

Natural History Museum of Utah (UMNH)

Preparing Paleontological Collections for Reposit

Although the Museum is also known as the Natural History Museum of Utah (NHMU), we remain legally, Utah Museum of Natural History. The acronym UMNH will continue to be used for all collection purposes.

Table of Contents

	Page
Introduction	2
STEP 1: Apply yearly for a UMNH Repository Agreement	2
STEP 2: Request Accession Number(s)	3
Accession Request Webform	3
Preliminary Inventory Spreadsheet	3
1. Specimen Data	3
2. Information on Collector	4
3. Accession Data	5
4. Locality Data	5
5. Geographic Locality Data	6
6. Geologic Locality Data	6
7. Locality Discovery Information	6
8. Preparation Information	6
STEP 3: Prepare the Collections for Repositing	6
How to apply numbers to fossils	7
Legibility	7
Packing fossils for transportation to UMNH	7
Authorized materials	8
Proscribed materials	8
Associated Records	9
1. Required documentation	9
2. Digital Records	9
3. Photographic Materials	10
STEP 4: Dropping off Collections	10
Set an Appointment	10
Curation Fees	10
Drop-off Documentation	10
Pest Management	11
APPENDIX	
A. Curation Fees	
B. Definitions	
C. Accessibility	
D. Conservation/Archival Supply Companies	
E. UMNH Collections Personnel	
F. Assembling an Archival Marking Kit for Paleontological Specimens	

Introduction

The Utah Museum of Natural History (Museum or UMNH) serves as the State designated repository (Utah Administrative Code R807-1) for paleontological collections acquired under permit from state lands in Utah. Additionally we reposit Federal collections. Criteria for determining whether the Museum will curate a collection are in the Museum's formally adopted Collections Management Policy (CMP) and in compliance with Utah State law. Reposited materials will be curated in accordance with the Museum's established CMP and these procedure.

STEP 1: Apply yearly for a UMNH Repository Agreement

The Museum will review repository agreement applications from contract companies, research institutions and land management agencies to curate paleontological artifacts.

Application must be submitted in the name of an organization or institution, with the Principal Investigator (PI) serving as applicant and manager of the agreement. There are three requirements for application:

1. The applicant's organization must have applied for a UMNH accession number under the previous agreement or notify UMNH that no collections were made under the previous agreement, listing the agreement number. (There is a place on the application to note this.)
2. The application fee is due at time of application submission.
3. A shortened CV of the PI must be submitted every 3 years or if there is a change in organization.

All efforts should be made to submit applications prior to the end of the calendar year for most efficient processing, and to ensure the agreement is in place when the PI is applying for a new permit.

UMNH repository agreements are valid for a maximum of one calendar year. UMNH repository agreements will **always have a December 31st expiration**. The PI must apply for a new agreement each year if they anticipate collections to be made, despite the expiration of the permit. If a permit transcends the end of a calendar year, it is the responsibility of the PI to reapply for a new repository agreement to cover the term of the permit.

All projects conducted by an organization in the state of Utah will be covered by the same agreement. However, firms with multiple branches must apply for separate agreements. Please note that when applying for accession numbers **each collection from a different land owner/ manager** will require a different accession number. (See Step 2)

The Museum will accept only complete collections from each site or project, rather than collections that have been divided among several repositories. If a project is carried out in phases (i.e., survey, testing, and excavation) collections must be repositated at the end of each calendar year. If the PI requires access to materials from an earlier phase of the project, these materials can be loaned to him/her by the Museum. Loans can be requested from the appropriate collection manager and will comply with UMNH loan policy.

Timelines are dictated by the permits obtained by the PI, however in order to best manage our collections and anticipation of space for new collections, the Museum does maintain some time restrictions. At the end of each calendar year, holders of UMNH repository agreements who have collected under the agreement are required to apply for accession number(s). If a repository agreement holder did not collect under the agreement, they need only note this (with the previous year's agreement number) on the following year's repository agreement.

STEP 2: Request Accession Number(s) **(Request after collections are made prior to end of calendar year)**

The purpose of the unique UMNH accession number is to link **all** appropriate legal data for collected objects or specimens together. Information includes: the source of the material (i.e., repositior), the investigator, the year in which the work is carried out, land manager/owner at time of collection, the permits, project numbers etc. Only the UMNH registrar is authorized to assign UMNH accession numbers. The accession number (e.g., UMNH.A.2013.15) is a required element of object numbering.

Accession Request Webform

It is the responsibility of the PI to request an accession number prior to the end of the calendar year the fieldwork was completed, and prior to processing the collection. To request an accession number, submit the online form found on the museum's website, <https://nhmu.utah.edu>. Submission for an accession number must include a copy of the valid collecting permit for the collections as well as the Preliminary Inventory Spreadsheet. The template for the Preliminary Inventory Spreadsheet is available on the website. Due to management in our databasing system, this spreadsheet is the only acceptable format for your inventories (both preliminary and later final).

All questions about the following procedure should be emailed to both the Registrar and the Paleontology Collection Manager.

Preliminary Inventory Spreadsheet

While in the field, the collector/repositor will have used their own system for numbering localities and specimens. Once these have been submitted to the Museum, UMNH locality and specimen numbers will be assigned on the Preliminary Inventory Spreadsheet which is then returned to the repositior, for processing of collections. It is important that the returned Preliminary Inventory Spreadsheet be used and edited to eventually becoming the Final Inventory Spreadsheet. This is essential as the formatting of this worksheet was designed for the most efficient importing of data into our database. This will allow for ease of use by future researchers.

1. Specimen Data

Collection

UMNH numbers are assigned by paleontological collection. By assigning the locality and specimen to a particular collection we can more effectively respond to research requests. Prefixes are used to distinguish these collections:

VP for Vertebrate Paleontology
IP for Invertebrate Paleontology
PB for Paleobotany

Unique Specimen Field Numbers

The field numbers are assigned in the field by the collector. While cataloging/ numbering systems may vary, each specimen and each site should be given a **unique** field number.

