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## Artifacts and Commingled Skeletal Remains from a Well on the Medical College of Virginia Campus: Appendices

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**Appendix I.**  
**Artifact Catalog**

Site ID	Art Id	Form	C o u n t	Ware	Material	Color	Manf Tech	Remarks
44HE 814	001	Jar	28		Glass	Colorless	Mouth Blown	Flat, everted lip, rolled in; pinched in neck; cylindrical body; slightly domed base with rough pontil on exterior; base dia.: 5 3/4"; 28 fragments
44HE 814	002	Saucer	1	Ch Porcelain	Porcelain	Blue and White	Wheel-Thrown	Translucent white fabric; glossy white glaze; interior underglaze cobalt blue decoration consisting of hanging dots above diaper motif; ca. 1785-1820
44HE 814	003	Bowl	1	Ch Porcelain	Porcelain	Polychrome	Wheel-Thrown	Translucent white fabric; colorless glaze; interior hand painted overglaze decoration consisting of horizontal lines of black dots between horizontal bands of red below rim; ca. 1780-1820
44HE 814	004	Platter	1	Pearlware	Earthen-ware	Blue and White	Pressed	White fabric, colorless glaze; unscalloped rim, impressed with wavy-lined feather edge motif highlighted with underglaze cobalt blue; post 1840

44HE 814	005	Bowl	1	White Ware	Earthen- ware	Blue and White	Pressed	White fabric, colorless glaze; exterior underglaze pale blue "banded" or "annular" decoration; post 1835
44HE 814	006	Cream Jug	1	White Ware	Earthen- ware	Brown and White	Pressed	White fabric, colorless glaze; sherd with partial handle terminal below carinated body; exterior underglaze transfer-printed brown motif consisting of foliage and possible architectural motif; post 1830
44HE 814	007	Tankard	1	White Ware	Earthen- ware	White		White fabric, colorless glaze; wide foot ring squared on exterior edge, recessed base; post 1830
44HE 814	008	Sherd	3	White Ware	Earthen- ware	White		White fabric, colorless glaze, one sherd with indeterminate pale cobalt blue transfer print; post 1830
44HE 814	009	Ointment Pot	7	Cream- ware	Earthen- ware	Cream		White fabric, colorless glaze appearing pale bluish-cream; single vessel consisting of 5 mended sherds and 2 loose sherds; walls slightly flare outward from flat base, vertical rim is squared on exterior; post 1810
44HE 814	010	Window Glass	20		Glass	Light Green		
44HE 814	011	Jar	8		Glass	Colorless	Mouth Blown	Flat, everted lip, rolled in; pinched in neck; cylindrical body;

								slightly domed base with rough pontil on exterior; base dia.: 4-1/2" ; 8 fragments labeled 44HE814/21 on base
44HE 814	012	Hollow Ware	1		Glass	Colorless	Mouth Blown	Vertical rim, possible drinking glass
44HE 814	013	Bottle	1		Glass	Olive Green	Mold Blown	Squat cylinder shape with high domed kick; post 1825
44HE 814	014	Bottle	3		Glass	Olive Green	Mold Blown	Squat cylinder shape body fragments; post 1825
44HE 814	015	Jar Lid	1		Glass	Colorless	Mouth Blown	Short, hollow cylinder, rounded on bottom with open pontil, ground side walls, flat on top, and bearing flattened, ovoid-shaped knob on central top; dia: 2-1/2"; 1st half 19th century Labeled 44HE814/21 for EU21
44HE 814	016	Test Tube	1		Glass	Colorless	Mouth Blown	Elongated hollow cylinder with outbent rim; broken and missing most of rounded base; L: 3-15/16" Labeled 44HE814/21 for EU21
44HE 814	017	Thermo-meter	1		Glass	Colorless	Mouth Blown	Narrow, elongated hollow cylinder, broken on both ends; L: 8" Labeled 44HE814/21 for EU21
44HE 814	018	Window Glass	1		Glass	Light Green		

44HE 814	019	Phial	1		Glass	Colorless	Mouth Blown	Round bottle with rounded shoulder, short cylindrical neck, and flared finish; retains ground cylinder-shaped stopper with knob broken off; seam stops at neck/shoulder junction; post 1820 Labeled 44HE814/21 for Test Unit 21
44HE 814	020	Bead	1		Glass	Cobalt		Multi-faceted; dia: 3/16"; Bohemian "Russian Blue"
44HE 814	021	Button	1		Earthen- ware	White	Molded	Small round button, convex on both sides, central concavity on one side, perforated with 4 equidistant holes; post 1840; dia: 1/2"
44HE 814	022	E Tobacco Pipe	1	White Ball Clay	Clay	White	Molded	Mouthpiece with 3 parallel cordons, one of which is directly on the end; 1st half 19th century Bag labeled "44HE814, Between Foundation Bricks (Builder's Date)." A tight date for this pipe could not be determined.
44HE 814	023	E Tobacco Pipe	1	White Ball Clay	Clay	White	Molded	
44HE 814	024	Door Knob	1		Copper Alloy		Cast	Flattened round knob on short cylindrical stem with flared base; stem perforated with round attachment hole; base perforated with central square

								attachment hole, late 18th-1st half 19th century
44HE 814	025	Handle	1		Bone		Hand-made	Narrow, oval-sectioned hafted handle that is pinched and flattened toward spatula-shaped end; retains iron blade shaft and 2 iron pins that secure the shaft; likely a scapula handle; L: 3-3/4"
44HE 814	026	Handle	1		Bone		Hand-made	Narrow, oval-sectioned hafted handle that is pinched and flattened toward broken end; retains iron shaft and portion of blade, and 2 iron pins that secure the shaft; likely a scapula handle; L: 3-5/8"
44HE 814	027	Peanut	1		Organic			
44HE 814	028	Window Glass	7		Glass			
44HE 814	029	Suture	1		Organic			Numerous thin, square-sectioned thread-like fragments; original finds list identifies this as a cat gut suture, 0.77' long; broken into multiple small fragments
44HE 814	030	Unknown	1		Organic			Unidentified material containing resin-like material, paper-like material, and a human tooth (sent to SI)

