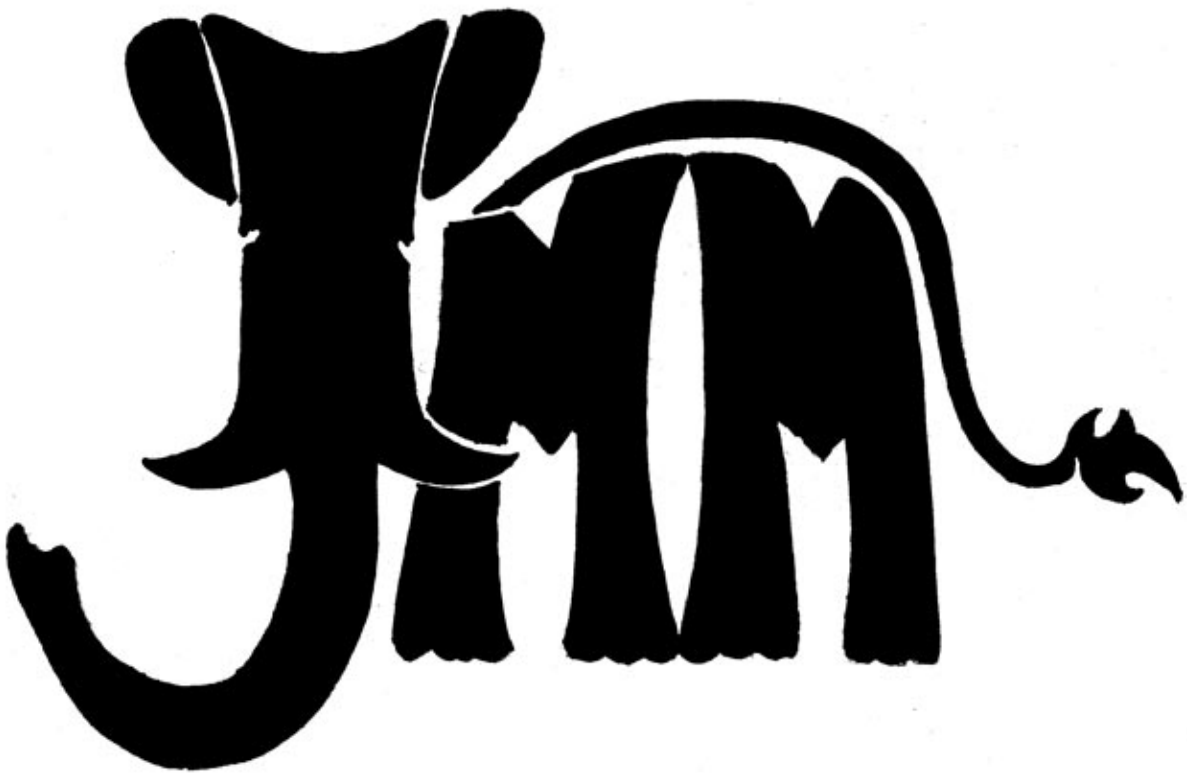
Curator's Handbook:
Collections Care and Handling

Joseph Moore Museum

DRAFT DOCUMENT



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A few general rules about working in the collections

- The JMM's collections are used widely by many different people. Cleanliness is essential. If you work in a collection, be sure to clean up after yourself. Put things back where you found them.

- The JMM uses a monitoring based Integrated Pest Management system. Therefore no food or drink is allowed in the collection at any time.

- Note that some collections contain arsenic and present a potential serious health hazard. Please take appropriate cautions.

- Wash your hands before and after handling the collections. Wash them before to protect the collection. Wash them after, because that's just good hygiene.

Some more Specific Rules….

- No eating, drinking or smoking in collection areas.
- Specimens brought into collection areas must be free of pests (i.e. frozen as necessary).
- Specimens should be fully documented (labelled/databased) before incorporation into or removal from the collection.
- Delicate specimens must not be left exposed and unattended, even for short periods of time.
- No specimens should be left in direct sunlight or under any strong illumination.
- Specimens must be returned to cabinets or other secure storage at the end of each day.
- Sampling, dissection, restoration or any other interventive or descructive process must not be carried out without thorough consultation.
- Conservation grade materials must be used wherever possible.
- All curatorial and conservation actions must be fully recorded/documented.
- Visitors must be supervised at all times and must not handle or move specimens without permission.

Introduction to the Collections

The Joseph Moore Museum is a vital contributor to the education of both Earlham College students and the public of Wayne County, Indiana and beyond. The museum and its collections provide the opportunity for experiential learning through hands-on activities and research while maintaining a valuable asset for scientists around the world.

The JMM provides many teaching opportunities for professors and their classes at Earlham College. Courses from all divisions on campus have used our exhibits and collections, such as Ecological Biology, Biodiversity, History of the Ancient Mediterranean, Natural History Museum Curation, Drawing I, Vertebrate Zoology and French 102.

