

# **Introduction to the Osteoware Data Entry Software Program**

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**April 2011**

## Introduction

The Osteoware data entry interface is a complex software program designed to assist in the documentation of human skeletal remains as well as the real-time data entry of quantitative and qualitative observations into a structured query language (SQL) database. It is available for free. This database can be used for subsequent meta-analyses by writing SQL-based queries within the **Advantage Data Architect**<sup>™</sup> database manager (see *Installation Instructions for Osteoware*), which is also available as freeware from **Sybase**. A more user-friendly graphic user interface (GUI) for data extraction and report production is in the works.

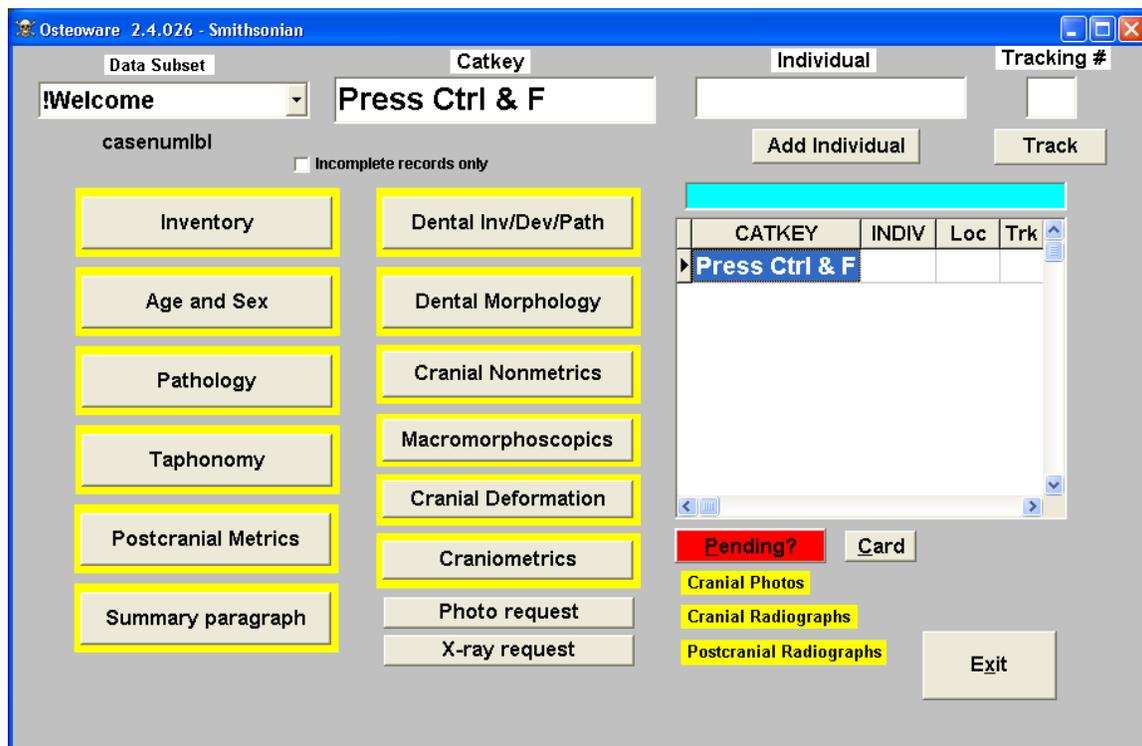
The following manuscript is based on the Smithsonian Institution's Repatriation Osteology Lab Manual for Osteoware, which is itself a work in progress. Be advised that in some instances museum specific content and/or instructions appear. Follow the advice at your discretion. Also note that institution specific nomenclature in the Osteoware software such as 'Catalog Number' (or 'Catkey' for short), is used only for convenience. Substitute your institution's burial number, serial number, or specimen number whenever Catalog Number/Catkey appears in this manual. Unfortunately at this time there is no method to substitute the use of Catkey within the software, therefore **Catkey** will also be used throughout this manual.

### Some initial suggested instructions:

- Follow the directions and standards outlined in this manuscript as well as the original Buikstra and Ubelaker (1994) *Standards for data Collection from Human Skeletal Remains*.
- Handle the remains and maintain your workspace according to your institution's best practices and code of ethics, such as outlined in the American Association of Physical Anthropology website [<http://physanth.org/association/position-statements/code-of-ethics>].
- Always look at each catalog/burial/serial number on each bone placed on your workspace.
- Never mix remains from different individuals on you workspace - maintain discrete areas! Use separate tables if you need to compare different remains.
- When available review the archaeology field notes and publications present for the site you are working on in order to make adequate attempts to reassociate commingled remains from other individuals found with remains.
- Always check the original accession records whenever you start to document new remains in order to compare/contrast information found, such as whether elements are present or absent, or when multiple individuals are supposed to be present.
- Always have standard x-rays on hand while documenting remains, or wait to start documentation until they are available. Make special x-ray requests for bones when required to properly document unusual pathology or taphonomy.
- Seek a second opinion. Other eyes will always see more than yours alone, and will provide a fresh perspective.
- Remember, it is better to over document than it is to under document, therefore request special x-rays and photo documentation as appropriate.

## Osteoware Home Screen

Clicking on the Osteoware desktop shortcut (the skull & crossbones icon; see *Osteoware Beta Installation* to create a desktop icon) opens the Osteoware **Home Screen**. The Home Screen contains buttons to the various **Data Entry Modules**, the **Special Function** buttons, as well as a **CATKEY window** displaying all catalog numbers in the selected **Data Subset**. Each will be described in further detail in subsequent sections after a brief explanation of how to navigate to a particular catalog/catkey number.



The Osteoware Home Screen

### Navigating to a Catalog/Catkey Number

You can navigate to any catalog/catkey number from the Home Screen by pressing the Control key and the F key simultaneously (**Ctrl + F**). This keystroke combination opens a small accessory window where you input the Catkey you wish to view, then press **Enter** to go to that record. This shortcut offers the quickest way to open a catkey record.

Alternatively, you can press the down arrow to the right of the **Data Subset** window (upper left corner of the Home Screen) to browse a list of site names, states, provinces or other regional divisions previously entered into the appropriate database table. Clicking on any of these Data Subset divisions will open a list of all catkey numbers associated with that site or regional division in the **CATKEY Window**.

**NOTE:** direct entry of Catkey specific site names and/or regional divisions into the database **Data Subset** field is an advanced step best left for the database manager. It is outlined in the *Osteoware Beta Installation* guide; however a more user-friendly system for Catkey and related geographic data entry is in the works.

## CATKEY Window

There is a **CATKEY window** to the right side of the Home Screen that displays a simple table with columns from left to right: a black arrow/triangle to the left of the current selected catalog number, other catalog numbers in that **Data Subset** (see the drop down list in the upper left corner of the Home Screen), whether there are other distinct individuals **INDIV** remains associated with that catalog/catkey number (such as A, B, or C,...X), the **Loc** or temporary shelf location of the remains in the lab, or whether they've been returned to storage (RET), or repatriated (RIP). The last column **Trk** displays the total number of tracking numbers that have been assigned to commingled remains found in that catalog number. How to use Tracking Numbers, and the Tracking Database, will be discussed separately in the Inventory Chapter.

