolecidan worms, and soft tissue in fossils including sponges and hydroids (Botting 2005; Botting & Muir 2012; Botting et al. 2011).

Typical Builth Inlier fossils. A: *Ogygiacarella debuchii* (trilobite). B: *Didymograptus murchisoni* (graptolite). C. *Iocrinus* cf. *pauli* (crinoid).

The geology displays at the Radnorshire Museum

Details of the collection

The value of the collection does not lie only in individual specimens, but in the variety of the fossils assembled, which include all the common and many of the uncommon species of the Builth Inlier.

- Several hundred fossil specimens, the vast majority collected from the local area.
- A small (but growing) number of figured specimens.
- Almost all of the collection is catalogued; photography of the specimens is in progress.
- Most of the collection is on display.
- Multiple specimens for each species, where possible. This facilitates identification of fossils brought into the museum.
- Displays constructed by specialist palaeontologists.

Importance of local collections

The importance of this type of collection helps to solve potential problems with supporting major collections in local museums. Support from national museums and subject specialists is an important part of maintaining a major local collection, and enhancement of local collections increases the resilience and relevance of museums as a whole.

- Funding for improved storage facilities or displays more easily obtained
- Collection significance may help to insulate the museum from closure during financially difficult times.
- Voluntary support from local residents enhanced if the community is proud of the local collections.
- Encouraging local museums to maintain important local collections enriches public displays, enhances the cultural importance of local museums (and their resilience), and reinforces community appreciation of local heritage.

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Mold Remediation of Herbarium Specimens

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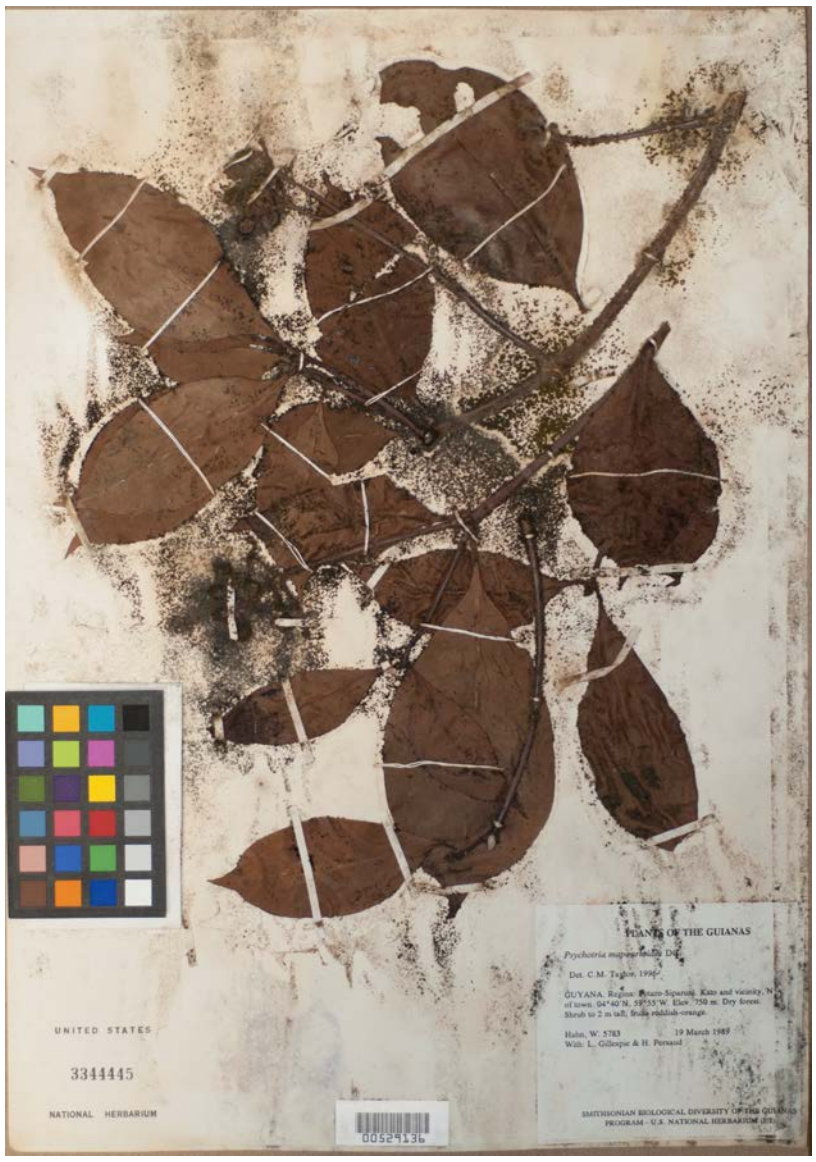