The JMM maintains ornithology, mammalogy, herpetology, vertebrate paleontology, invertebrate, and anthropological collections. These handling guidelines contain generalized information that is pertinent to the entire collection as well as discipline specific guidelines.

Mammalogy

The Mammal Collection at the Joseph Moore Museum maintains 4,332 total specimens from twenty-six countries and forty-four different states. Almost two thousand of these have been collected throughout Indiana, making the museum a vital resource for research into native species. As well, the collection contains specimens from such places as the Peru, Canada, Jamaica, Panama and Austria. Of particular note is the museum's extensive collection of bat species from all around the world.

The collection includes study skins and skeletal material. As of 2012, the JMM has also begun to take tissue samples of all specimens prepared at the museum.

Ornithology

With over 5,000 individual specimens, the scope of which extend over four continents, the Ornithological collection at the Joseph Moore Museum has been a resource in avian research for decades. Many of the specimens have been used in genetic sampling and population surveys for both Earlham College students and researchers across the country. The collection maintains over 400 genera and 700 species from 43 countries; among them include several Passenger Pigeons, (*Ectopistes migratorius*), a Harpy Eagle (*Harpia harpyja*), an Ostrich (*Struthio camelus*) and a Whooping Crane (*Grus americana*).

The Ornithology collection is located in the adjoining room to the Mammal Collection, and is organized in a U-shaped set of drawers. The Pelecaniformes and Anseriformes are closest to the door, going around the U are followed by Falconiformes, Gaviiformes, Charadriifromes, Strigiformes, Apodiformes, and finally all the Passeriformes.

The taxidermist birds are located across from the Passeriformes. There are also two sets of Detention shelves in the Birds collection.

Also, keep in mind that specimens tagged with a red tag have been tested positive for arsenic, these specimens often being the older specimens due to arsenic preservation being an obviously dated method. Use gloves while handling these specimens.

Herpetology
At the Joseph Moore Museum the herpetology collection is devoted to the maintenance and care of our 1,290 specimens that includes 456 genera and 684 different species. Almost half of all the specimens are from Indiana and the surrounding area, providing a catalog of both native and invasive species. The collection also contains reptiles and amphibians from over 30 states and 19 countries.

Invertebrates

Teaching

Vertebrate Paleontology
The Vertebrate Paleontology collection at the Joseph Moore Museum is proud to house one of the most important specimens of Pleistocene mammals in the world. The Giant Beaver (*Casteroides ohioensis*) skeleton on display is the single most complete specimen of its species everfound. Discovered in 1889 in eastern Randolph County it was acquired for the museum by Joseph Moore himself. Yet in addition to the beaver skeleton, the collection also contains 139 specimens from 25 states and 15 countries. These include a mastodon (*Mastodon americanus*) composite skeleton and a bison skull that is widely considered the best ever found in Indiana.

Anthropology
The JMM has an eclectic ethnographic and archaeological collection that includes everything from Babylonian tablets to Roman lamps, stone tools from local Adena mounds and an authentic Egyptian mummy. The collection consists of over 1,800 pieces and has considerable teaching potential. It houses objects from many different countries including Egypt, Japan and the Americas. The JMM is not actively collecting archaeological or ethnographic materials, but maintains its current collection for educational purposes.

Tissue
JMM began collecting tissue samples from all prepped specimens in 2013.

Agents of Deterioration
Every effort should be made to minimize damage to the collections. The major threats to any collection are physical forces, water, theft, pests, contaminants, light, temp/rh, and neglect. These handling guidelines are designed to minimize the impact of each of these.

Collections Storage

The collections of the JMM are stored primarily in the basement of Dennis Hall. Collections are used frequently by the biology department and some specimens are stored for extended periods in the biodiversity lab and elsewhere. These should be checked annually and evaluated.

Dennis 029	Ethnographic and Archaeological collections Misc museum publications
Dennis 025	Teaching
Dennis 024	Mammals (a few birds and eggs as well)
Dennis 022	Birds
Dennis 026	Invertebrates
	Herpatology
	Short term tissue storage (chest freezer)
	Long term tissue storage (-80 freezer)
	Paleo Collections
	“Head Room”
Museum galleries	Items from all collections are on display in the museum. Although on display they remain part of the collection and should be handled in a manner consistent with these guidelines.

Most collections are stored in numbered cabinets and in trays. Oversized items are stored on open shelves in the teaching collection and on top of the metal cabinets in Dennis 024. A specimen’s location should be listed by room, cabinet, and shelf/drawer. In the case of oversized items they are simple labeled as location “99” in Specify database (i.e., Dennis 024.99).

