

Col. Joseph Bridger's Remains from the Chancel of St. Luke's Church, Smithfield, Virginia

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Col. Joseph Bridger of Smithfield, VA died on April 15, 1686, and was buried on the family estate known as Whitmarsh Plantation. In 1894 his remains were exhumed from the original grave site and re-interred underneath the chancel floor of St. Lukes Church in Smithfield, VA. Bridger was a financial contributor to the construction of the church. In 2005, Bridger's descendents requested that his remains be exhumed and examined by scientists at the Smithsonian Institution's National Museum of Natural History to learn more about his physical attributes. Bones found in a small brick crypt under the ledger stone of Col. Joseph Bridger were exhumed from St. Lukes Church on January 29, 2006. The findings of this investigation are presented in this report.

Bone Inventory and Taphonomic Description

Present is the partial skull and postcrania of a European male aged 54 to 57 years (age is based on historical records and is corroborated by characteristics of the skeletal remains). The remains are well-preserved but highly fragmented and incomplete with less than 20 percent of the skeleton recovered. This percentage represents the portion transferred to St. Lukes Church. Most of the remains were left *in situ* at the original burial site. The recovered bones also show exhumation and reinterment damage incurred in 1894.

The cranial vault is represented by 39 fragments, ranging in size from approximately 10 mm by 12 mm to 53 mm by 99 mm. Of these, 18 bone pieces are from the frontal, 10 represent the left parietal (one of these pieces also represents a small portion of the right parietal), four are from the right parietal, and 5 are fragments of the occipital. Two additional bone fragments are from the cranium, but they cannot be classified by specific bone. All but five fragments can be rearticulated and comprise a partial cranial vault.

The mandible is represented by three pieces of bone, none of which can be rearticulated. One piece represents a partial left horizontal and ascending ramus. The socket for the left third molar is visible and indicates postmortem loss of the tooth. The socket for the left second molar is mostly remodeled, indicating antemortem loss. Another mandibular fragment represents the medial portion of the mandible, including the mental eminence and sockets for the left canine through the right first premolar. A partial socket for the right second premolar is also visible. These sockets have clearly defined edges that indicate postmortem tooth loss. The mental eminence is prominent and protrudes from the plane of the incisors by approximately 11 mm. The third piece of the mandible is comprised of the posterior right body. Sockets for the distal root of the right first molar,

the right second molar, and right third molar are represented. These sockets are also clearly defined, indicating postmortem tooth loss and lack of recovery of the teeth from the original interment site. No abscessing is noted. Despite the erosion of the bone and its poor preservation, it can be estimated that the mandibular body height was low, especially in the posterior socket region.

The rib cage is represented by a single rib body fragment (unside) measuring 37.5 mm in length.

Seven vertebral fragments are present and represent one upper thoracic vertebra, three lumbar vertebrae, and a small section of the posterior body of the sacrum. The upper thoracic vertebra is represented by the left lamina, base of the spinous process, and left inferior articular facet. The second lumbar vertebra is represented by the right and left laminae of the vertebral arch, the right superior articular facet, the left inferior articular facet, and the base of the spinous process. The third lumbar vertebra is represented by two pieces that can be rearticulated. The smaller piece is comprised of the right lamina and right superior articular facet. The larger piece is comprised of the left lamina, portions of the superior and inferior articular facets, and the base of the spinous process. The fourth lumbar (L4) vertebra is also represented by two pieces that can be rearticulated. The larger piece is comprised of the right half of the vertebral arch (including the lamina and pedicle) and the superior articular facet. The inferior articular facet is eroded so that the joint surface is missing. The smaller piece of L4 is comprised of a partial left superior articular facet and the superior aspect of the left lamina.

The left scapula is represented by two pieces of bone. One is a fragment of the glenoid including a small area of its margin. The other is the lateral portion of the scapula spine (minus the acromion process) and the superior aspect of the lateral border. Visible on the lateral border is the origin of the long head of triceps. Disinterment damage, a probable "shovel bite," is present on the postero-lateral aspect of the spine.

The right scapula is represented by two pieces. One is a fragment of the glenoid with a tiny area of the margin. The other is the lateral portion of the spine (minus the acromion process). This lateral piece is smaller than that of the left scapula and does not include any visible muscle attachments. Cortical flaking is evident on the inferior aspect of the spine. Postmortem breakage is evident on the superior aspect of the spine.