As an Example the system UMNH Paleontology Department uses in the field:

Unique Field Locality Number

CLB 17/1 means Carolyn Levitt-Bussian discovered this site in 2017, it was the first site she discovered in 2017 (the three initials of the person who discovered it, followed by the year collected, then the site number that is of that year)

Unique Field Specimen Number

CLB 17/1-1 represents the first specimen collected at this locality (the three initials of the person who discovered it, followed by the year collected, the site number and then the specimen number). Work done at this same locality in later years would use the same locality number. but the specimen number would be preceded by the year collected, with the number element collected that year after the decimal point i.e., CLB 17/1-2018.1

If you name your sites with an acronym, you can use that acronym as part of your Unique Field Specimen Number as long as it is somehow unique to each specimen.

This Unique Field Specimen Number will be written, along with the UMNH Specimen Number, on the element(s).

Taxon

We know that sometimes the exact genus and species identifications of the fossil you have collected might be unknown to you (or not yet named). We prefer whatever clade name you put here to be narrowed down as far as possible. If you do not know what it is, please provide an educated guess and indicate in the comments field this is a preliminary ID. **HOWEVER DO NOT include question marks or other punctuation** as these spreadsheets will be imported into our collections database system and we do not wish to have superfluous punctuation.

Element

Please describe the anatomical element to the best of your ability (e.g., femur, leaf, shell, etc). If it is unrecognizable, "bone fragment(s)" is acceptable. We do, however, prefer a tentative identification where possible.

Element Description

This is where we want you to provide any more descriptive information you want to provide for the element. This includes right, left, partial, complete, articulated, isolated, distal, proximal, etc.

Number of Pieces

There should be a separate row for each individual element collected. If the element is fragmented, please provide the number of pieces it has fragmented into.

UMNH Specimen Numbers

The specimen number, or catalog number, is to be assigned by the UMNH Paleontology Collections Manager at the time of receiving the Preliminary Inventory Spreadsheet/during the accession number request process. Once returned to the depositor, it is expected, that the depositor will use this spreadsheet with the assigned UMNH numbers to be used as reference for numbering the specimens for final deposit. The Catalog Specimen Number should be written on the specimen by the Depositor. The numbers are in the formats: UMNH VP #####, UMNH IP #####, UMNH PB ##### depending on the kind of fossil.

Date Collected

We prefer this data to be the most accurate possible (month/day/year). However, if all you know is the year, please write that. Some information is better than none.

2. Information on Collector

Collected by: Names (People information)

For the **Collector**, **Site Discoverer**, and **Preparator** fields, we are asking for very specific data. There will be specific records made in our database from this information. If we just have John Smith and we have multiple John Smith's in our database, we won't know which one collected which specimen. Full, given names are best. Nicknames are confusing and lead to errors. Please separate information into appropriate columns for first, middle and last names.

Affiliated institution

Records will also be made of institutions and organizations. Thus we also request the person's affiliated institution.

Collectors Role in Institution

Finally that person's role in their institution, (Curator, Graduate Student, Volunteer, etc.) to create the most accurate record possible.

3. Accession Data

Accession Number

The UMNH Accession Number is assigned by our Registrar, See STEP 2 above.

Land Ownership

Please be as detailed as possible when it comes to filling out the Land Ownership field. Land ownership refers to the owner/manager of the land **at the time the collections were made**. If the land changes hands after this point, we are not interested in that information here.

If, for example, the site is from BLM land in a national monument, write the official BLM acronym for that monument (e.g., GSENM for Grand Staircase-Escalante National Monument). If it is from Utah State land, **entering STATE is no longer sufficient**. It is the collector's responsibility to discern the actual land manager. For state land this is often SITLA; however, it could also be DWR, Sovereign lands, etc.

As accession numbers are given to objects all coming from localities of the same land manager, specimens listed on a spreadsheet should all be from the same landowner. In other words, each land agency/accession number is to be on an individual spreadsheet.

4. Locality Data

Unique Field Locality Number

Field Locality Numbers are assigned in the field by the collector. While numbering systems may vary, each locality should be given a **unique** field number. See Unique Specimen Field Numbers for example.

Locality Name

In addition to the locality number, the locality might have a name associated with it (e.g., Cleveland Lloyd Dinosaur Quarry, The Skin Site, etc.). Please feel free to include that here.

UMNH Locality Number

UMNH locality numbers are in the format UMNH.VP.LOC.####. Note this is very similar to the UMNH specimen number however, "LOC" is added. This number will be assigned by the UMNH Paleontology Collections Manager at the time of receiving the Preliminary Inventory Spreadsheet/ during the accession number request process.

It is possible to have a site containing specimens from all three collections. Please be sure to separate out the vertebrates from the invertebrates from the plants on your spreadsheet allowing a separate row for each collection (e.g., the vertebrate fossils first on the spreadsheet, the invertebrates next, then the paleobotanical specimens last).

If a site has been visited repeatedly, it may already have been assigned an UMNH Locality Number. The Depositor should alert the Paleontology Collections Manager of to this fact, to ensure that a new number is not erroneously assigned to site already in the UMNH locality database.

UGS Locality Number

The Utah Geological Survey assigns numbers to every site in Utah, no matter who manages the land. Martha Hayden, Assistant to the Utah State Paleontologist, assigns these numbers and manages the database for the state. Locality information needs to be given to Martha for a UGS number to be assigned. This number needs to be incorporated into the Preliminary Inventory Spreadsheet. Martha can be contacted at: marthahayden@utah.gov.

Locality Notes

This is a place for any additional information/ notes with regards to the site.