Adding New items to Collection or returning specimens to storage

New additions to the collections must be added following the process outlined in the Collections Policy of the JMM and processed according to the cataloging procedures outlined below. No item that has not been properly accessioned should be stored in any collection area. Any item that has spent time outside of storage must be checked and quarantined for a period of time to ensure that no threats are introduced to the collection (pests, mold, moisture, etc.). This applies

to all items whether they are new to the collection, returned from on or off site loan, returned from exhibitions etc. All will spend time “in detention.”

Detention

Any specimen that has been recently prepared or has been out of the collection for any reason must be placed in Detention before placing it back in the collection. This reduces the risk of potentially harmful pests from finding their way into and causing damage to the collection. The Detention cabinets are the only cabinets which are regularly “mothballed.” We have otherwise done away with the use of mothballs in the collection for pest management in favor of a monitoring based IPM program.

When placing a specimen in Detention, ensure the mothballs in the drawer are at an adequate level. Place the specimen in the drawer with a card indicating when the specimen was put in, and what the date in two weeks will be when it is to be taken out. Newly prepared specimens may benefit from a longer stay in detention--especially large specimens which should spend several weeks before moving to permanent storage.

The following cabinets in Dennis 022/024 are designated detention areas:

Arrangement

All specimens are stored with like specimens. They are arranged according to current phylogeny at the species (or subspecies) level and within that smallest grouping in numerical order according to the specimens collection number.

The edge of the tray must be labeled with the contents of the tray. This varies from collection to collection, but may include Order, Family, Genus or species depending on size and number of specimens.

Care should be taken to allow adequate space between specimens and particularly trays. Trays must be spaced to allow adequate vertical space so that specimens do not rub the bottom of the tray above.

All trays should be lined with polyethylene foam to limit sliding.

Depending on the size of the specimens, the trays are ordered from left to right and top (back of the tray when in the cabinet) to bottom.

Tray lining

Trays in the collection are lined with polyethylene foam to prevent them from sliding, preventing damage and disorganization. To line or reline a tray:

- Prepare a spare tray of the same size as the tray to be lined by vacuuming dust and debris from the bottom of the tray.

- Cut a piece of foam to fit the tray's bottom (a rotary cutter works best, be sure to use a cutting mat and ruler)
- Remove label from old tray and move to new tray or replace label. (If tray does not have a metal label holder, please affix one. Do not use tape to affix the label.)
- Move specimens from unlined tray into the lined tray, placing them in the proper configuration as outlined in the Arrangement section.
- Place the newly lined tray back into the space in the drawer the unlined tray was taken from.

Boxed Specimens

Many older specimens in the JMM's collection contain arsenic. To prevent spread of this contaminant identified specimens are boxed. Specimens were tested by XRF in 2008. Specimens with significant concentrations should be tagged with a neon orange tag. Note: If a specimen is in a box (likely because of arsenic content), leave it in the box, mark the outside corner of the box lid with the accession number, species number, locality, and date.

Collection Specific Issues

Mammals

Mammal study skins are organized according to current phylogeny to the Genus level. Within each Genus, specimens are ordered alphabetically by species. Within species, the specimens are ordered by JMM catalog number. The specimens are arranged from the rear of the tray forward, left to right. Therefore those species that are alphabetically first will be to the rear left of the tray and species will continue in ascending order--generally from oldest specimen to most recent. Skeletal material is boxed and kept in line with the skin in the same tray. Refer to note on codes above for proper box labeling.

Birds

Bird study skins are organized according to current phylogeny to the Genus level. Within each Genus, specimens are ordered alphabetically by species. Within species, the specimens are ordered by JMM catalog number. The specimens are arranged from the rear of the tray forward, left to right. Therefore those species that are alphabetically first will be to the rear left of the tray and species will continue in ascending order--generally from oldest specimen to most recent.

Skeletal material is kept separately but arranged in the same manner by species and JMM number.

Tissue samples

TIssue samples are taken when a study skin/skeleton is prepared--usually a sample of heart and muscle tissue. These are stored in 2 ml Corning Cryogenic Vials. These must be labelled with the tissue number (G-xx) and species identification. It is helpful if the original specimens catalog number is also included for cross reference. Tissue sample info must also be entered in the tissue spreadsheet. If possible also write the G number on

the cover so that when placed in a tray the number is visable. Al tissue samples are stored in the freezer in trays by numerical order.

Herpatology -- Heather Brock

There are currently 9 cabinets in the Herpatology room. The collection is separated into Amphibians, Reptiles, and Fish. The majority of the collection is stored in fluid, although the fluid does vary and that is cataloged in the Specify database as fluid-isopropyl, fluid-ethanol, fluid-formalin. Each specimen is tagged individually and stored according to current phylogeny.

In some cases multiple specimens are stored together in a single jar. In the Specify database jars with multiple specimens are referred to as “containers,” and there are specific cataloging requirements in specify.