## The Home Screen Buttons

There are numerous buttons on the Osteoware Home Screen. Briefly, these buttons are organized into two subdivisions, the **Special Functions** and the **Data Entry Modules** as listed below, and are color-coded for easy recognition of documentation status. Each will be discussed in detail in the next sections.

### Special Function Buttons

1. **Card** (link to the Smithsonian catalog card - **not active in public Osteoware**)
2. **Pending?** (to place a hold on the currently active catalog number)
3. **Photo request**
4. **X-ray request**
5. **Add Individual** (for commingled remains data entry only)
6. **Track** (for commingled remains data entry only)
7. Auxiliary Documentation indicators (**Cranial Photos, Cranial Radiographs** and **Postcranial Radiographs**; located below the **Pending?** button)

### The Data Entry Modules

8. **Inventory**
9. **Age & Sex**
10. **Pathology**
11. **Taphonomy**
12. **Postcranial Metrics**
13. **Dental Inventory/Pathology**
14. **Dental Morphology**
15. **Cranial Nonmetrics**
16. **Macromorphoscopies**
17. **Cranial Deformation**
18. **Craniometrics**
19. **Summary Paragraph**

## Module Color Coding/Documentation Status

Briefly, each of the **Data Entry Module** buttons (Inventory, Age and Sex, Pathology, et cetera) as well as the **Auxiliary Documentation indicators** (Cranial and Postcranial Photography and Radiographs) are color coded. This helps to easily identify the documentation status, such as whether data entry is required (yellow), or data has already been collected (purple). Using a 3-button mouse you may right click on any module or Auxiliary Documentation indicator to manually change the documentation status and color.

**Yellow** = documentation is required

**Purple** = documentation is complete

**Orange** = not applicable/indeterminate, i.e. if no postcranial remains are present, then the Postcranial Metrics module button should appear orange. Right click on the module button to manually change the documentation status to orange.

**White** = No Deformation, and only applies to the Cranial Deformation button. Right click on the module button to manually change to the documentation status.

## The Special Function Buttons

### 1) Card Button (**not active in public version Osteoware beta**)

Just below the **CATKEY window** is the white **Card** button that will open a new window containing a digital copy of the original catalog card.

**IMPORTANT: THIS CARD MUST BE CHECKED FOR RELEVANT INFORMATION BEFORE DOCUMENTING ANY CATALOG NUMBER.**

Just above the CATKEY window is a **Turquoise box** that briefly states what should be present in the storage box(es) containing the remains.

CRAN = cranium

MAND=mandible

PC=postcranial remains

PC PART=partial postcranial remains

etc.

### 2) Pending? Button

Pressing the **Pending?** button opens a new Pending window through which you may personally place a 'hold' on the catkey by pressing the **Add/Keep** button. For example, a pending status is required when special requests for x-ray documentation is ordered for pathological conditions. The reason for the 'hold' must be entered into the provided comments field as a reminder to yourself to conduct some action. A Pending status will keep the remains in the current temporary location (a lab location outside of permanent storage) until you have looked at your requested x-rays and entered specific comments regarding what the x-rays reveal into the pathology comments field. Only then will you

clear the Pending 'hold'. You must personally clear your 'holds' by re-entering the **Pending window**, selecting the appropriate catalog number and pressing the **Clear Hold** button. The effective use of the Pending button will provide you with a reminder of actions to be taken on certain catalog numbers that required temporary removal from your work area before documentation was complete, such as for x-ray documentation.

### 3) Photo Request Button

Photo requests must be made for any unusual examples of taphonomic and pathological conditions, or other exceptional characteristics found on the remains. If you are in doubt about whether to photograph something, ask for a second opinion or simply make the request, since over documentation is better than under documentation.

Make multiple photo requests of the same bone(s) if documentation of a pathological or taphonomic condition dictates a need for this action. For example, a long bone fracture should be documented from at least four sides/aspects (anterior, lateral, medial, posterior, and perhaps even superior and inferior) as well as separate close ups. If the abnormal condition appears on more than one view/aspect of the bone, then request all views that the abnormal condition is displayed. When in doubt, request more photographic views, since over documentation is better than under documentation.

#### **There are three fields to fill out in a photo request:**

##### **1. The Bone/View field at the top must include:**

- a) The bone side (Left or Right, or L or R).
- b) The bone name(s). Be specific in naming the bone; vertebra is not specific enough, whereas T4 identifies the bone exactly as the fourth thoracic vertebra.
- c) The view (lateral or medial, superior or inferior, anterior or posterior, or an oblique-be specific). You can combine views when requesting oblique shots, i.e., superolateral oblique.
- d) Whether you want it to be a close up/detail shot

##### **2. The Pathology/Notes section:**

You must include an adequate description of the trait to be photographed in order for others to identify it in the image, and also to search for it in the database. If it is a pathological condition then copy and paste the pathology description into this field, but include only descriptive adjectives or adverbs and nouns by eliminating unnecessary words. For example: "Lytic lesions with sclerotic response on thoracic vertebrae". If it is a taphonomic characteristic, then briefly describe the appearance and what you think may have caused it. State it in this manner, "unknown stain probably due to in situ copper contact", or "unknown white material adhering possibly adipocere", or "localized periostosis of unknown etiology".

##### **3. Special Instructions section:**

Special instructions must be written in this field if you want to include other bones in the same shot, or if you want bones to be articulated in the same shot.

For example, include the superior end plate view of a vertebra and the inferior end plate view of the adjacent vertebra in the same image in order to illustrate an intervertebral pathological condition such as severe Schmorl nodes. With complex instructions that cannot be written down easily, ask for the photographer to get verbal instructions from you by writing in this field, “see me”.

#### 4) X-ray Request Button

X-ray requests must be made for any unusual examples of pathological or taphonomic conditions, or any possible changes that are not clearly visible to the naked eye, such as processes that might disrupt the medullary space, diploe, et cetera. If you are in doubt about whether to x-ray something, ask for a second opinion or simply make the request since over documentation is better than under documentation.

Make multiple x-ray requests of the same bone when required. For example, a long bone fracture or any lytic lesion needs to be x-rayed from at least 2 sides (anteroposterior/AP and mediolateral/ML) in order to see the profile of the lesion from all sides, or to detect the path of a fracture line. When in doubt, request more views since over documentation is better than under documentation.

#### There are four fields to fill out in an x-ray request:

1. The **Bone** name field at the top left must include:

- a) The bone side (Left or Right, or L or R)
- b) The bone name. Be specific in naming the bone since vertebra is not specific enough, whereas T4 identifies the bone exactly as the fourth thoracic vertebra.

2. The **View**

Pick appropriate view(s) from the drop down list. If a lesion is on the anterior aspect of a bone, pick postero-anterior (PA) since you want the lesion as close to the x-ray film/screen as possible in order to be in focus. If necessary you can combine views when requesting oblique shots, ie: superolateral oblique, but this must be entered in the **Special Instructions** (see below).