5. Geographic Locality Data

Please fill in all fields, **State**, **County**, the (GPS) **Datum** (e.g., NAD27, NAD83 and WGS84) in which you collected the coordinates. (Please do not abbreviate, use NAD83 not just 83). Note the **Accuracy** from your GPS (feel free to put a + or – in front of the number e.g., +3m). With regards to **UTM Zone**, please be sure to include the letter (e.g., 12S, 12T, etc.). UMNH records location coordinates in UTM format: **Zone**, **Easting**, and **Northing**. If you collect the coordinates in Latitude and Longitude, please convert (<http://www.rcn.montana.edu/resources/converter.aspx>). If data are converted, please list the original Lat/Long data include hemisphere (EW, NS) in the **Verbatim** column.

6. Geologic Locality Data

It is important to include any data you have relating to the stratigraphy and geologic age of a site: Geologic Period (e.g., Cretaceous), Geologic Epoch (e.g., Late Cretaceous or Pleistocene), Geologic Stage (e.g., Campanian), Formation, and Member.

7. Locality Discovery Information

People information see “2. Information on Collector”

Date (Locality) Discovered

Please enter the date that the locality was first discovered in the MM/ DD/YYYY format

8. Preparation Information

People information see “2. Information on Collector”

Adhesives/Consolidants Used in Preparation

Preparation details will enable UMNH to better manage and conserve collections. In the case of preparation and conservation, it is important to know the types of adhesives and consolidants used.

STEP 3: Prepare the Collections for Repositing

All collections to be reposited at UMNH must be prepared according to these procedures. No other techniques of curation are presently accepted. If a collection is received that does not satisfy these conditions, the collection may be refused at the discretion of the museum and the permitting agency will be notified immediately. If the PI has made a good faith effort to discuss the curation procedures with the museum in advance, we will work with the individual to determine an acceptable solution in a reasonable period of time.

All fossils must be prepared before they are brought to the museum.

If you have any questions with regards to how to appropriately prepare and glue fossils before they are repositied at the UMNH, please email your questions the UMNH Fossil Preparation Laboratory Manager (Tylor Birthisel: tbirthisel@nhmu.utah.edu and cc clevitt@nhmu.utah.edu).

- There should not be loose dirt on the specimen. Please brush off any loose dirt before repositing.
- All fossils must be marked/ **numbered** with a UMNH Specimen # and the Unique Specimen Field # before they are brought to the museum. Please see Appendix F titled, “Assembling an Archival Marking Kit for Paleontological Specimens” for the preferred process of marking and labeling numbers on fossils.
- All fossils must be **packed properly** for transport.
- All fossils must be **accompanied by associated records** on a gold disc; i.e., Final Report, Specimen inventory sheet (excel) enclosed with each box, Field Notes and journals (scanned or typed), Field Maps/Quarry Maps, USGS Maps with Site Location(s), Stratigraphic Sections, Preparation Sheets/Logs, Lab and analysis records/notes, Photographs with printed inventory enclosed, and additional Digital data.

How to apply numbers to fossils

Davidson et al 2006.pdf

Please see Appendix F titled, “Assembling an Archival Marking Kit for Paleontological Specimens” for the preferred process of marking and labeling numbers on fossils.

Important Points:

1. Find a flat part of the specimen to put the number on (that is not on a joint or important process).
2. Apply a base coat stripe of thin Paraloid B-72 in Acetone. Various conservation supply companies carry Acryloid B-72 [polyvinyl acetate)] (PVAC) (see Appendix E).
3. Apply a stripe of white acrylic paint.
4. Put the UMNH Specimen # and the Unique Specimen Field # on the white stripe using India ink or an Archival pen.
5. Please apply a top coat of thin Paraloid B-72 in Acetone over the number.

Legibility

When writing numbers on specimens, numbers should be written carefully and legibly so similar numbers will not be confused (i.e., “4” and “9” and “1” and “7” should all be clearly distinct). When labeling specimens directly, small, legible numbers should be placed in a location that will not disfigure the specimen or obscure an important area, but can be seen easily with a minimal amount of handling when the specimen is in storage. If possible, avoid putting the number in an area that is too rough or unstable.

Individual specimens must have their UMNH Specimen # and the Unique Specimen Field # labeled directly on them. The associated UMNH Locality #, Accession Number, Taxon, Element, Formation, Collector and Date Collected should be written on an acid-free paper tag contained together with the specimen in the container. Specimens that are too small to have numbers written directly on them (generally 1 cm² or less in size) should be placed in a specimen bag or vial with an acid-free paper tag clearly numbered with their UMNH Specimen # and the Unique Specimen Field # with indelible ink.

Packing fossils for transportation to UMNH

Specimens should be brought to UMNH in a receptacle which offers the most protection. This can mean a clam shell or cradle, an appropriate sized box, foam lined Ziploc bags, specimen vials, etc. Upon scheduling a drop off time with the Collections Manager and Registrar, you need to specify in what form the fossil will be arriving (e.g., pallet, boxes, clam shell, etc.) and how many of each type, so we know what to expect and how much space to designate for this collection.

When boxing materials, use the following guidelines:

1. Each box should weigh no more than 30 lbs.
2. Specimens from different sites must not be placed in a single box unless prior consultation with and approval by UMNH is obtained.
3. When multiple sites or multiple animals are packaged in one box, specimens must be separated by site number in some way either with acid-free corrugated board internal dividers, polyethylene foam, or in separate bags or separate smaller boxes.
4. Large, heavy specimens must not be boxed with small, fragile specimens (e.g., large fossil elements together with microfossils).
5. Fragile specimens should be supported and protected within the storage box by wrapping or padding with polyethylene foam, tissue paper, paper towel, bubble wrap, or cotton. Specimens should be packed so they will not be abraded or crushed. Pieces of acid-free corrugated board or polyethylene foam can be used to construct internal dividers.
6. Some large or fragile specimens, which are unable to be boxed, should be repositied in other containers after prior consultation with and approval by the UMNH Paleo Collection Manager. It is preferred that large, heavy fossils be repositied in a clam shell archival storage jacket (Please contact the Paleo Prep Lab Manager for instructions on how to make one).
7. A **Box Inventory Sheet** must be placed inside each box. Only the contents of the box should be listed on this spreadsheet with the following columns at a minimum: The UMNH Specimen Number, the Field Specimen Number, the Accession Number, Land Owner, and the UMNH Site Number.
8. Two copies of the Full Final Box Inventory Spreadsheet should accompany the collections.