Invertebrates -- TBD

Teaching -- TBD

How to Catalog a Specimen

A complete catalog record for a specimen in the Joseph Moore Museum has three parts: a label, an entry in the collection accession book, and a specify entry. Labels should be created at the time the specimen is prepared. The other two elements are usually completed when the specimen moves from the prep area into the collection. The delay is useful because the quality of the completed specimen will determine whether the specimen is entered in the research or teaching collections.

A note about handwriting:

Throughout the cataloging process you will need to be writing and completing forms and tags by hand. Clear, standardized handwriting is critically important. The records you create today will far outlast you and must be legible to all who come after you. See the Appendix at the end for handwriting exercises and standard letter formation.

Cataloging Steps for new specimens:

1. Prep specimen
2. complete specimen tag or label
3. assign catalog number using collection book and complete book entry (at this point a decision is made whether the specimen will go into teaching or research collections)

4. If necessary write catalog number on the specimen itself
5. assign catalog number to any tissue sample, complete entry in tissue spreadsheet, label tissue vial and place in freezer
6. If possible, catalog in Specify 6 database (refer to separate documentation for this process) immediately although this can occur while in detention or before putting in storage.
7. Put in detention if necessary (see below for details)
8. "file" in collection and update specify 6 database to record location

Cataloging Step 1: Specimen preparation

This is specimen specific and will be dealt with separately. See appendices.

Cataloging Step 2: Labels

All specimens should have a label of some type, although there may be some variation based on preparation type. Labels should be made at the time of preparation and record as much information as possible. Collection numbers need not be assigned at this time, but should be assigned as soon as possible. It can be good to wait to make sure the preparation is adequate/successful and once collection destination is determined (teaching vs. research). All specimens should have some sort of paper label. In some instances, you will also write a catalog number directly on a specimen. This is most common with bones, plaster casts, fossils, and archaeological materials.

Paper for dry specimens:

Tags are pre printed with Joseph moore museum, etc. [1] Tags need to have a small hole poked on the left side and a cotton string attached. To prevent fat migration from the specimen to the tag a small amount of clear, Paraloid B-72 adhesive can be painted on the string just above the knot to the tag, but do not saturate whole string because the string must remain flexible. (It is OK to use clear nail polish, but Paraloid B-72 is more stable and will not yellow. Nail polish formulas vary among manufacturers and their longevity can not be confirmed.)

Paper for fluid preps

The National Park Service (Conserv-O-Gram 11/06) recommends "high-quality long-fibered, cotton rag paper." Tyvek may also be suitable. Most NH collections however, use Resistall paper. The labels currently used in the collection are not resistall, the actual paper type is unknown. In the future all labels for fluid preps should be created on Resistal paper.

Pens and Pencils

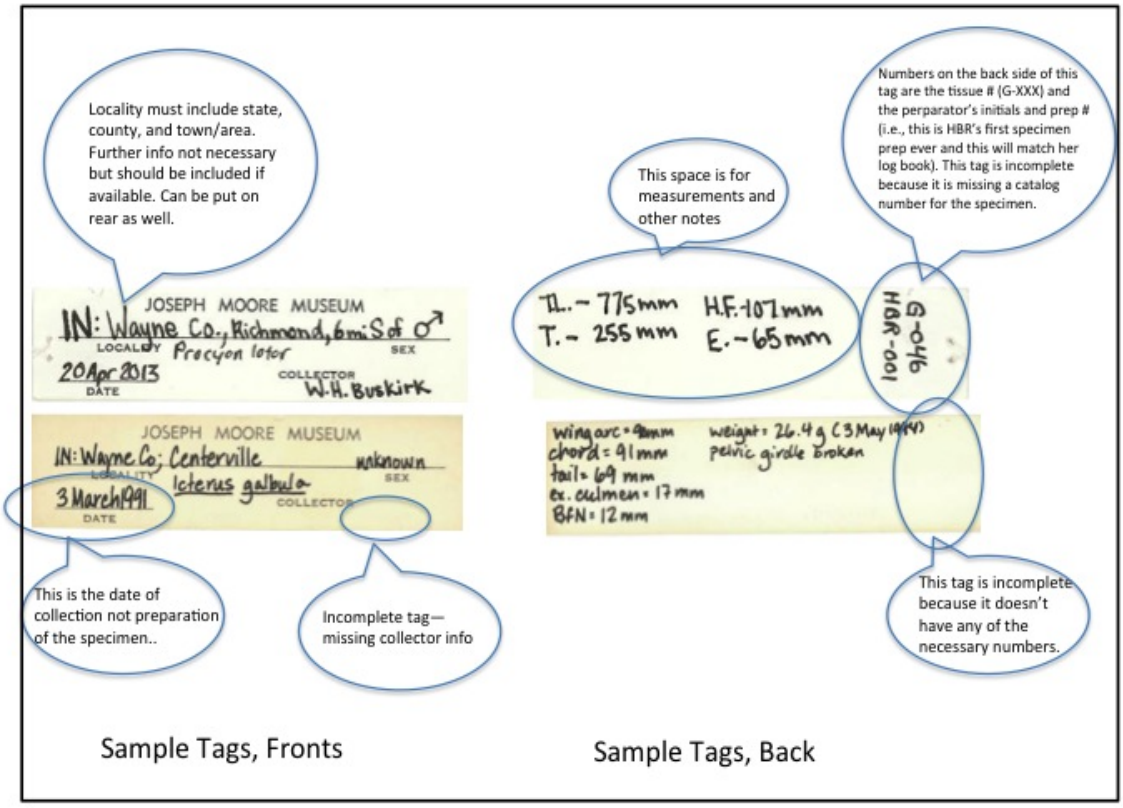
Labels and catalog book entries must be completed using archival ink. Either MICRON brand or refillable rapidograph pens are acceptable. You may also use a quill and india ink, but this requires considerable skill and is not recommended. If no appropriate pen and ink is available, it