3. The **Pathology/Notes** section

You must include an adequate description of the trait to be x-rayed in order for others to identify it in the image, and to search for it in the database. If it is a pathological condition then copy and paste the pathology description in this field, but include only descriptive adjectives or adverbs and nouns by eliminating unnecessary words. If it is a taphonomic characteristic, then briefly describe the appearance and what you think may have caused it. State it in this manner, “projectile entry wound, probable gunshot trauma if lead bullet wipe is revealed on x-ray”.

4. **Special Instructions** section

Special instructions must be written in this field if you want to include right and left bones in the same x-ray exposure in order to detect bone density differences

between the bones, or if you want the bones of the knee to be articulated in the same exposure. With complex instructions that cannot be written down easily ask for the x-ray technician to get verbal instructions from you by writing in this field, “see me”.

## 5) Add Individual Button

When bone(s) are discovered that do not belong to the main individual representing the catalog number, then an inventory of these bones must be entered into the appropriate **Commingled Inventory** page in the **Inventory** module (see **Inventory** chapter).

Bones are suspected, or even determined, to be from different individuals when: duplicate bones are present (i.e. two left humeri), significant size or morphology difference between the same left and right bone, inconsistent developmental age (i.e. unfused epiphyses on one bone versus fused epiphyses on other bones), or when the sex may be different (i.e. male pelvic sex traits versus cranial traits indicating a female). In addition, the corresponding articular surfaces of the bones, or the upper and lower dentition, may also be incompatible (ie: mandibular dental wear does not match the maxillary dental wear, thus proper occlusion is impossible). Whenever possible seek out multiple opinions from others before disassociating remains from the main catalog number.

Data collected from commingled bone(s) will then be entered either into the **Tracking** database system (see **Tracking** below), or entered as a separate individual by clicking on the **Add Individual** button. Prior to this decision the context of the burial itself must be taken into consideration, such as whether any archaeological field notes mention recovery of stray bones, *in situ* commingling, scavenging activity, or other postmortem disruption. In brief, if all burials were disinterred and recovered from a single site and are now available for documentation, then the skeletal collection may be considered a closed system. If a closed system exists then a commingled bone should belong to one of the other burials, therefore try reassociation to other individuals from that site (i.e. find catkey(s) missing the bone(s), compare antimeres, age and sex, *et cetera*). It is also possible that the bone was misplaced in permanent storage (potentially between two different recovery locations/sites) so check a few storage drawers above and below for a possible reassociation. With all attempts to reassociate now failed, enter data for that bone into the **Tracking** database system.

If commingled bones comprise a cranium, mandible, or a series of articulating elements (appendage or spinal column, *et cetera*) and cannot be reassociated to another catalog number based on missing elements, morphological, or age and sex compatibility, then the bones probably belong to another unidentified person from the site and data should be entered as an additional individual by pressing the **Add Individual** button and assigning a letter (or additional letter) to the catalog/catkey number.

Decisions to enter commingled bones as another individual (A, B, or C...), or into the Tracking system (1, 2, or 3...), should always be made in consultation with the lab manager or their designated representative.

## 6) Track

The special **Tracking** database system is used when commingled bones from other individual(s) are found commingled with the remains from the main individual represented by the catalog number. The **Tracking** system facilitates collecting data and keeping track of these commingled remains for possible *future* reassociation, though reassociation attempts should always be made now before any data collection is accomplished into the **Tracking** system.

Given that there is a commingled bone inventory section in the **Inventory Module** (see section **8) Inventory** below for details), only certain kinds of bones will require data entry into the Tracking system. The bone must display some characteristic requiring data entry documentation, such as osteometric measurements, pathological conditions, unusual taphonomy relative to other bones in the catalog number (such as sun bleaching, or unusual adhering material not seen on other bones), or unique field numbers or other writing on the bone itself.

Decisions to enter commingled bones as another individual (A, B, or C...), or into the Tracking system (1, 2, or 3...), will be made in consultation with the lab manager or their designated representative.

## 7) Auxiliary Documentation indicators

The Auxiliary Documentation indicators are located below the **Pending?** button. These indicators are not true buttons, but the color of the indicator provides information on the status of the cranial and postcranial photography and radiographs. If **yellow** the documentation is required, if **orange** then the documentation is not applicable, if **purple** then it is accomplished. This color code is the same as the **Data Entry Modules** discussed previously.

You can right click on the Auxiliary Documentation indicators to change their status to Not Applicable, Done, Not Done. In addition an 'Info' option is available that opens a new window with a table that contains data relevant to the type of auxiliary documentation, such as the photo and radiograph views accomplished. This information feature is a Smithsonian specific feature and may not be available in the current Osteoware install.

## The Data Entry Modules

8. Inventory
9. Age & Sex
10. Pathology
11. Taphonomy
12. Postcranial Metrics
13. Dental Inventory/Pathology
14. Dental Morphology
15. Cranial Nonmetrics
16. Macromorphoscopies
17. Cranial Deformation
18. Craniometrics
19. Summary Paragraph

### 8) Inventory

Nearly all bones in the human body are listed in the **Inventory** data entry pages, with a blank box associated with each bone when a new record is opened for the first time. When a particular bone is absent then no value is entered in the inventory—the box is left blank for that bone. However, if the bone is present, then a value **MUST** be entered for that bone according to whether it is complete or incomplete:

- 1=Complete; cortex intact (>75% of the bone is present)
- 2=Partial or Damaged (25% to 75% of the bone is present)
- 3=Fragmentary or badly eroded (<25% is present)
- BLANK**=Missing

To the bottom left of the first Inventory page is a turquoise box for **Teeth**, and a value must be entered –no blanks are allowed in the turquoise box. In this case the values 0 to 3 represent:

- 0=No teeth present (due to antemortem condition, or postmortem loss)
- 1=Complete; all teeth present postmortem that were likely present antemortem
- 2=Nearly Complete dentition (some teeth lost postmortem, but >50% present from the determined antemortem dentition)
- 3=Partial Dentition (<50% of the antemortem dentition is present)

### Inventory Comments

The **Inventory Comments** field located on the third tab of the **Inventory Module** (the tab for ‘Appendicular Skeleton’) must be filled in for documentation to be complete. If written properly, the **Inventory Comments** can be transferred directly to the **Summary Paragraph** module with little to no editing. Complete the comments correctly here and save yourself some time at the end when composing the **Summary Paragraph**.

The first sentence of the **Inventory Comments** shall include whether the cranium, mandible, and postcranial skeleton was complete, nearly complete, partial, or fragmentary, and then list the exact bones present (or alternatively exactly what bones are missing/absent depending on whichever is the majority condition). It is good practice to always state whether the mandible is present or not. Ribs, hand, and foot bones may be summarized as complete, nearly complete, partial, or fragmentary, however summary statements such as “complete legs and arms” should never be used. For vertebrae, state which ones are missing or present such as, “T4 through T12 is missing”. This may end up being a long sentence, but do not be concerned.