Authorized materials

Materials that should be used for preparing collections to be repositied at UMNH include*:

Acid-free paper (minimum 20 lb. weight)
Acid-free board and/or corrugated board and map tubes
Acid-free metal edge document boxes (i.e., clamshell boxes – both 2” and 5” depth accepted)
Archival gold CD-ROM discs (for electronic images and records)
Plastic clips for documents (e.g., Plastiklips™)
India ink (using quill and ink)
Specified black ink pens for artifact labeling (currently only Zig™, Staedtler™ and Pigma™ are approved)
Black markers for labeling specimen boxes and jackets only (only Sharpie™ pens approved)
B-72 or Vinac with solvent of Acetone or Alcohol
Other consolidates and adhesives may be considered with prior written authorization by UMNH.

Proscribed materials

Materials that should not be used for preparing collections to be repositied at UMNH include*:

Metal paperclips (coated or uncoated)
Elastic bands
Staples
Common adhesives or labels
Newspaper
Packing “peanuts” of any variety
Any materials of unknown composition
Common foams (i.e., polystyrene [e.g., Styrofoam™], polyurethane, etc.)
Polyvinyl chloride (e.g., PVC)
Packing material with evidence of pest or material that has been soiled

*this list is subject to update as necessary

Associated Records

1. Required Documentation

Collections will not be accepted by the Museum without **all** associated records. All records must be legible and provided in both hard copy and digital formats. Hard copy documentation must be an exact duplicate of digital documentation and organized in comparable folder systems.

Because the associated records are an archival copy of your work that will be used by both museum personnel and future researchers, they must be complete. Documentation should include, when applicable:

- Spiral bound Final Reports (2 copies)
- Final Inventory Spreadsheet
- Field Notes and Journals (scanned in PDF format or typed up)
- Field Maps/Quarry Maps
- USGS Maps with Site Location(s)
- Stratigraphic Sections/Columns
- Preparation Sheets/Logs
- Lab and Analysis records/notes
- Photographs with a printed inventory enclosed
- Publications referring to any specimen in the repositied collection
- Full box inventory (compilation of the individual box inventories with a column for box to be used for inventory.)

All documentation must reference material by UMNH specimen number so data entry and retrieval will be possible. It is especially important that Site data (geographic coordinates, stratigraphic data etc.) for each specimen and locality be included.

Any materials released or destroyed during analysis (destructive analysis, histology, etc) must be accounted for in the written documentation of the project. It is the responsibility of the permittee to ensure that collections analyzed by outside specialists are received by the museum in the conditions required by these procedures.

2. Digital Records

All electronic data should be recorded on an archival gold CD or DVD in archival sleeves or holders and should be a duplicate of what is submitted in hardcopy. Several file formats are acceptable as archival for digital records.

File formats for digital documentation:

- Acceptable archival file formats for documents and text include: PDF/A
- Acceptable archival formats for, datasets, databases and spreadsheets include: .CSV, .ODS, .XLSX, .XML.
- Acceptable archival file formats for raster-based images (e.g., photographs) include: .DNG, and uncompressed .TIF (.TIFF)
- Acceptable archival file formats for vector-based images (e.g., maps) include: .PDF/A

Maps related to the site and/or report may be embedded in the appropriate PDF/A version of the site or project report. If the size or scale of the map requires that the printed copy be submitted separately, the digital file should be submitted as a separate PDF/A in a map file folder.

3. Photographic Materials

Photographic records provide an essential component of project documentation. The submitted material will be made available to researchers and may be used for other collections' purposes. Thorough documentation of photographs and a logical numbering system is required.

Photographic Log

Documentation for each image should be typed or neatly written in photo number order on photographic log. Each sheet should contain general information such as the project name, site number and cataloger. The following documentation for each image should be recorded:

- A. Date of photograph (as near as possible)
- B. Photo number: Make sure the UMNH Specimen Number and UMNH Locality Number is written encompasses the photo label.
- C. Subject (description of what is visible in the photograph i.e., Field Specimen Number of specimen being photographed, the full name of any individual pictured, etc.)
- D. Site information (site number, site name, Geologic Formation imaged, etc.)
- E. Photographer's full name

Important digital photographs pertinent to the collection of the specimen are required to be placed on an archival gold CD. Color laser printouts on acid-free paper are required for each photo on the archival, gold CD.

Please do not include any data not associated with specimens being repositated at UMNH. For example, if you have spreadsheets about specimens that were not collected or are NOT being repositated at UMNH, please DO NOT include them in the documents you provide UMNH. **We are only interested in the data associated with the specimens in our care.**

STEP 4: Dropping off Collections

Collections will not be accepted from third party researchers. Instead, those researchers should return material to the PI/repository agreement holder for delivery to UMNH.

All specimens must be prepared prior to drop off at UMNH.

Set an Appointment

The Natural History Museum of Utah requests 30 days advance notice of intent to reposit processed collections. As both the Registrar and the Paleontology Collections Manager must be present for drop off, an appointment must be made. It is best to contact both by email, with some suggested dates and times that you are available. It is also helpful to send a copy of the Reposited Collection Checklist form at this time.

Curation Fees

UMNH will be compensated for the curation of collections repositated by the fees as outlined in Appendix A, and is subject to revision by the museum. Payment must be made before or at the time collections are repositated. No collection will be accepted before fees are paid. Any deviations must be requested in writing and approved by the appropriate curator and collections manager.