Abstract

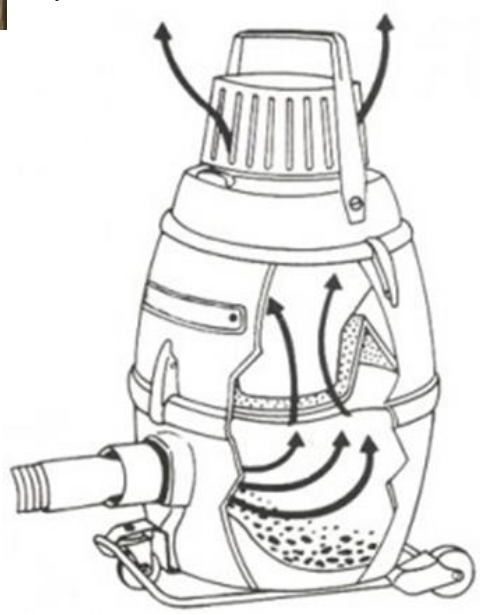
Approximately 700 specimens belonging to the United States National Herbarium, National Museum of Natural History (NMNH), Smithsonian Institution, were damaged in 2012 while on loan. The specimens, collected from the Guianas (Guyana, Suriname and French Guiana), were exposed to water from a leaking air conditioning unit, installed above the storage cabinet while the researcher was in the field for a month. This resulted in a severe fungal infestation.

The borrowing institution attempted to dry the specimens before contacting the Smithsonian, which may have resulted in more damage by adjacent papers sticking and possibly additional mold, as not all 700 could be dried at once. Upon return and drying again at the NMNH, Department of Botany staff contacted the Smithsonian's Museum Conservation Institute (MCI) with a request for assistance in mold remediation. The objective of the resulting project was to remove gross fungal residues and salvage the plant specimens for research purposes.

Collaboration among MCI, and the Department of Botany, the Collections Program, and the Safety Office at NMNH, resulted in the development of a protocol for mold remediation. Intern, Lyndy Bush, was trained in safe implementation of the remediation protocol, which included: systematic conservation imaging, cleaning of specimens and labels, un-mounting specimens, and interleaving the un-mounted specimens with new paper.

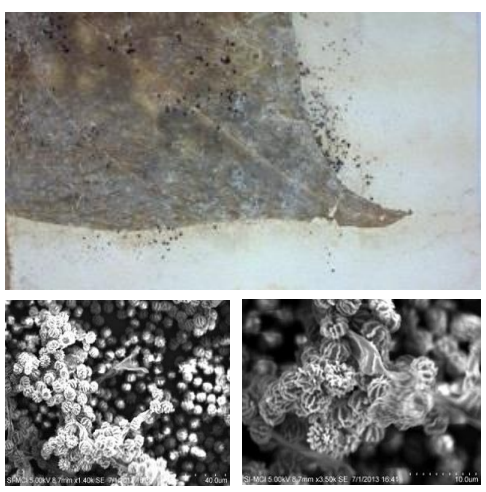
Methods of mold removal

The contaminated herbarium sheets were micro-vacuumed to remove mold. The vacuum, a Nilfisk GM 80 HEPA with variable-speed drive was used because it permits control of the suction. The HEPA (high-efficiency particulate air) filter captures the spores, so they are not released into the air.



Images of the two most common fungi present, using a single-lens-reflex camera and via scanning electron microscopy.

Chaetomium globosum
Large black to dark olive balls with long hairs, common on cellulosic substrates



Stachybotrys chartarum – small black balls on the paper; common on cellulose substrates.