[1] At this time the basic JMM museum label is not acid free. When a new bulk order is made be sure to order with acid free paper. Tags for fluid preps should be printed on resistall.

is better to use pencil, which is more stable than most other inks. Do not use sharpies, ball point pens, or other misc. ink.

Completing paper labels

Labels must be as complete possible and absolutely accurate. The basic information needed on all labels includes: Catalog number, locality information, determination (species ID), collection date and collector. If a tissue sample was taken that too should be recorded as well as preparator info. Specimens that do not include locality information, but that are well prepared, will be considered for the teaching collection.



Attaching paper labels

Specimens labels should be attached in consistent locations.

- Birds, study skins: right leg
- Birds, taxidermy mounts: right leg
- Birds, eggs: label container
- Birds, nests: tie securely if possible and label container

- Mammals, small study skins: rear right leg
- Mammals, large tanned skins: attached by sewing tag through nose
- Skeletal material: because skeletal material is stored boxed, the label can simply be tucked inside the box with the bones. Note that many times there is not a separate label for skeletal material if there is also a study skin. In this case write the catalog number on as many bones as possible. See below for instruction on how to write on a specimen.
- Herps: right rear leg (when there is one!) otherwise tie securely around main body.
- Invertebrates:
    - Shells: shells are rarely tagged, a catalog number can be written on a non diagnostic part, preferably on the interior if possible.
    - insects, etc.: insects have very different labelling requirements which are handled separately.

Boxes

Skeletal material and specimens contaminated with hazardous chemicals are boxed. Boxes should be archival grade and clearly labeled on the exterior. The presence of a box does not make labeling of the specimen with a tag and/or written label unnecessary. Specimens must also be labeled directly. The box label, should however, duplicate the information on the tag and if necessary identify the contaminant or contents. DO NOT use adhesive labels of any kind. Write the information directly on the box cover using an archival quality pen or a pencil. Our current supply of boxes is not archival grade. When reordering, be sure to order proper natural history storage boxes.

Containers for Fluid Preps

Fluid preps are stored in glass jars with screw top lids. A variety are available in the herpetology room. Choose the smallest possible jar, but ensure that there is adequate space for the specimen to be fully submerged. When possible an inch would be a reasonable amount above the specimen. This will minimize the need to frequent topping off. Before using a far confirm that the seal on the jar is tight and undamaged.