The left humerus is complete and represented by six pieces. A partial humeral head represents the proximal joint surface. Three pieces represent the proximal, middle, and distal thirds of the diaphysis. The distal joint surface is complete and represented by two pieces. All pieces except for the proximal joint surface can be rearticulated. The anterior aspect of the proximal third, in the area of the ridges for pectoralis major and latissimus dorsi, has approximately four postmortem defects consistent with "shovel bites." The deepest impact mark has a depth of approximately 3 mm. A defect on the antero-medial aspect of the middle third shows similar characteristics. The lateral aspect of the proximal and middle thirds has a scored appearance represented by at least 12 shallow, linear defects. These also resulted from postmortem contact with a shovel blade or other

digging tool. The distal third of the diaphysis exhibits slight cortical flaking along the anteromedial surface and lateral epicondylar ridge of the bone. The postero-lateral aspect of the distal end, including the lateral epicondyle, displays postmortem erosion.

The left radius is represented by the proximal and middle thirds of the shaft (in one piece). The proximal tuberosity is represented but the joint end is missing along with the distal third of the bone.

The right radius is represented by a complete, intact diaphysis. The proximal and distal ends are missing postmortem. The right radial tuberosity is partially represented as a separate fragment. The proximal and middle thirds of the right radius exhibit moderate postmortem flaking and erosion of the cortical surface.

The left ulna is complete and represented by three pieces: the proximal, middle, and distal thirds. The three pieces can be rearticulated. The proximal joint surface is mostly complete; the distal joint surface is missing postmortem. The middle and distal thirds exhibit slight erosion and flaking of the cortical bone.

The hands are represented by four metacarpals in eight pieces and several phalanges. At least three proximal phalanges (in five pieces) and two middle phalanges are present.

The innominates are represented by six pieces of bone. Four can be identified as belonging to the left side and include the greater sciatic notch and section of the posterior ilium, the arcuate line, the acetabulum with acetabular margin, and a portion of the ischiopubic ramus. The posterior ilium exhibits slight cortical exfoliation as well as one possible "shovel bite." Two distinct "shovel bites" perpendicularly intersect the arcuate line. The two unisided fragments are identifiable as ilium.

The left femur is complete and represented by five pieces including the joint surfaces. A partial femoral head, including the fovea capitis, represents the proximal joint surface. Two pieces, broken at midshaft, represent the diaphysis. Two separate condyles represent the distal joint surface. Only the two pieces of diaphysis can be rearticulated. The inferior aspect of the proximal third of the left femur has two defects representing "shovel bites." The defects are aligned vertically and are present on the medial aspect of the bone. A similar, shallower defect is present on the posterior aspect of the middle third of the diaphysis.

The right femur diaphysis, or shaft, is mostly complete and represented by 10 pieces, all of which can be rearticulated. The proximal third, including the trochanteric region, is represented by 4 fragments, the middle third by a complete portion of the shaft, and the distal third by 5 fragments. Both the proximal and distal joint surfaces are missing postmortem. The large section of middle diaphysis with clean breakage of both ends suggests that some fragmentation was intentional and the result of forcefully fitting the longer bones into the small brick chamber below the floor of St. Lukes Church. The middle and distal thirds of the right femur exhibit slight to moderate flaking of the

cortical bone. Four relatively shallow defects representing “shovel bites” are present on the lateral aspect of the shaft’s middle third.

The left patella is present and represented by its superior half and the mostly complete anterior surface. The posterior-inferior aspect has postmortem breakage.

A small bag of 64 tiny bone fragments is also present. These pieces cannot be identified as to bone.

Many fragments (e.g., the exposed interior of the right mandibular ramus, the rib fragment, exposed cancellous bone of the left innominate, cancellous bone inside the distal right radius, and the medullary cavities of the distal left humerus and ulna and midshaft of the left femur) have small amounts of adhering or embedded soil from the original burial location. These deposits are fine-grained and a light sandy brown color.

Six non-human bones were recovered with this burial. Of these, two are complete sheep tibiae (missing their unfused proximal epiphyses) from the same immature animal, one is a rabbit’s partial left humerus and partial left innominate, and two are the right femur and left tibia of a mouse. These well-preserved extra elements represent postmortem deposits dating to 1894 or later in the case of the mouse bones. The original interment location reportedly had animal pens within the immediate vicinity that were inadvertently gathered up; or possibly the sheep and rabbit bones represent components of meals that were discarded by the work crew. The rabbit and sheep bones show better preservation than the human bones, and are more recent (i.e., ca. 1894). The proximal end of the rabbit humerus had been snapped off. Its medullary cavity is free of sediment. The mouse bones are in even better condition and post-date placement of the human bones in the church.