Small and medium-bristle brushes were used for removal of fungal residues.

Some of the residue was removed by gently scraping with a surgical scalpel, while vacuuming.

Cotton swabs saturated with 70% ethanol were gently rolled over the areas of mold residues where suction or mechanical removal may have damaged the specimen.

Safety Precautions-Reduction of the exposure to spores

- Protective gear: lab coat and nitrile glove
- Work was performed under a ventilation hood
- Dynamic Germicidal System-Model G-375, Uvc fan Active polarized media filter Traversing UV-C light Rays. Intake fan was placed adjacent to the work area in the room, to potentially render airborne spores inactive. It operated during mold remediation work and remained on a least 24 hours afterwards.

Annotation Label for Treatment

It is important for a researcher to be informed about the condition or treatment of a specimen, as it may affect the outcome of a particular scientific procedure. Upon completion of cleaning and remounting, the following annotation label will be affixed to each specimen sheet:

> Specimen damaged by mold while on loan, Sept. 2012.
> Heavy mold removed with micro-HEPA vacuuming and 70% ethanol. Specimen remounted; labels reproduced. Remediation at NMNH (US) in consultation with the Smithsonian Museum Conservation Institute.

In conclusion:

Sixty-six specimens were completed in 120 hours of work. This included the time to develop skills in implementing the protocol, but did not include time for remounting or duplication of labels. Discussions with mycologists indicate that the work resulted in a successful remediation protocol, although certain spores could remain viable for centuries. The key is to keep the specimen dry, as in normal collections storage conditions. Spores are present, and they were there before the specimen became wet. Because the specimens will be of very limited use if not part of the working collection, the cleaned specimens will each be placed in a clear archival polyester sleeve with overlapping folds, to reduce any potential for direct transfer of spores. Work is now underway on remediation of the remainder of the specimens.

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Dr. John M. McKemy, National Mycologist, APHIS, USDA

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Smithsonian
National Museum of Natural History

Pyromorphite from Zschopau, Saxony, Germany.

Insanity's legacy:

the Richard Simmons mineral collection

Monica Price
Head of Earth Collections
Oxford University Museum of Natural History

After travel and education in many cities of Europe, physician Dr Samuel Foart Simmons FRS settled in London, and chose to specialise in the treatment of insanity. In 1803, he was called to administer to King George III during the monarch's bouts of mental illness. Simmons was appointed 'physician extraordinary' to the King, and this enabled him to build both his personal reputation and his fortune.

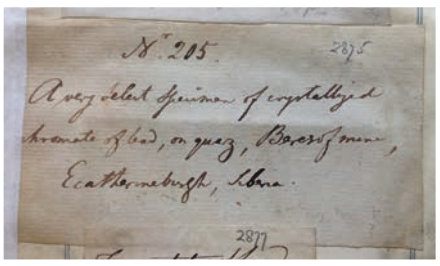
His son, Richard, was born in 1781, and studied at Christ Church, Oxford. He was elected to Fellowship of the Royal College of Physicians in 1810, but Munk's Roll tells us that '*Inheriting an ample patrimony, he had no need of professional exertion, and was little solicitous of business, which for many years he wholly declined*'[i]. He collected works of art, and he was a connoisseur of minerals, buying exceptional specimens from the salerooms of the famous London dealer, Henry Heuland.

Richard Simmons presented a number of mineral specimens to the University of Oxford in 1839, and bequeathed the remainder of his collection in 1846. It was labelled, packed and despatched to Oxford by Heuland, and soon put to good use for teaching by Dr William Buckland, Reader of Mineralogy and Geology, and Dean of Christ Church.