Whenever appropriate, after the first sentence of the **Inventory Comments** a stand-alone section should be started and labelled ‘**Reassociation Note**’. This section identifies the catalog number(s) and provides details regarding the exact bone(s) reassociated from other catalog number(s) and the reasons why an association was made in the first place, ie: appropriate size, morphology, and age related development, same sex, matching articular surfaces, consistent taphonomy, et cetera. This reassociation information must also appear in both the **Summary Paragraph** and **Inventory Comments** section(s) of the recipient catalog number, as well as the donating/original catalog number(s) that the bone(s) were found in. This is required in order to preserve the original provenience information, which may be important for future research. An example reassociation note follows:

Reassociation Note: Several elements of the individual with RO catalog number 227211 have been reassociated from other skeletons in accession number 42109. The left femur, two cervical vertebrae, and the L5 vertebra were reassociated from RO catalog number 227003 based on compatible articular surfaces and consistent size and morphology. The left clavicle was reassociated from RO catalog number 227001 based on compatible size and morphology to the extant antimer.

**IMPORTANT:** Once bones are confidently reassociated, you should write the new catalog number down just above or below the old catalog number - NEVER overwrite the original catalog number!

## **Inventory: Commingled Inventories**

The **Inventory Module** data entry system is programmed to handle not only the primary individual that represents the catalog number under documentation, but also potentially three additional inventory pages for commingled remains composed of bones NOT belonging to the primary individual. Depending on the skeletal age estimate of each of the commingled bone(s) present, each commingled bone will be entered under the appropriate **Commingled Inventory** page, which is accessed by clicking the **light blue Commingled box** on the first **Inventory Module** page. Clicking in that box opens a new list with three choices:

- 1) Infant
- 2) Subadult
- 3) Adult

Clicking on any of these choices opens the relevant **Commingled Inventory Data Entry** page appropriate for the skeletal age of the bone(s) you need to score as present in the inventory. On the **Commingled Inventory Data Entry** pages, each bone has a blank box beside it as before, however, in this case the value entered **MUST** be the number of bones of that type present, ie: if there are 6 adult left clavicles present, then a 6 is scored in the box regardless of whether they are complete or not. The number is no longer scoring completeness, but a count of the element type present.

**IMPORTANT:** The **Commingled Inventory Comments** field of each age-related **Commingled Inventory** page shall include the specific list of commingled bones present and the number of each bone type. These commingled remains must be bones that could not be reassociated to any other individual within the same site/accession number. Each **Commingled Inventory Comments** field should have its own justification as to why these bones cannot be associated to the primary individual representing the catalog number. In addition, the Commingled remains comments shall include an estimate of the minimum number of individuals (MNI) present and the evidence for this conclusion, ie: three unassociated left adult scapulae (where the primary individual of the catalog number is a subadult) indicates an MNI of three commingled adults. An example commingled inventory comment follows:

Commingled Adult Inventory: Two unidentifiable adult thoracic vertebrae possibly from a single individual do not belong with the remains with RO catalog number 227001 since the vertebral column is already complete, and they are of a size and morphology incompatible with the primary individual. In addition, they are not compatible with any individual from accession number 42109.

## 9) Age and Sex

Refer to Buikstra and Ubelaker (1994) *Standards for data Collection from Human Skeletal Remains* for age and sex estimation standards. In addition refer to and cite any other relevant publication when estimating age or sex on isolated bones, such as when estimating sex from metric variables for a particular population.

All skeletal traits/characteristics used in the formation of an overall age or sex estimate should be commented on in the **Comments** field, located on the fourth tab of the **Age and Sex Data Entry** section. You must provide some logical justification for your estimates, or explain why you judged some traits to be less reliable in this case, ie: pathology affecting the innominates may render pelvic age traits less representative of the skeletal age of the individual. If written properly, the Age and Sex Comments field can be imported directly to the **Summary Paragraph** with little to no editing. Complete your comments correctly here and save time when composing the Summary Paragraph.

## 10) Pathology

The **Pathology Data Entry** pages attempt to capture and categorize very complex biological processes. At this time the contractor will receive verbal training in how to use the **Pathology Data Entry** pages. However several important requirements and comments can be made at this time.

**IMPORTANT:** In most cases, common pathological conditions such as osteoarthritis do not require citation of a diagnostic publication. However, particular forms of trauma or disease shall include an appropriate published reference (with page number) leading to your diagnosis, for example in the case of infantile scurvy:

Ortner, D.J. (2003) Identification of Pathological Conditions in Human Skeletal Remains. p 384-387.

**IMPORTANT:** For specific fracture trauma cite: **Galloway, A. (1999) Broken Bones**. This book is available on the Osteology Lab reference book shelf or in the Anthropology Library. When citing Galloway provide the appropriate page number for the identified fracture type, and give a brief summary of the possible conditions, variables, and/or context specific to that fracture type when appropriate.

**IMPORTANT:** The **Trauma** check boxes and radio buttons should only be used when the bone has sustained observable fracture or dislocation with the naked eye or on radiograph (x-ray). While “traumatic” events can occur to muscle tendons and ligaments, resulting in osseous alterations to muscle origins and insertions, these are more appropriately entered under the **Abnormal Bone Formation** or **Bone Loss** tabs, not the **Trauma** page.

### The Pathology Description

#### Pathology Description

The **Pathology Description** field must be filled in for documentation to be complete, and must include a qualitative description of the physical appearance of the lesion. Therefore observations shall be conducted using at least 5X or 10X power magnification. To not view any lesion under this magnification constitutes incomplete documentation. The Zeiss dissecting microscope is also available for your use.

The description shall also include a quantitative metric assessment of the pathological area affected, ie: measure and report the size of the affected area and depth. Also state whether it is well or poorly defined, where it is located (anterior, posterior, medial, lateral aspect, et cetera) as well as at least one quantitative locating measurement (using calipers) from an established landmark, for example:

There is a well defined lytic lesion with sharp margins 25 mm in diameter x 5 mm deep, and is located on the anterior aspect of the right humerus 55 mm distal to the proximal articular surface.

In the case of cranial conditions, always triangulate the lesion from a minimum of two cranial landmarks, for example:

There is a smooth surfaced bone deposit 12 mm in diameter x 3 mm raised and located 40 mm from Bregma and 60 mm from Nasion on the left side of the frontal bone. The margin is slightly undercut, and is therefore consistent with a button osteoma.

## 11) Taphonomy

The following guideline for approaching the documentation of taphonomy is not an exhaustive treatise, since there are virtually limitless manifestations of postmortem environmental and cultural variables that will affect the body and thus the appearance of the skeleton. That said, taphonomy is such an important factor to document that it deserves a fair deal of your time to do properly.

Check all boxes that apply on the **Main Taphonomy Screen**, but you must provide a comment for each box you check. When you are in doubt about making a comment, seek a second opinion, or do so anyways with an appropriate caveat to the observation (possibly due to; is of an unknown material, et cetera) since over documentation is better than under documentation.