Age, Sex and Ancestry Identification

The remains represent an adult male of European ancestry. An adult age is based on complete development of the bones including full epiphyseal union. The represented bones exhibit cortices that lack the smooth surface characteristics of a young adult and the muscle attachment sites are roughened. The cancellous bone is moderately compact, and the cortical thickness noted for the femora and left humerus is relatively dense with no indication of osteopenia. There is advanced endocranial closure of the coronal and sagittal sutures in the cranium. The sagittal suture is mostly obliterated externally, but the coronal and lambdoid sutures are still visible. The middle meningeal artery impressions are moderately defined on the internal surfaces of the anterior parietals. Although no teeth are present, the sockets indicate some antemortem tooth loss had occurred along with loss of mandibular body height from alveolar resorption. These features are consistent with a middle aged to older adult.

A sex of male is based on characteristics of the cranium, mandible and postcrania including prominent supraorbital ridges, a low, sloping forehead, a square and very prominent chin, large femoral heads, and relatively robust bone size.

European ancestry is identified through features of the cranium and mandible. The cranial vault is relatively large and broad but is not thickened or heavy. The interorbital distance and overall morphology of the forehead and calotte are consistent with previously documented 17th century English skeletal remains. The flared mental eminence, low body height of the mandible's horizontal ramus, and small tooth root size indicated by the represented tooth sockets are also consistent with European ancestry.

Functional morphology

The skeleton of this male is moderately large and robust. He was taller than most 17th –century English men in Virginia. The left scapula has a defined projection at the origin of the long head of the triceps. The left humerus shows development of the deltoid tuberosity and ridges for pectoralis major, latissimus dorsi, and teres major. The lateral epicondylar ridge of the left humerus is moderately defined and the distal joint of the humerus is large.

The supinator crest and the ridge for pronator quadratus of the left ulna are well-defined. The insertion for brachialis and the proximal interosseus border of the left ulna are also moderately well developed. The left ulna has a slight to moderately raised ridge for the insertion of pronator quadratus. The radial tuberosities of both radii are moderately developed (the radial tuberosity of the right radius is present as a separate fragment only). These features of the arm bones are consistent with upper and lower arm activity and strength.

The proximal hand phalanges exhibit moderate palmar ridging.

The posterior femora have moderately raised and roughened gluteus maximus attachments and moderately developed lineae aspera in the middle thirds of the diaphyses.

The left patella shows moderate development of the attachments for the common tendon of the quadriceps femoris and the patellar ligament.

Pathology

Ossification of the ligamentum flavum is present on the left anterior lamina of one upper thoracic vertebra. The projection measures 9.5 mm in length by 3 mm in width.

The superior articular facets of the fourth lumbar vertebra (L4) are scored for slight osteophyte development and slight porosity of the joint surfaces.

The distal joint of the left humerus is scored for trace degenerative lipping. The proximal joint of the left ulna and the distal joint of the left femur are also scored for trace lipping.

Summary

All evidence is consistent with the remains being those of Col. Joseph Bridger. The bones represent a male aged approximately 57 years with European ancestry. The incomplete skeleton is represented by a partial skull and incomplete postcranial bones. As determined from the number of bones present for examination, less than 20 percent of the skeleton was recovered. The skull is missing the mid-face and much of the base. No complete long bones were recovered although the pieces present are generally solid and well-preserved.

The human bones show no stains caused by contact with iron or cuprous artifacts.

The limb bones are robust and relatively long and large with moderate development of the muscle attachments. Pathological changes are limited to slight arthritic degeneration of the joints of the long bones and vertebrae. Several bones display postmortem damage from repeated impact from dull-edged digging tools used to recover the remains in 1894. The exhumation was not carefully conducted and was done without concern for recovering the entire skeleton.

Preliminary archaeological investigation at the 17th-century home site of Whitemarsh plantation suggests that the original burial site is likely identifiable. In anticipation of this discovery, and regarding the Bridger family's desire to complete a forensic facial reconstruction of Col. Bridger, replicas were made of the mandible and the reconstructed recovered pieces of the cranial vault using a 3D imaging process involving white light structured scanning by the Smithsonian's Museum Conservation Institute and computerized machine milling of the virtual model by the Smithsonian's Office of Exhibits Central. These components could be joined with newly discovered future cranial pieces, potentially permitting the fulfillment of this request.

Photographs:

Frontal and left lateral views of the reconstructed superior cranial vault of Col. Joseph Bridger.

Superior view of the mandible indicating a projecting, prominent chin.

Tool mark damage incurred during the 1894 partial relocation of Col. Bridger's skeleton.