Drop-off Documentation

A Reposited Collection Checklist form must accompany each deposit of materials at UMNH. The Collection Manager will send or give preliminary notice of receipt when a collection arrives at the museum. This form with preliminary acceptance usually suffices for agency reporting requirements. However it is the responsibility of the permit holder, not the repository, to submit this to the land manger/ agency.

If Museum staff discovers any discrepancies between the repositor's inventory and the actual reposit, the repositor will be notified so the discrepancy can be resolved. If the collection does not satisfy the conditions specified in these procedures, the collection may be refused at the discretion of the museum, and the permittee and agency notified immediately. In such cases the museum will assist the permittee or agency in determining what must be done to rectify the problem(s). When museum staff has inventoried the collection, a final approval will be emailed to the repositor.

Pest Management

The Museum currently undertakes an Integrated Pest Management plan to insure the collections currently in the facility are free of pests. UMNH, at its discretion, will undertake measures necessary to ascertain all incoming materials are pest-free. The museum is equipped with a walk in freezer for pest eradication. However this process can be detrimental to certain specimens and adhesives. Therefore paleontological specimens do not always go through this process. However if you have pest concerns for the collections you will be repositing (e.g., specimens were collected on or near an ant nest), please contact the Paleontology Collection Manager to discuss options.

Appendix A

UMNH Curation Fees

As published on UMNH website May 2017

UMNH will be compensated for the curation of collections at the following rate with the fee schedule effective 2017. Due to the rising costs of resources there will be a 3% annual increase. Fees will be assessed based upon the year collections are **submitted** to the Museum for curation. Please budget for curation costs accordingly. All prices are in US dollars.

	Effective 05/01/2017	Effective 1/1/2018	Effective 1/1/2019	Effective 1/1/2020	Effective 1/1/2021
Artifact/Specimen Box archival box (1.3cu ft)	\$600.00	\$630.00	\$660.00	\$690.00	\$725.00
Document Box 2" clamshell	\$85.00	\$90.00	\$95.00	\$100.00	\$105.00
Document Box 5" clamshell	\$200.00	\$210.00	\$220.00	\$230.00	\$240.00

Oversized material (material exceeding one or more standard box dimensions or weight limitation) will be assessed by the number of standard boxes the material displaces.

Appendix B

Definitions

Accession(1) [noun] An object or specimen that has been accepted into the Museum's collections.

(2) [verb] The formal process used to accept and record an object or specimen into the Museum's collections.

Accessions Committee

The chief curator, division curators, registrar and ad hoc members from appropriate academic disciplines as necessary. The committee makes recommendations and approves proposed multi-division acquisitions, deaccessions and long-term Museum collections commitments.

Accession number

The unique identification number assigned to a group of objects or specimens entering the Museum's permanent or repositied collection.

Acquisition

An object or specimen brought into the Museum for anticipated placement in the permanent or repositied collections or for educational utilization.

Cast

An object or specimen that was made or sold for the purpose of reproducing an original object or specimen, but not with the intent to defraud a buyer (see also Reproduction).

Catalog

(1) [noun] A collection of records that classifies and describes objects or specimens in the Museum's collections

(2) [verb] The act of creating a record that classifies and describes an object or specimen in the Museum's collections

Collections Management

Practices and procedures that prescribe the prudent acquisition, care, display, documentation, loan, preservation, security, disposal of, and accountability for, collection objects and specimens.

Deaccession

(1) [noun] An object or specimen that has been permanently removed from the Museum's collections.

(2) [verb] The formal process used to permanently remove an object or specimen from the Museum's collections.

Deed of Gift

A mechanism of conveyance or form that is signed and dated by a donor, and countersigned and dated by the authorized museum employee (i.e., registrar, division curators, etc.) which transfers legal title of a donated object or specimen to the Museum.

Disposal

The physical act of removing a deaccessioned object from the Museum's collections.

Donation/Gift

Something voluntarily transferred without compensation by the donor to the Museum.

Exchange

The transfer of ownership of an object(s) or specimen(s) from one institution to another institution in return for another object(s) or specimen(s) being given in reciprocation.

Exhibition

The presentation of ideas through the display of objects or specimens with the intent of educating the viewer.

Incoming Loan

Object(s) or specimen(s) placed in the temporary custody of the Museum (not involving change of ownership) for exhibition, research, or acquisition approval.

Inventory

The act of physically locating objects or specimens for which the Museum is responsible and comparing them with documentation records.

Loan Agreement

A form used between a lender and a borrower that identifies the lender, specifies the item(s) to be lent, and outlines the conditions of the loan and the respective responsibilities of the lender and borrower.

Loan Number

The unique identification number assigned to an incoming loan upon receipt.

Outgoing Loan

An object in the Museum’s collection, lent to a borrowing institution in care of an individual (not involving change of ownership) for research or exhibition.

Preventive conservation

Planned care of an object or specimen and its environment to mitigate deterioration, destruction, or neglect.

Provenance

The origin, source, and ownership history of an object (generally for art).

Provenience

The origin and source of an object or specimen (generally for natural history items).

Purchase

The act of obtaining ownership of an object or specimen through the transfer of money.

Record

The documents and information pertaining to the receipt, acquisition, management, and disposition of an object or specimen in the museum’s custody.

Repatriation

The return of human remains or cultural objects on request from the permanent collection to the appropriate representative tribe with a documented connection to the materials.

The materials may be retained by the tribe or reburied at their discretion.

Reproduction

An object or specimen that was made or sold for the purpose of reproducing an original object, but not with the intent to defraud a buyer (see also Cast).

Rights & Reproduction Agreement

A form to be completed and signed by an applicant for the purchase and/or use of photographic images of objects or specimens in the Museum’s collection and/or for the permission to reproduce such images in a publication or other format. The form records information on the applicant and the intended use of the photographic image, and provides rules governing rights and reproductions issues.