Always smell the remains. Odors may be qualified as general decomposition, water exposure/immersion, smoke, et cetera. Some remains may accomodate the smell of other remains in the same drawer so be sure remains have "aired out".

Always look inside the braincase, nasal aperture, and EAM's (external auditory meati) with flashlights or snake lights, and make appropriate comments on what you see. This is important information to tell what side the cranium was resting on postmortem, such as,

Soil and rootlets adhere to the left side and anterior aspect of the endocranial surface.

### Key Taphonomy questions to answer

#### **Burial and/or Surface Exposure?**

Is there any adherent soil, rootlets, or roots, even in very small foramina? Always document whether soil and/or roots are present or absent. Is there evidence for surface exposure such as sun bleaching, algae, or lichen deposits? Always document the presence or absence of surface exposure.

Keep in mind that in most case bones were cleaned of soil, but that it can't be removed from everywhere. Look in foramina first. Look in tooth sockets, exposed trabecular bone. If you see apparent soil staining, you will find some adherent soil somewhere. Qualify the soil as to grade and color (type) if possible: fine silty soil, grainy sand, sandy soil, red clay, dark organic humus etc. Keep in mind that advanced decomposed tissue will appear like rich brown or black soil.

**Presence of insect debris?**

Describe and measure (or at least estimate) the size of pupa casing, larval casing, ootheca, etc., and WHERE they occur. A prime location to look thoroughly for insect debris is the nasal cavity, especially for fly pupa casings. EAM's, tooth sockets, and basilar foramina, are also good for larval casings and cobwebs. Look for worm castings, which have the appearance of grainy dark soil.

**Presence of adipocere?**

In most cases, adipocere should be bright white with a grainy, or crusty crystalline structure - grayish-white may be light-colored sandy soil. Always check for typical areas where white adipocere may be found - inside the braincase, the EAMs, exposed trabeculae, and other foramina. It will often be in more than one location.

**Presence of desiccated tissue?**

Always check for desiccated tissue especially on the occipital condyles, the TMJ, and other postcranial articular surfaces, but look everywhere in small foramina and within cranial sutures. Document the color, location, and extent of the tissue.

**Presence of cut or scrape marks?**

While a specific cut mark database may be implemented in the future, it is still very important to briefly document cut and/or scrape marks, their location, size, orientation, approximate number of marks at any locus (if repetitive "sawing" action), and whether the mark is V-shaped or U-shaped in cross section. Any cut marks present shall be viewed under the large Zeiss dissecting microscope for proper observation, and a second opinion should be sought out before documentation is complete.

**Writing on remains?**

Transcribe absolutely everything that you see written on the bones and any notes found in the box(es) the remains came in. Use a slash '/' to represent a line break between lines of these notations. Note whether different colors of media were used such as ink, paint, pencil, marker, chalk, grease pencil, et cetera., and whenever possible whether the media is faded or fresh. When a male or female symbol appears (the shield and spear of Mars and mirror of Venus, respectively), document them in this manner:

The symbol for male is written in black ink on the...

OR

"... [female symbol] is written in pencil on the...

**General Taphonomy Descriptors:**

For general condition, one man's "fair" is another man's "good". Be descriptive rather than summaritive, "water damage is seen on the interior braincase" is not descriptive - it's interpretive. "Exfoliation and flaking of bone is seen inside the braincase, probably due to water damage" is the expected standard.

Avoid using "appears to be" or "maybe" and instead use "probably" or "likely" to reflect an educated opinion from experience. Consult with other osteologists as much as you can to see what you can say with some degree of confidence. "Possible" is acceptable

but use it only when you really don't know, such as, “An unknown substance, possibly quicklime, adheres to the right side of the cranium”.

### **Documentation Order to the Taphonomy Comments field:**

Follow this general guideline when documenting taphonomy. Approach the composition of the **Comments** field in a logical manner, and attempt to arrange the observations in the likely, or possible, chronological order that they may have occurred:

#### **1) Interment environment:**

What color(s) and condition(s) are the bone(s) in. Do not write merely “overall fair” or “good” but you must note general patterns of bone diagenesis such as which surfaces and locations, ie: left side, posterior aspect, only axial skeleton affected, et cetera. In the upper right corner of the **Main Taphonomy** screen is the turquoise **Bone Condition** entry box with associated **Help** button. Pressing the **Help** button opens a new window with a list of standard stages of bone decomposition. Read all the descriptions, decide on which best suits the remains, and then put that number in the condition box. In many cases one decomposition stage does not apply to the entire skeleton, and if so, then in the comments field state the observable range and where it occurs.

Are the color(s) likely due to soil staining or soft tissue decomposition, or something else? Are there roots and soil adhering in recessed areas and/or root damage, such as etching or staining? Is there partial or complete surface exposure? Is there sun bleaching or other evidence of past surface exposure such as animal tooth marks, or insect casings? Is there adhering dried tissue or hair? Is there a lingering smell or odor of decomposition? Soil? Rootlets?

#### **2. Perimortem activity:**

Is the pattern of cut marks consistent with skeletal dismemberment at the joints, and if so was a stone/lithic instrument used (generally more U-shaped cut in cross section) or iron/steel (more V-shaped in cross section). If the body was cremated, what are the patterns of heat-related fractures and colors of the burnt bone.

#### **3. Reburial:**

Secondary interment is not uncommon, but usually the complete skeleton is not recovered, such as the small bones of the hands and feet, patellae, sometimes vertebrae, et cetera. Is there evidence of soil staining over previous sun bleaching, or different types/colors of soil present?

#### **4. Excavation/retrieval damage:**

Trowels, shovels, and other probing instruments create breaks and other damage that usually exposes less stained underlying bone.

#### **5. Curatorial changes:**

Document any writing, repairs, glue, clear coatings/preservative, hardware attached now or formerly? For example the Army Medical Museum, or AMM crania, will have nail holes in the temporal area and drill holes in the coronoid processes of the mandible for attaching springs, which are sometimes still present in the box. Some remains underwent

maceration as observed by numerous fine scalpel marks and/or wire brush abrasion. Volumetric studies may have been conducted, as seen by the presence of mustard seed or small metal shot in the storage box or inside the cranium. Has bone tissue been sampled during curatorial history?

## 12) Postcranial Metrics

When measuring the skeleton, follow the standardized postcranial metric definitions provided in the Buikstra and Ubelaker (1994) *Standards*. When in doubt, seek a second opinion.

**IMPORTANT:** While it is normal convention to measure only the left side, it is recommended policy, and the policy of the Repatriation Osteology Lab to measure both the right and left side of the skeleton for all measurements whenever condition allows.

In addition, several new measurements are now taken. On the second **Postcranial Metrics** page (for “Ulna, Sacrum, Innom, Femur”), there are two buttons for **Vertebrae** and **Metacarpals/Metatarsals**, and clicking these open a new window with additional measurements to be taken whenever bone condition allows. Vertebral body heights and ankle height are entered under the **Vertebrae button**, and maximum length of metacarpals and metatarsals are entered under the **Metacarpals/Metatarsals** button. In addition, the length of the tibia is also measured three different ways with each measurement definition provided if you “hover” the mouse pointer over the name of the measurement.