Cataloging Step 3: Numbering / Accessioning

Accessioning vs. cataloging

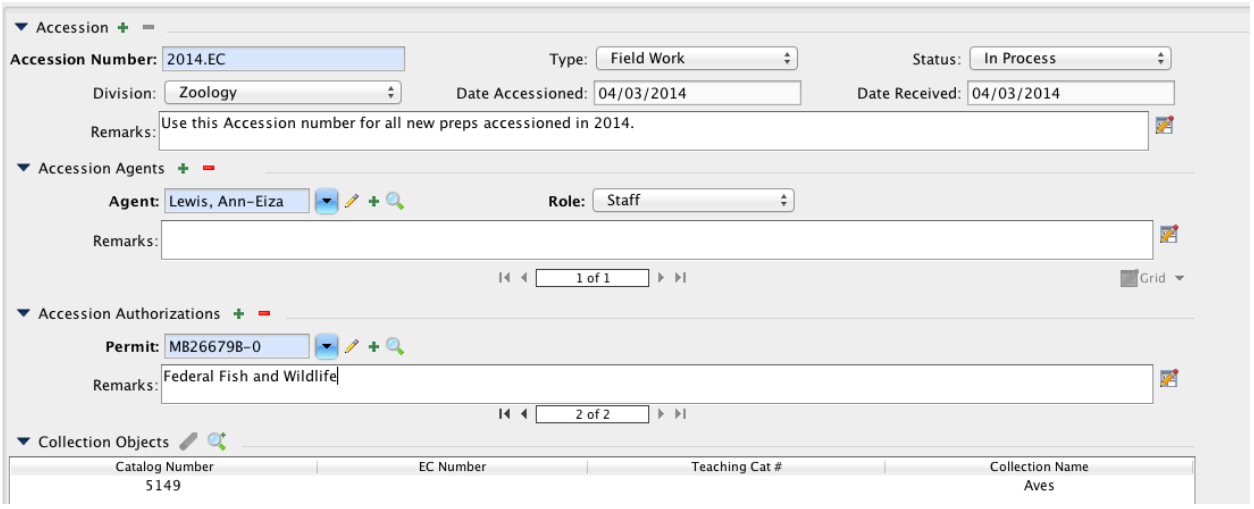
The JMM has historically used the terms accession number and catalog number interchangeably. With the implementation of the Specify 6 database these terms are now used to signify different actions. Accessions tend to record institutional history while catalogs document individual specimens. Accession is the term applied to groups of items added to the

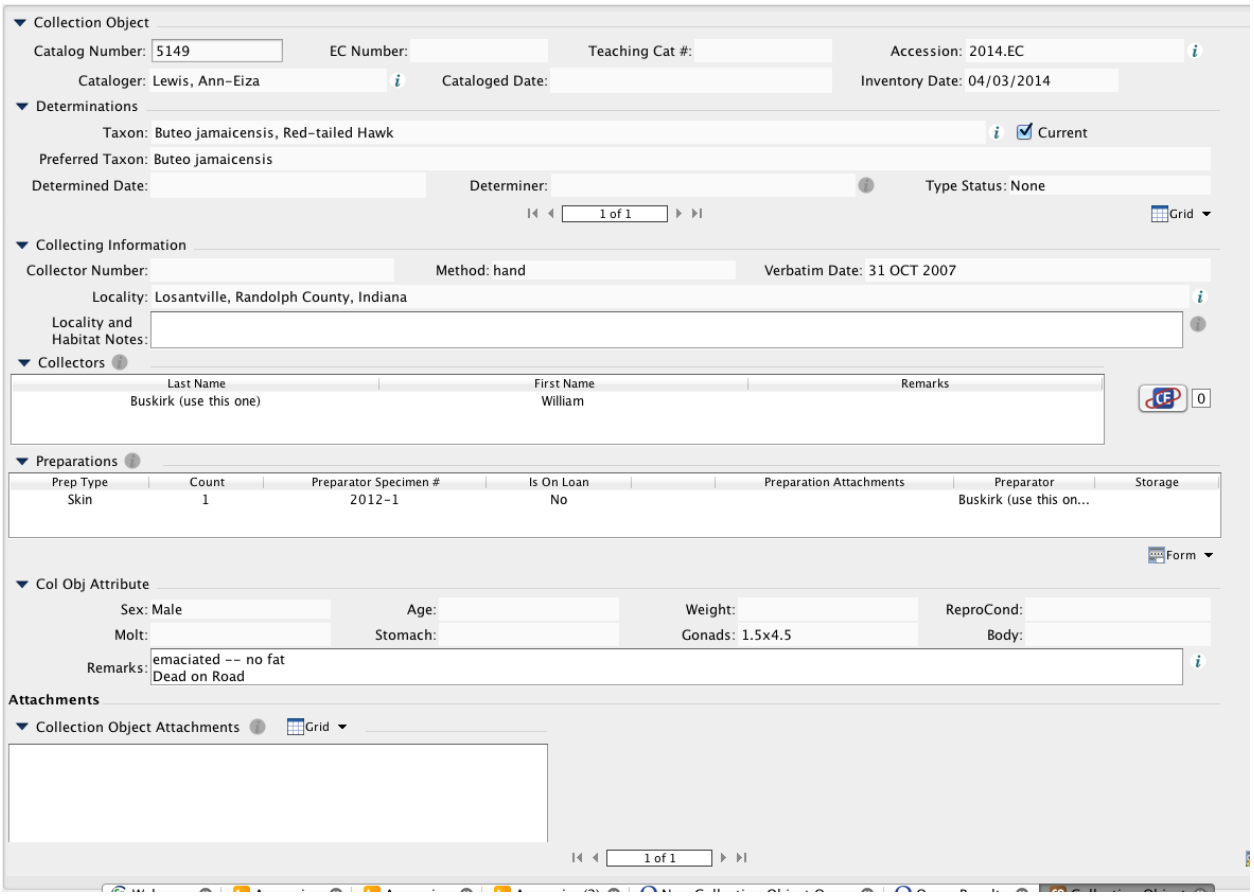
collection as a unit. Accession numbers are assigned by Specify 6 and are only entered by the Collections Manager or Director. A catalog number is the individual unique identifier for a specific specimen. The catalog number is recorded in both the Specify database and in the catalog book. This redundancy is necessary. To limit duplication, catalog numbers should be assigned from the books not from Specify 6.