Risk Management

A program of practices and procedures to control losses and minimize damage to objects for which the museum is responsible. The University of Utah Risk Management oversees all insurance held for the Museum.

Repository

UMNH is the authorized repository of archaeological and paleontology objects and specimens for the State of Utah. UMNH stores, curates and oversees the repositied collections with the understanding that transfer of title does not occur.

Title

The legal right to possess an object or specimen. Title to the collections is held by the Utah Museum of Natural History. Possessing “good title” to an object or specimen is understood to mean that the object or specimen is free of all liens, encumbrances, and claims of any kind, whether from the United States or any other country.

Transfer

The conveyance of ownership of an object or specimen from one entity to another.

Appendix C

Accessibility

Excerpts from UMNH Collections Management Policy (CMP)

Access Policy

Access to the collections provides opportunities for research and education. However, measures must be undertaken to preserve the integrity and security of the collections. Access to collections must be pre-approved by Curators or Collection Managers and will follow the guidelines of individual collections. Researchers and interested parties must contact the respective UMNH Curator or Collection Manager in order to schedule an appointment to study a specific object or specimen from the collections. Requests for access to collection objects and specimens will be considered by the appropriate Curator and Collections Manager taking into consideration risk to objects or specimens, resources available for supervision and research goals. Access to collections storage areas shall only be under the supervision of collections personnel or, in the case of contractors or inspectors, the Facilities Manager.

UMNH policy, guided by state and federal law, allows for curatorial discretion to restrict access to sensitive data such as site, locality, donor, valuation and cultural information. Reposited collections and their associated records may be safeguarded by further restrictions placed by the public land agency. In cases where a Curator needs greater clarification, they may contact the public land management agency. Curators, Collection Managers and the Registrar will take all reasonable steps to ensure that this sensitive information is safeguarded.

Outgoing Loans

For research, exhibitions, education, or other stated purpose, the UMNH will agree to arrangements with other like institutions for the loan of UMNH permanent collection objects or specimens. An Outgoing Loan Agreement will accompany loans originating from the UMNH and signed by both responsible parties. A General Facility Report will be required from the borrowing institution if the object or specimen is loaned for exhibition. Loans from UMNH will be made for a period of one year, with the option of renewal at the discretion of the appropriate Curator or Collection Manager but are non-transferable without written authorization from Curator or Collection Manager. Collection objects or specimens will not be loaned to individuals. If the loan is for research purposes, results of analyses (including publications, reports, images, GenBank number, digital data such as CT scans etc.) must be forwarded to the Museum and remaining materials, not consumed during analysis in the case of destructive studies, will be returned to division Curator or Collection Managers upon conclusion of the study.

Appendix D
Conservation/Archival Supply Companies

Conservation Resources

800-634-6932

www.conservationresources.com

Gaylord Bros. (Demco)

Syracuse, NY

800-448-6160

www.gaylord.com

Hollinger Metal Edge, Inc.

Commerce, CA

800-862-2228 or

Fredericksburg, VA

800-634-0491

<http://www.hollingermetaledge.com>

Light Impressions

1-800-975-6429 www.lightimpressionsdirect.com

ULINE

Pleasant Prairie, WI 53158

1-800-295-5510

<http://www.uline.com/>

Print File, Inc.

1-800-508-8539

www.printfile.com

Talas

Brooklyn, NY

212-219-0770

talasonline.com

University Products

Holyoke, MA

800-628-1912

www.universityproducts.com

Appendix E

UMNH Collections Personnel

Registration

Janaki Krishna
Registrar
801-585-7484
jkrishna@umnh.utah.edu

Forms and policies:
<https://nhmu.utah.edu/collections/policies-forms>

Paleontology

Carolyn Levitt-Bussian
Paleontology Collections Manager
801-581-5578
clevitt@nhmu.utah.edu

Randall Irmis, Ph.D.
Curator of Paleontology
801-585-0561
irmis@umnh.utah.edu

Museum Information

Natural History Museum of Utah
University of Utah
301 Wakara Way
Salt Lake City, UT 84108

**Before mailing, please contact Registrar and
Collection Manager.**

801-581-6927
Website: www.nhmu.utah.edu

Tylor Birthisel
Paleontology Prep Lab Manager
801-581-5578
tbirthisel@nhmu.utah.edu

Appendix E

Assembling an Archival Marking Kit for Paleontological Specimens



Amy Davidson, Preparator, Division of Paleontology, American Museum of Natural History, New York, NY

Samantha Alderson, Objects Conservator, Division of Anthropology, American Museum of Natural History, New York, NY



Marilyn Fox, Preparator, Division of Vertebrate Paleontology, Yale Peabody Museum of Natural History, New Haven, CT

A poster presented at the 66th Annual Society of Vertebrate Paleontology Meeting, Oct 2006, Ottawa, Canada

The use of proper application methods and archival materials results in numbers and labels that remain legible, durable, and removable over time. Assembling a marking kit makes archival marking of specimens convenient and more consistent throughout a department or institution.

Abstract

Will the number you put on your specimen, its tag, box or other housing, be legible in one hundred years? Is it rub-proof, water-proof, fade-proof? Will a future worker be able to remove it if necessary? This poster will present a plan for assembling an archival marking kit, adapted for fossils from a similar kit for anthropological objects. Having a well-designed kit saves time and can help improve and standardize marking practices. The proposed kit includes a variety of high quality materials, including India ink, acrylic paint, Acryloid/Paraloid B72 in a convenient nail-polish bottle and also in a tube, Japanese and archival papers, Bristol board and various dispensers, brushes, pens, etc. Possible additions to the kit (such as disposable pens) will be discussed. But even the best materials can fail if not used well. This poster illustrates marking failures and solutions for problematic fossil surfaces (dark, rough, friable, very small or fragile, etc.) and problematic materials such as coated surfaces and plastics. Also included are a discussion of permanence and removability, looking both at the materials included in the kit and others that could be used or have been used in the past.