The third **Postcranial Metrics** page (for “Tib, Fib, Calc”) also has a **Comments** field that shall be filled out whenever estimated measurements were made. Each estimated measurement must be stated clearly as well as which bone (right or left). If a bone is shortened or bowed due to antemortem trauma, then this bone should still be measured and this must be mentioned in the comments field, and repeated in the pathology comment.

## 13) Dental Inventory/Pathology

**IMPORTANT:** Dental radiographs **MUST** be completed before any dental documentation is started. If the standard cranial x-rays are not yet done, put a “**hold**” on the catalog number through the **Pending** button on the **Osteoware Home Page**, place the cranial remains in the work area of the radiograph technician and send them an e-mail requesting that the radiographs be expedited. Meanwhile work on something else (such as the postcranial remains) until you receive the x-rays.

### Dental Inventory

Teeth should be scored for presence/absence as noted in the Buikstra and Ubelaker (1994) *Standards*. If a socket is unobservable, it should be scored as a “9”. If you are unsure if a tooth was lost antemortem or is congenitally missing, score it as a “9”.

Always look at the radiographs for supernumerary teeth. If a supernumerary tooth is present, describe its location, size, and orientation.

### **Dental Development**

Score teeth as noted in the Buikstra and Ubelaker (1994) *Standards*. Always look at the radiographs when scoring development. Often a tooth will appear to be fully erupted and formed to the eye, but will not have complete root development, which will be evident on the radiographs. If you cannot determine the developmental stage of a tooth from the radiograph, request any additional radiographic views that you think may help. If you still cannot see it, score it as a “99”. However, leaving a particular tooth’s developmental field blank when it was possible to score the developmental stage will constitute unacceptable documentation.

### **Dental Wear**

Always use magnification and additional lighting when examining teeth for occlusal wear. The method used in the lab is different than the one in the Buikstra and Ubelaker (1994) *Standards*; click the “**Help**” button for an image of the stages to be compared and contrasted, then record the appropriate stage for each tooth in the box.

### **Carious Lesions**

All tooth surfaces should be examined for caries, both macroscopically (under magnification and with task lighting) and on radiographs. Carious lesions should be noted as to aspect, location, and size.

**IMPORTANT:** Teeth should only be scored as not having a lesion (“0”) if it was possible for them to have this condition. If a tooth is not yet erupted, logically it cannot be carious, thus it should be scored as a “9”, not a “0”. Remember that scoring something as a “0” implies that the tooth could have suffered from this condition, but was nonpathological. If much of the enamel of a tooth is broken away postmortem, score the tooth as unobservable (“9”), not as unaffected by disease (“0”).

### **Dental Abscesses**

The presence of dental abscesses should be scored by location, as seen on the screen. Examine radiographs for abscesses not visible macroscopically. As with caries, if a tooth is not erupted, it is not possible for it to be abscessed, thus it should never receive a score of “0”, but rather that of “9”.

### **Hypoplasia**

Examine teeth for hypoplasia using raking light and magnification. If a tooth shows a defect, note the type and measure its location from the Cemento-Enamel Junction (CEJ). **IMPORTANT:** Forming (unerupted) teeth can sometimes be scored for hypoplasia if the crown is visible to the naked eye (i.e., the enamel is visible due to loss/breakage of the alveolar bone). If the crown is not visible to the naked eye, it should be scored as unobservable (“9”), not as nonpathological (“0”). If you can’t see it, you don’t know that it’s not hypoplastic. For teeth that are observable (no missing enamel on the labial/buccal surface), only score the absence of hypoplasia “0”, if more than 2/3 of the enamel surface is still present (not worn down by occlusion). If the tooth is significantly worn, score it as a “9”. If the tooth is very worn but you can still see a defect, score the defect.

## Dental Modification

Classify the tooth according to the categories on the screen, and describe the modification in the **Dental Modification Comments** field. Provide justification for your conclusion(s), for example:

The left mandibular 1<sup>st</sup> molar displays likely antemortem chipping along the distal occlusal margin, while the left maxillary 2<sup>nd</sup> molar displays corresponding mesial occlusal margin antemortem chipping as seen by rounding/smoothing and staining of the chipped surfaces.

## Comments

Summarize your findings in the comments field. Note the number of teeth present, and those lost antemortem or postmortem. Note general patterns (i.e., loss of all mandibular molars). Note pathology. Note general stage of dental wear. Note modifications or anything else of interest.

**IMPORTANT:** Postmortem loss, damage to the enamel, or other circumstances may render the documentation of certain teeth impossible. In this case you will score that tooth as “**9 unobservable**”. However, leaving a particular tooth’s field blank when it was possible to score the tooth will constitute unacceptable documentation.

## 14) Dental Morphology

Forthcoming

## 15) Cranial Nonmetrics

The documentation of **Cranial Nonmetrics** is relatively straightforward as long as you are familiar with the nonmetric standards published in Buikstra and Ubelaker’s (1994) *Standards*, which provides a reduced set of traits. However complete documentation of **Cranial Nonmetrics** requires you to be well versed with the traits presented in the book by:

Hauser, G., and G.F. De Stefano (1989) *Epigenetic Variants of the Human Skull*.

One should refer to this book whenever uncertain of the specific trait, or its particular manifestation.

**IMPORTANT:** In certain cases traits will display unusual morphology, and in these instances the osteologist shall describe, and if appropriate, reference the Hauser and De Stephano book by page and plate number when available.

**IMPORTANT:** Damage to the cranium may render the assessment of certain traits impossible. In this case you may score the trait as “**9 unobservable**” from the drop down list, or simply leave the field blank. However, leaving a particular trait blank when it was possible to score the trait is incomplete documentation.

## 16) Macromorphoscopies

The documentation of **Cranial Macromorphoscopies** is relatively straightforward as long as you completely read and follow the illustrations and trait descriptions as they appear in the window on the lower right side of the page, and score the trait accordingly. When in doubt about how to score a trait, seek a second opinion.

**IMPORTANT:** Damage to the cranium may render the assessment of certain traits impossible. In this case you will simply leave the field blank. However, leaving a particular trait's field blank when it was possible to score the trait is incomplete documentation.

**IMPORTANT:** In certain cases traits will display unusual morphology, and in these instances the osteologist **MUST** provide a quantitative and/or qualitative description of the anomalous trait. A **Comments** field is available by pressing the turquoise **Comments** button located just below the trait list on the right side.

## 17) Cranial Deformation/Modification

The documentation of **Cranial Deformation** proceeds from the **Posterior** aspect of the cranium on the first page, through the **Anterior** aspect on the second page, and finally to **General** miscellaneous traits and **Comments** on the third page. Click the appropriate radio button for each trait, or if the trait is not applicable leave it blank. For example, if there is no deformation on the anterior aspect of the cranium, then only the "**Deformed?**" field needs to be checked for "**No**", and then leave all other fields blank.