While catalog numbers are unique to a specimen, accession numbers are used to group large related specimen groups. For example, if a faculty member on a field expedition returns with a group of specimens they will likely be kept together as a single accession to preserve that grouping and to permanently tie them to a particular research trip. Each specimen brought back however will have a unique id. Another example of an accession would be a group of specimens that are given to the museum from another institution. If for example another museum or repository gives the JMM a collection of eggs (or any other group of specimens) they will be considered a single accession.

All items collected and prepared by museum staff are included in an annual accession. Accessions are also used to tie specimens to permit numbers. (NB: there is some inconsistency here to be worked out. Often specimens are not prepped in the same year collected and are therefore collected under a different permit from the year prepped and accessioned)

The images below are sample Accession records and Catalog records from the Specify 6 database. These illustrate the different nature of data recorded by the different actions of accessioning vs cataloging.





Numbering and Codes

The most important element of a a specimens record is its collection number, which in written form consists of a letter code followed by a number. The letter code identifies the collection. This letter code is dropped in the Specify database, which is divided by collection. Many specimens in the written catalog book entries have sub codes that described the preparation(s) for that specimen. For example a mammal for which we have a skull and skin will be labelled Ma-XXXX. If there is no subcode, then the prep can be assumed to be skin only. Like collection codes, subcodes are also dropped in the database to be replaced by the more accurate “prep type.” An alternate code system is identified in some of the older records. It is reproduced below in case the codes are seen somewhere in the collection, but it is not actively used at this time (2014).

Collection Codes (to be used on specimen labels and tags):

M=Mammal
A=Ornithology (includes eggs and nests)
HA=Amphibian
HR=Reptile
VP=Vertebrate Paleontology
C=Cultural

Im=Invertebrate mollusk
I-insect
T=Teaching
G=Tissue

Subcodes
none=skin only
a=skin & skull
A=skull only
b=(male) skin & baculum
B=(male) baculum only
b=(female) skin & embryo
B=(female) embryo only
c=skin & skeleton
C=skeleton only
d=skin&horn
D=Horn only

Alternative: Zoological Specimen Collections Codes (no longer used)
AL=in alcohol
BO=baculum only
EO=embyro only
ES=Embryo and skin
HN=Horn Only
HO=Head only
KO=Skull only
KS=skin & skeleton
MT=mounted specimen
SB=skin and baculum
SH=skin and horn
SK=skeleton only
SO=skin only
SS=Skin and Skull
ST=skin and trunk skeleton
TO=Trunk skeleton only

Alternative Numbers

EC numbers

Older specimens in the collection often have “EC” numbers. These represent the original catalog number assigned to the object before the collection was divided. Note that there are items elsewhere in the college that also have EC numbers (i.e., the art collections). These numbers should not be removed from objects and are recorded in the Specify 6 database along with the catalog number

Teaching numbers

The JMM keeps a separate teaching collection for specimens that have little research value, but still have teaching value. Items in this collection should first be cataloged according their collection type (bird, mammal, etc.) and then be assigned a teaching number, which is recorded in the catalog record.

NB: Historically, the teaching collection has had a separate numbering system. As the teaching collection is entered into Specify 6, each specimen will be cataloged in its taxonomic collection and and its teaching # recorded in that record. We will continue to assign teaching numbers as well.

Assigning a number

Catalog numbers are assigned by collection in numerical order. To assign a catalog number find the appropriate collection book and enter your specimen with the next available number. Do not use Specify 6 to auto number. Using the appropriate collection book, take the next available number and using an archival grade pen and your best handwriting, complete the information according to the columns in the book.

Cataloging Step 4: Writing on specimens and collection items

Most collection items are not labeled directly. The exceptions are skeletal materials and eggs and each has its specific requirements.

Labeling Skeletal material

Labeling Eggs

Cataloging Step 5: Tissue Samples

Cataloging Step 6: Specify

After numbers are assigned for the specimen, its tissue sample, and (if necessary) a teaching number, you are ready to catalog the item in specify 6 database. For details on this please refer to the JMM Specify 6 users guide.

Cataloging step 7: Detention

All items newly added to the collection (as well as all specimens that have left storage for more

than a few minutes) must be placed in a detention area with mothballs. For specimens that are newly prepared they must spend at least two-three weeks in detention.

When placing a specimen in detention be sure to take a card and list the date placed in detention so that we can determine when it is ready to move to long-term storage.