NON-ARCHIVAL PRODUCTS CAN AGE POORLY

Many commercial products used in the past should be avoided



Nail Polish is usually cellulose nitrate, an unstable resin that can yellow, become brittle and flake off of surfaces.



Correction Fluid can also become brittle and flake off over time.



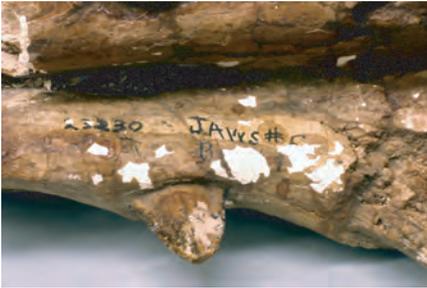
Commercial Pens (Bic, Flair, etc.) often utilize dye-based inks that fade severely. Even so-called "Permanent Markers" (Sharpies, etc) are not lightfast, actually fading rapidly with light exposure. In this case "permanence" refers only to the fact that the markers are waterproof.



Self Adhesive Tape (Scotch, Masking, etc) often ages poorly and falls off.

MARKING PROBLEMS

Improper marking techniques or use of non-archival materials can lead to illegible labels and numbers, resulting in loss of important information. Here are examples of such problems:



A number written on non-archival clear resin that is yellowing and flaking off.



An unstable white basecoat (probably typewriter correction fluid) flaking off.



Ink on a rough, unconsolidated sandy surface rubbing off.



Dye-based ink fading with exposure to light.



Severely darkened resin (shellac) that has almost completely obscured the number written under it.



Ink applied on a handling point with no overcoat that is rubbing off.



A paper label lifting off of an unconsolidated surface.



An incompletely adhered paper label that is peeling off the surface.



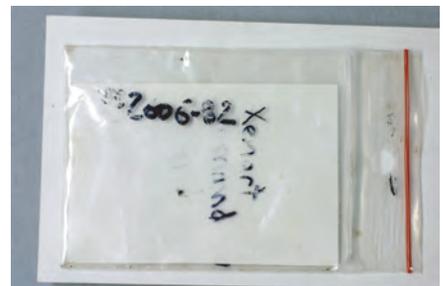
Brittle failure of non-archival paper, adhesive and coating.



Smeared marker on rubber.



Illegible marker ink on foam.



Marker ink rubbing off plastic.

THE MARKING KIT

A marking kit may contain a variety of archival materials, applicators and tools. Here is a list for a sample kit that can be customized for individual collections and users.



Thin Paraloid B-72 in Acetone in a Nail Polish Bottle.

Used as a basecoat and overcoat for ink and paint markings. Paraloid B-72 in acetone 20% w/v (approximately 20g Paraloid B-72 in 80ml acetone) is prepared and placed in a nail polish bottle for easy dispensing. It is a good general-purpose acrylic resin with excellent aging properties.

Black or White Ink

Ink can be used with a quill pen. The black ink must be carbon based, such as Pelikan Drawing Ink #17. The white ink should be titanium oxide based.



Technical pen

Technical pens (rapidographs) such as Koh-I-Noor or Rotring are a convenient way to apply black ink numbers to specimens. 0.30 or 0.35 nibs are good for most marking, while 0.13 is the finest point and is useful when marking very small objects. The pen nibs are fragile and the pens must be carefully handled or they clog or leak.

Crow Quill Pen

Used for applying ink or paint to the undercoat. Some users prefer quill pens to technical pens on some or all surfaces.



Archival pens

Commercial pens are not recommended for applying numbers to specimens as the ink contained in them a mixture of a wide range of ingredients that can be changed by the manufacturer at anytime. Thus the permanence and quality can not be guaranteed. In addition they often do not write well on the resin basecoat and can run when the overcoat is applied. However pigment based pens (such as Pigma) are useful for writing on paper labels and tags. For labeling plastic bags and containers Identi-pens are recommended as they are fade-proof and more rub resistant than other permanent markers.



A variety of useful tools

Brushes for applying ink or white paint, small scissors and tweezers.



Marking Kit

A small plastic container easily holds materials for a complete marking kit.



White acrylic paint

Used to mark dark specimens. The paint must be composed of a stable pigment (titanium oxide). Golden Fluid Acrylics are a perfect consistency for application with brush or quill pen and are supplied in small handy dropper bottles



Black ink for technical pens

The ink must be pigment based (carbon black) as this is light stable while dyes used in some inks are not.

Koh-I-Noor 3080f Universal Black Ink is one example.



Technical Pen Cleaning Solution

The pen point should be dipped in the solution after each use and capped without wiping to prevent clogging of the delicate nibs.

MARKING SOLUTIONS

Archival marks are well adhered and durable. They are fade-proof, rub-proof and waterproof. It is also important that they be removable without damage to the specimen. Reasons for removal may include correcting catalog errors, molding, photography, analysis, or exhibition.

The Standard Method Carbon Based Ink Between Layers of Paraloid B-72.

The Basecoat: A layer of thin Paraloid B-72 in acetone seals and isolates the surface.



The basecoat provides a smooth, even surface for the number or label. It also allows the number to be easily removed from the specimen if necessary in the future.

Keep in mind that many surfaces must be properly consolidated prior to application of marks. If the surface is very friable or powdery the basecoat of Paraloid B-72 may not be sufficient to ensure durability.

The B-72 basecoat may sometimes bubble upon evaporation of the acetone. This can be remedied by adding some ethanol to slow down the evaporation rate. Note that the ethanol/acetone mixture may sometimes smear ink if used as an overcoat.

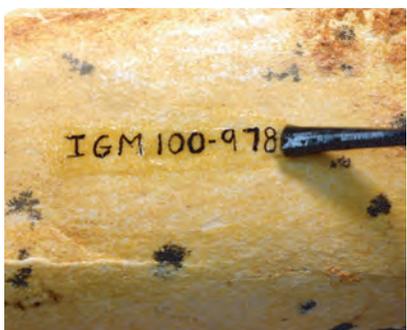
The Ink: Carbon-based ink is lightfast.