We can recognise specimens from the Richard Simmons collection today because two good curatorial decisions were made when the cataloguing of minerals commenced in 1896. It was decided that:

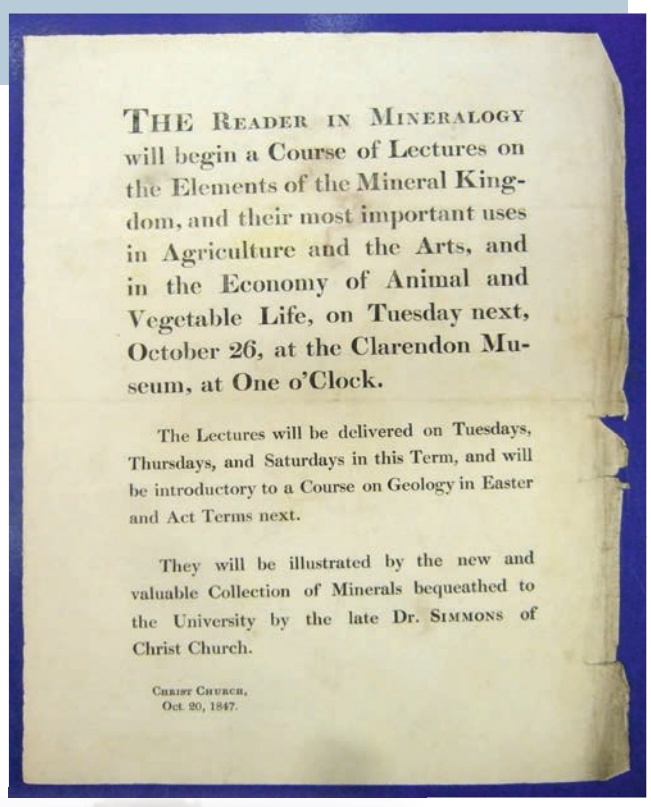
- all numbers and labels already attached to specimens should remain in place
- all labels accompanying specimens, no matter how torn or abraded, would be annotated with the new museum number, and glued in albums.

Specimens with a distinctive green paper dot and printed number were from Simmons.



Some also had distinctive manuscript labels in the albums. In the late 1990s, when Mick Cooper was carrying out research for his history of British mineral dealers[ii], he identified the handwriting as that of Henry Heuland.

We can now identify 310 specimens as being from the Dr Richard Simmons collection. All are exhibition quality and provide an important record of mineral localities and associations of the time. They demonstrate his connoisseurship and personal wealth.



THE READER IN MINERALOGY will begin a Course of Lectures on the Elements of the Mineral Kingdom, and their most important uses in Agriculture and the Arts, and in the Economy of Animal and Vegetable Life, on Tuesday next, October 26, at the Clarendon Museum, at One o'Clock.

The Lectures will be delivered on Tuesdays, Thursdays, and Saturdays in this Term, and will be introductory to a Course on Geology in Easter and Act Terms next.

They will be illustrated by the new and valuable Collection of Minerals bequeathed to the University by the late Dr. SIMMONS of Christ Church.

CHRIST CHURCH,
Oct. 20, 1847.

John Henry Heuland, a German by birth, was from a family of mineral dealers. He settled in London and traded between about 1800 and 1850, holding auctions of fine minerals at the Steven's sale rooms in Covent Garden. He had agents, contacts and family members in many countries of the world enabling him to source the very best specimens; indeed he virtually had the monopoly on specimens from Russian localities.

Heuland's specimens had characteristic manuscript numbers too. Lower numbers corresponded to lots in his sales, but it is thought higher numbers, above 1200 or so, were samples from his private collection. Both low and high numbers are seen on Richard Simmons's specimens.

Calcite from St Andreasberg, Harz Mountains, Germany bearing a Heuland manuscript number.

i. Lives of the Fellows of the Royal College of Physicians (Munk's Roll) http://munksroll.rcplondon.ac.uk/Biography/Details/4057
ii. M.P. Cooper 2006 *Robbing the Sparry Garniture, a 200-Hundred Year History of British Mineral Dealers* (Mineralogical Record Inc, Tucson, Arizona), 358pp. The research archive for this book is in the Oxford University Museum of Natural History.

Visiting us

The Museum is open free of charge to visitors daily between 10.00am and 5.00pm. The Richard Simmons collection and our other mineral collections may be viewed by prior appointment, and we welcome visitors wishing to see them or use them to assist with their research. Please telephone 01865 272967, or email earth@oum.ox.ac.uk.

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