Cataloging Step 8: Store

At the end of its time in detention as specimen can be placed in long term storage according to the arrangement described for that collection. If not already done, its location in long term storage must be entered into the specify 6 database for easy future retrieval and return.

Climate Monitoring

The JMM does not have a climate control system in the galleries or in the storage areas that is adequate for collection care. Close monitoring and documentation is all we can do at this time. Vigilant inspection is necessary to watch for mold growth, excessive dryness, or infestation because of hot or moist conditions. In cold/dry times of the year the concern is more for brittle conditions. For example, study skins are likely to shed and crack was the humidity drops.

Data should be collected from the loggers periodically, preferably on the last day of the month. For consistency, ideally all loggers will be “read out” on the same day and graphs of the data placed in the appropriate binder in Ann-Eliza’s office.

Data Loggers:

The JMM has 10 HOBO brand temp/Rh loggers which are deployed throughout the galleries and storage areas. As of May 2014 they are located as follows:

- JMM1: Dennis 029 (Hadley)
- JMM2: Dennis 025 (Teaching)
- JMM3: Dennis 024 (Mammals)
- JMM4: Dennis 022 (Birds)
- JMM5: MISSING --needs label when found
- JMM6: Dennis 026 (Invertebrates)
- JMM7: Gallery Bird Alcove near Passenger Pigeons
- JMM8: Gallery, back left leg of mastodon on metal support.
- JMM9: Behind Mummy
- JMM10: Old style from mummy--no lcd for reading

HobowareLite

The loggers are managed by Hoboware Lite software, which is installed on Ann-Eliza’s desktop. All “reading out” should take place on AEL’s desktop because that is where the datafiles are stored. This will keep them all in one place. The data loggers need to be “launched” to start data collection and should periodically be “read out” and the data stored. “Reading out” empties the

logger's memory so upon relaunch there should be full data capacity.

Logger Settings:

As of May 2014 all loggers have the same settings (note we have three different models, so setting them on each is a little different). These are set when launching a logger after connecting to HoboWare to collect data.

Log interval: 2 hours and allow 4 readings out of range before triggering alarm

Temp Alarms:
    High 75
    Low: 55
Rh Alarms:
    High: 60%
    Low: 40%

Data Storage

After Reading out and plotting data as needed, be sure to save the data file. Hoboware will prompt you to do this. If reading out on AEL's computer (at this time the only one with Hoboware where it can in fact be done), the files will be stored automatically in the correct place. Name the storage files as follows: logger number collection date (i.e., JMM5 Mammals May 12 2014).

IPM (Integrated Pest Management)

Light Levels

Natural History specimens are subject to fading and damage from excessive light. Never leave a specimen in direct sunlight or any strong illumination. Shades should be kept pulled in collection areas at all times. Turn lights off when you are the last to leave a storage area.

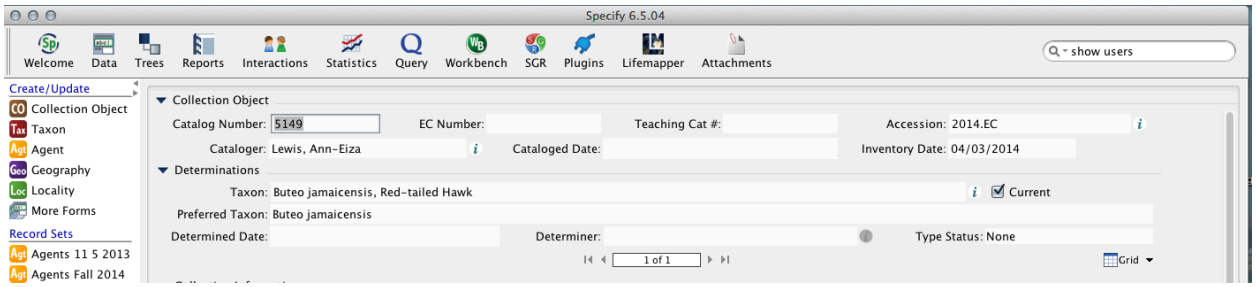
Security

Collections items should be returned to storage at the end of every day. Items on display must be securely locked. When loaned to classes every effort should be made to return the specimens to permenant storage at the end of the class period and to generally limit the time the item is removed from storage. Faculty and TAs should be aware of all risks and

Collections Inventorying

In a collection used as heavily as the Joseph Moore's inventorying the collection is an ongoing function. "Inventorying" is essentially visually identifying a specimen to confirm that it is still present in the collection in its proper location.

In the picture below on the right side of the collections object record, there is a window for "Inventory Date." This is updated manually during the cataloging process and any time a collection inventory is conducted. The date entered is the last "official" time a specific item was seen.



Collections inventorying will be carried out at the discretion of the Collections Manager.

Useful References:

[Care and Conservation of Natural History Collections]

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