The basecoat should be allowed to dry completely before applying the ink.

Carbon black ink can be applied with a technical pen or crow quill pen. These inks adhere well to the basecoat. Many commercial pens are dye-based and should not be used as the numbers may fade over time. Others, such as Pigma pens, are more lightfast but may not adhere well to the basecoat or run when the overcoat is applied.

The Overcoat: A layer of thin Paraloid B-72 encapsulates the ink, making the mark more durable.



The ink should be allowed to dry thoroughly before application of the overcoat.

Avoid disturbing the ink by flowing on the overcoat with a heavily loaded brush without the bristles touching the surface.

Methods for Dark Surfaces

White paint or ink with a stable pigment (titanium oxide) can be used in two ways to mark a dark surface.



White paint or ink can be applied with a crow quill pen or fine brush to a basecoat of B-72, and then overcoated with B-72.



A brushed on patch of white acrylic paint can be placed on top of the B-72 basecoat, then marked with carbon based ink and overcoated with B-72.

Rough and Uneven Surfaces

Some surfaces, such as coarse matrix, can be too rough to mark legibly with a pen or brush.



Paper labels can be useful in these cases. However, it should be noted that ink labels are always preferable, as there is less chance of separation and loss of information. If a paper label is used, the paper and ink used should be archival, and the label must be well adhered and completely saturated with Paraloid B-72 to prevent detachment. Paper labels should not be applied to powdery or friable surfaces that have not been consolidated, as they will peel off over time.

Materials for making paper labels can be included in the marking kit for easy access.

Papers

A variety of archival papers and boards, including Japanese rice paper, precut archival paper strips, and Bristol Board strips can be used for labels on specimens, casts, molds and storage housings.

Thick Paraloid B-72 in acetone in a tube.

Used to adhere paper labels to specimens, boxes, casts, jackets, etc. A concentrated solution of approximately 50% B-72 in acetone w/w is prepared and placed into an empty aluminum tube for easy use.



Torn edges grab better than cut edges. Japanese paper is especially flexible, allowing it to conform to irregular surfaces.

The paper label can be applied with thick Paraloid B-72 and should be pressed well into the surface.



The label should be saturated with resin by dipping it in the solution or by coating it well after placement.

Marking Plastics



Silicone rubber can be marked by "tattooing" with a sharp point and rubbing India ink into the marks.



Casts can be marked in several ways including paper labels, black ink between layers of B-72 and paper tags.



Plastic bags and boxes can be marked with an Identipen which is lightfast and adheres well to plastic. A loose paper label inside can be used in addition.



Foam can be marked by inserting a stiff, folded Bristol board label into slits.

This paper label is adhered face-out to the inside of the lid with B-72. If acetone causes the plastic to cloud, alcohol or Jade glue can be used.



SUPPLIERS AND RECIPES

Paraloid B-72 (formerly Acryloid B-72 in the US) is an ethyl methacrylate co-polymer. It is sold as solid beads by conservation suppliers, such as Conservation Resources International - <http://www.conservationresources.com>, 800-634-6932 or Talas - <http://talasonline.com>, 212-219-0770. The beads dissolve in a variety of solvents including acetone and ethanol. For a discussion of how to prepare it in tubes see the Koob article referenced below.

Empty Nail Polish Bottles may be purchased from beauty suppliers or, more simply, a bottle of clear nail polish can be emptied, rinsed well with acetone and filled with a thin solution of Paraloid B-72.

Empty Aluminum Tubes. Available from Conservation Resources International - <http://www.conservationresources.com>, 800-634-6932. Item #TUB-1, sold in boxes of 10 tubes.

All of the other pens, ink, paint, tools and papers listed are available from art or office supply stores.

REFERENCES

Alten, Helen. "Numbering Museum Collections." ICOM Ethnographic Conservation Newsletter, Number 17, April 1998. pp. 18-21. <http://www.collectioncare.org/cci/ccin.html>

Braun, Thomas. J. An Alternative Technique for Applying Accession Numbers to Museum Artifacts. JAIC, 46 (2007): 91-104.

Koob, Stephen P. The Use of Paraloid B-72 as an adhesive: Its Application for Archaeological Ceramics and Other Materials. Studies in Conservation, Vol. 31, No. 1 (Feb. 1986), pp. 7-14.

Sullivan, B. and D.R. Cumberland, Jr. "Use of Acryloid B-72 Lacquer for Labeling Museum Objects" Conserve O Gram Number 1/4 (July 1993) National Park Service <http://www.cr.nps.gov/museum/publications/conservoogram/01-04.pdf>

"Labeling and Marking Museum Objects" a fact sheet published by the MDA (Museum Documentation Association) of the UK <http://www.mda.org.uk/labels.htm>

"Appendix J: Marking" in The National Park Service Museum Handbook, Part II: Museum Records (2000) <http://www.cr.nps.gov/museum/publications/MHII/mh2appj.pdf>

ACKNOWLEDGEMENTS

The authors wish to thank Ana Balancel, Cornelia Blik, Bob Evander, John Flynn, Bushra Hussaini, Carl Mehling, Chris Norris, Ivy Rutzky and Linda Scalborn of the Division of Paleontology, AMNH; Lisa Elkin, Conservator of Natural Sciences Collections, AMNH; Greg Brown of Vertebrate Paleontology, University of Nebraska State Museum; and Rachel Perkins-Arenstein, Conservator in Private Practice, who all helped us adapt, develop and test the marking kit or offered advice during the compilation of this poster. Also many thanks to George Scott of Scott & Nix.

Parts of this material contributed by Marilyn Fox are based on work supported by the National Science Foundation under Grant No. 0346678. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.