On the third data entry page the definitions for "**Form**" follows the illustrations in Buikstra and Ubelaker's (1994) *Standards*, on page 160-163. Review the text and illustrations and make click on the appropriate choice. Additional traits or characteristics on the third page are self-explanatory and should be scored as appropriate if present, or if damage precludes observation they should be left blank.

**IMPORTANT:** Damage to the cranium may render the assessment of certain traits or characteristics impossible. In this case you will simply leave the field blank. However, leaving a particular trait blank when it was possible to score the trait is incomplete documentation.

The **Comments** field on the third page **MUST** be filled in for documentation to be considered complete. The comments should include **BOTH** a qualitative and quantitative assessment of the cranial deformation. Once again, one person's "moderate" deformation may be "severe" deformation to another, so use calipers to estimate a measurement range of the flattened area. For example:

The skull exhibits possible unintentional deformation consistent with plagiocephaly (Hutchinson et al., 2003), with the posterior left parietal

flattened/deformed over a poorly defined 70 to 80mm diameter area centered roughly 20 to 25mm left of lambda. The contralateral right parietal is bulging, the ipsilateral right frontal displays mild flattening with inferior displacement of the right orbit, and there is slight bulging of the left mid-frontal. An 11mm diameter x <1mm deep depression is located 22mm left lateral to lambda, and has a porous surface. Some taphonomic alterations and warpage have occurred, limiting further observations.

B. Lynne Hutchison, John M. D. Thompson and Ed A. Mitchell (2003)  
Determinants of Nonsynostotic Plagiocephaly: A Case-Control Study  
*Pediatrics*. 112;316-322.

[<http://www.pediatrics.org/cgi/content/full/112/4/e316>]

## 18) Craniometrics

Forthcoming.

## 19) Summary Paragraph

**IMPORTANT:** Summary Paragraphs are composed after all other documentation that you are responsible for has been completed. Do not proceed with a summary paragraph until all modules containing comments are complete.

The Summary Paragraph is the final distillation of all observations you have made. These paragraphs will be used to form the basis of a report. The summary paragraphs are also used by the Case Officers in reports and by other SI staff (curators or collections managers) or outside researchers as a quick summary of a catalog number, and should thus be complete, accurate, and to the point. This is especially important when remains are reassociated into or from other catalog numbers. That said, summary paragraphs shall be written in complete sentences and pathology comments summarized and condensed for space.

The **Summary Paragraph** composition page contains various buttons on the right side that add the comments field to the Summary Paragraph composition window from the other data entry module pages, such as: Age & Sex, Inventory, Taphonomy, Pathologies, Dental, and Cranial Deformation.

## Summary Paragraph Main Goal

The main goal is to produce a summary paragraph that includes exactly what bones are present in the **Inventory** (or alternatively exactly what bones are absent depending on whichever is the majority condition), the basic **Age and Sex** estimate, the **Taphonomy** of the bones (including writing on the remains), a summary of any noteworthy **Pathologies** condensed for space, **Dental** observations, and any observations that pertain to cultural

affiliation such as labret wear or **Cranial Deformation**. Following this main section are **Reassociation Notes** and **Commingled Inventories** (see below).

## Summary Paragraph Inventory, Age, and Sex

The first sentence shall include the **Age and Sex** estimate (but not the exact details of the osteological methods employed), whether the cranium, mandible, and postcranial skeleton was complete, nearly complete, partial, or fragmentary, and then list the exact bones present (or alternatively exactly what bones are absent depending on whichever is the majority condition, see examples below). Always state whether the mandible is present or not.

Ribs, hand, and foot bones may be summarized as complete, nearly complete, partial, or fragmentary, however summarizations such as complete legs and arms shall not be used. For vertebrae, state which ones are missing or present such as, “T4 through T12 is missing”. For dentition some generalization is acceptable, such as anterior or posterior teeth, but specify maxillary or mandibular dentition and whether they are missing antemortem or postmortem.

### First sentence examples:

- 1) The complete cranium, mandible, and partial postcranial skeleton from a 35 to 50 year old male is present, including: the right scapula, right humerus, right radius, and right ulna, the C1 to C7 vertebrae, some ribs and hand and foot bones. The anterior maxillary teeth are lost postmortem, but the posterior mandibular teeth were lost antemortem.
- 2) The partial cranium but nearly complete postcranial skeleton of a 15 to 20 year old probable female is missing: the bones of the cranial base, the mandible, all ribs, and some hand and foot bones. All teeth are lost postmortem.

## Summary Paragraph Taphonomy

If the comments you made in the **Taphonomy** data entry page are well written and complete, then they can be directly entered into the **Summary Paragraph** by clicking the ‘Taphonomy’ button without need for editing, although you should proof read them for clarity. These comments will follow the Summary Paragraph first sentence as described previously, but precede the **Pathology** comments paragraph as discussed below.

**IMPORTANT:** Use appropriate verb tense, for example write, “...preservative **IS** present on the remains and the teeth **ARE** glued into their sockets.” Otherwise your comments may be misinterpreted that **YOU** applied the preservative if you write that “preservative was applied...”.

## Summary Paragraph Pathology & Dental

All Pathology comments you entered are added to the Summary Paragraph comments field by clicking on the 'Pathologies' button. However the pathology comments shall be summarized for content and space, and should start a new paragraph. Organize the Pathology paragraph by summarizing any trauma first, followed by infectious and neoplastic diseases, arthritis and stress markers, and finally a simple list of anatomical variants of note, such as squatting facets.

Particular forms of unusual trauma or disease shall include the appropriate published reference leading to the diagnosis, while for specific fracture trauma cite Galloway's (1999) *Broken Bones*, and provide the appropriate page number, and give a brief summary of the possible conditions, variables, and/or context specific to that fracture type.

A single condition that affects multiple bones can be summarized as such, "Arthritis is observed on all joint surfaces of the right shoulder and arm, throughout the vertebral column, both hips, and all leg bones."

If the comments you made in the **Dental** data entry page are well written and complete, then they can be directly entered into the **Summary Paragraph** by clicking the '**Dental**' button without need for editing, although you should proof read them for clarity. These comments will complete the Pathology Summary Paragraph.

## Summary Paragraph Reassociation Notes

**IMPORTANT:** After the first section of the summary paragraph (as outlined above) a stand alone section should be labeled '**Reassociation Notes**'. This section identifies the catalog number(s) and details the exact bones reassociated from each catalog number and the reason(s) why an association was made in the first place, ie: appropriate size, morphology, and age related development, same sex, matching articular surfaces, consistent taphonomy, etc.

This information shall also appear in both the **Summary Paragraph** and **Inventory Comments** section(s) of the recipient as well as the donating/original catalog number(s) that the bones were found in.

### **example:**

Reassociation Notes: Several elements of the individual with RO catalog number 227211 have been reassociated from other skeletons in accession number 42109. The left femur, two cervical vertebrae, and the L5 vertebra were reassociated from RO catalog number 227003 based on compatible articular surfaces and consistent size and morphology. The left clavicle was reassociated from RO catalog number 227001 based on compatible size and morphology to the extant antimer.

## Summary Paragraph Commingled Inventories

**IMPORTANT:** The last section of the summary paragraph includes any unassociated commingled remains that could not be reassociated to another individual within the same site, or other artifacts or faunal remains present. Each **Commingled Inventory** must be separate and with an appropriately labeled heading: **Commingled Infant, Commingled Subadult, Commingled Adult, Faunal Bones or Artifacts**. Each section must have its own comments as to why these bones cannot be associated to the primary individual representing the catalog number.

**example:**

Commingled Adult: Two unidentifiable adult thoracic vertebrae possibly from a single individual do not belong with the remains with RO catalog number 227001 since the vertebral column is already complete, and they are of a size and morphology incompatible with the primary individual. In addition, they are not compatible with any individual from accession number 42109, and are thus entered as RO tracking numbers 227001-1 and 227001-2 based on their compatible articular surfaces and presence of abnormal pathology (matching Schmorl nodes) across the intervertebral disc space.

### MNI

In addition, the Commingled remains comments shall include an estimate of the **Minimum Number of Individuals** (MNI) present and the evidence for this conclusion, i.e.: two unassociated left adult scapulae indicates an MNI of at least two commingled adults. Also, state whether it is possible to refine the MNI based on potential matches of bones by discounting antimeres, articular surfaces, age, sex, common taphonomic appearance, or shared pathological condition. Taking these variables into account may indicate there are more individuals present than a simple count of the most frequent bone, and is therefore very important to consider carefully and report all variables used in the estimation of MNI in the Summary Paragraph.

## Examples of Summary Paragraphs

### 380440

The remains of 5 adults are present (3 left and 4 right tibia, of which there are 2 antimeres pairs RO Catalog numbers 380440-2 and -3, and 380440-4 and -5), as well as 1 subadult left tibia 380440-1, and 1 subadult right tibia 380440-9 (not antimeres pairs) are present in this bone lot, for a minimum number of seven individuals.

The bones display various taphonomic alterations, including varying expression of sunbleaching (tracking numbers 1, 2, 3, 4, 6, 7, 8, 9), green algae stains (tracking numbers 1, 2, 3, 4, 8), as well as overall soil stains, slight excavation damage, desiccated tissue (track number 8), and adhering plant material (track number 5 and 6). Found with the bone lot is a calendar sheet with the machine ink-printed date, "SATURDAY / FEB. 19 1949" and "380,440" written in pencil. All bones have "380440 / Bartolombo Bay / Australia" written in black ink.

Pathological conditions include Osgoode-Schlatter disease (Ortner 2003:353) on RO tracking numbers 380440-4, and 380440-5, fracture of the distal metaphysis on RO tracking number 5, and squatting facet on RO tracking number 8.

### 380445

The incomplete postcranial skeleton from a 4.5 to 6 year old includes: a partial right clavicle, both humeri, the right radius, possibly the 5th lumbar vertebra, right ilium, both femora, left tibia and fibula, right calcaneus, and some hand bones. The bones are mostly medium brown to light tan in color, with some sun bleaching on the humeri, proximal femora, calcaneus, and distal tibia and fibula. There is a diffuse green stain, possibly algae, on the lateral aspect of the ilium. Sandy soil adheres in recessed areas. Glue attaches some epiphyses to their diaphyses. Damage to the proximal left humerus and femur expose sunbleached trabeculae. "380,445 / Bartolombo bay / Australia" is written in black ink on most bones, and coated in a clear preservative. Included with the remains is a piece of paper with, "#380445 / 09-404-06-09 / yaws" written in pencil.

The left tibial and fibular diaphyses displays abnormal bowing in the antero-posterior plane, consistent with sabre-shin resulting from chronic infectious disease such as yaws (Ortner 2003: 274-277). There are no dental remains.

Reassociation Notes: Three unnumbered deciduous teeth originally stored with these remains were reassociated to RO catalog number 380444 and 380446.

### 380453

A cranium, mandible, and incomplete postcranial skeleton from a young adult male, aged 25 to 35 years old, are present. These bones were re-associated by a curator and the collections manager from catalog numbers 380453, 380454, 380456, 380457, 380460, 380461, 380462, and 380463, mostly on the basis of a pathological condition that pervades the skeleton. The left and right ulnae (labeled 380460) and a left radius (labeled 380461) may not belong to the primary individual, as the proximal right ulna has extensive septic arthritis and the distal right humerus has none. The right fibula labeled 380458 may not belong with this individual, as it does not articulate correctly with the right tibia. These bones were documented as 380453. The left and right scapulae present (labeled 380462) and two left ribs (labeled 380463) probably belong to a larger person, and are tracked separately.

The bone color is tan to medium brown in areas not exposed to the elements. Many of the elements are at least partially bleached, probably from sunlight. Small amounts of soil are present on irregular surfaces, and there are also a few leaves and rootlets present. Desiccated tissue adheres to the anterior sacrum, and a thin layer of wood (bark) is present on the posterior surface of the proximal right tibia. Within the crest of the left innominate there is a considerable amount of soil, and some evidence for insect nesting (mud wall). There are several areas, especially on the innominates, where unknown animal activity has perforated the cortical bone. A preservative has been applied to the teeth. A large circular sample (28 mm in diameter) has been removed from the left parietal. Several bones have small (17 mm) circular patches of glue or other clear material, sometimes with a smaller circle of the same material in the center, and in a few cases, there is a small round disk within one of these patches. These may be a natural phenomenon (such as egg cases) or possibly some material used by exhibitors to protect the bones during display. The posterior right humerus has red staining in the area of a pathological lesion in the midshaft. There are small areas of white deposits on the bones, possibly from water. The bones come from several catalog numbers. These include 380453 (cranium), 380454 (mandible), 380456 (femora), 380457 (tibiae), 380459 (humeri), 380460 (ulnae), 380461 (radius), and 380463 (rib, sacrum, and innominates). In addition to being labeled with these numbers, the bones are also labeled "Gallery Hill", "Gallary Hill", G.H." or "G. Hill" in black ink or pencil. The distal left femur is labeled "36 [circled]" and the distal right femur is labeled "35 [circled]", both in pencil. A paper tag attached to the left femur is labeled "380456/09-404-06-08". **A blue Post-It note in the box reads "380453/ GH3" and a piece of lined paper reads "G.H. / INDIV III".**

Twenty teeth are present in good condition and in situ. The maxillary right lateral incisor is broken off around the CEJ postmortem, and the mandibular right canine just above. The remaining 10 teeth were lost postmortem. No carious lesions or apical abscesses were noted. The alveolar bone is slightly porotic and the crests moderately resorbed. Linear enamel defects are present on the maxillary canines. Occlusal wear is moderate. There is extensive evidence of a systemic disease in this individual. Multiple lesions, both lytic and proliferative, that are suggestive of either yaws, a treponemal disease, or osteomyelitis, which could have been the result of a fracture or infection that is now obscured by bone activity.

Commingled adult remains: A partial maxillary right molar originating from another adult is present.