44HE 814	031	Unknown	2		Rubber	Pink		Unidentified rubber-like material, possibly a large rubber syringe; in 2 fragments
44HE 814	032	Unknown	1		Rubber	Pink		Small y-shaped fragment
44HE 814	033	Bottle Stopper	1		Rubber	Olive Brown		
44HE 814	034	Bottle Stopper	1		Rubber	Olive Brown		
44HE 814	035	Straight Pin	1		Copper Alloy		Machine Made	Stamped head, L: 1-1/8"; early 19th century
44HE 814	036	Nail	6		Iron		Machine Made	Cut; 3 intact with heads; 1 fragment with head and 1 shaft, which mend; 1 shaft; post 1790
44HE 814	037	Unknown	1		Iron			Unidentifiable because heavily encrusted with oxidation, L: 3 1/2" x W: 1 3/4"
44HE 814	038	Mortar	1		Mortar			Sand mortar sample
44HE 814	039	Brick	20		Clay		Hand-made	Rubble
44HE 814	040	Oyster Shell	2		Shell			2 complete half shells, remainder are fragments
44HE 814	041	Slate	1		Stone			Fragment
44HE 814	042	Scrap	2		Tin		Sheet	Small y-shaped fragment in 2 pieces

44HE 814	043	Brick	1		Clay	Red Brown	Hand- made	3/4 of a handmade coping brick, D-shaped, rectangular-sectioned; L: - 8-1/2" X W: 4-1/8" X T: 3-1/2"
44HE 814	044	Shoe	1		Leather		Hand- made	Outsole with single row pegs, possibly machine pegged, thus ca. 1850's; missing sole; man's size 10 or 11; L: 11-3/8"; Other numbers: EU21/08 (11285)
44HE 814	045	Shoe	1		Leather		Hand- made	Midsole fragment from an undiagnostic bottom leather; Other numbers: EU21/13 (11286)
44HE 814	046	Shoe	1		Leather		Hand- made	Upper with leather string threaded through 2 closely punched holes; most likely a slave shoe made by a Richmond shoemaker of Bavarian descent, and crossmending with HE814/59, 62; Other nos:EU21/15A(11287)
44HE 814	047	Shoe	1		Leather		Hand- made	About one half of a man's heel with iron nails and pegs in situ; Other numbers: EU21/04 (11288)
44HE 814	048	Shoe	1		Leather		Hand- made	Man's welted insole displaying square toe with blunt corners; man's size 7; L: 10-1/2"; Other numbers: EU21/07B(11289)



44HE 814	049	Shoe	3		Leather		Hand- made	D-shaped heel, split into 3 sections; includes iron nails and pegs in situ; Other numbers: EU21/02 (11290)
44HE 814	050	Shoe	1		Leather		Hand- made	Handmade outsole of a man's shoe with square blunt toe, displaying stitching and excessive wear under first phalanx; adult male size 5; Other numbers: EU21/06C (11291)
44HE 814	051	Shoe	1		Leather		Hand- made	Large man's narrow shoe with partial heel and slightly rounded toe, very worn on bottom; L: 10-1/4"; Other numbers: EU21/05d (11292)
44HE 814	052	Shoe	1		Leather		Hand- made	Small non-diagnostic leather fragment with peg hole; Other numbers: EU21/03E (11307)
44HE 814	053	Shoe	1		Leather		Hand- made	Outsole of a man's shoe, round toe with blunt corners and single row of peg holes; severely supinated on lateral arch, and with heel completely worn off; possible zinc oxide pegs at toe indicating a machine pegged sole of ca. 1850's; US man's size 10

44HE 814	054	Shoe	1		Leather		Hand- made	Small fragment of man's pegged heel; Other numbers: EU21/03E (11293)
44HE 814	055	Shoe	1		Leather		Hand- made	Large triangular- shaped fragment with cut edges; Other numbers: EU21/14F (11296)
44HE 814	056	Shoe	1		Leather		Hand- made	Outsole fragment, worn at back; Other numbers: EU21/12G (11297)
44HE 814	057	Shoe	1		Leather		Hand- made	About 1/2 of a pegged heel displaying supernated or pronated wear; rigid forepart; Other numbers: EU21/09 (11298)
44HE 814	058	Shoe	1		Leather		Hand- made	Large man's shoe sole with broad rounded toe; L: 11-1/2"; Other numbers: EU21/10 (11299)
44HE 814	059	Shoe	1		Leather		Hand- made	Outsole with slightly rounded toe about 4" across the ball; inexpensive shoe with overlapped construction, and displaying vamp with a slit, possibly to extricate the foot; man's shoe size: 11; L: 11-3/4" ; most likely a slave shoe made by a Richmond

44HE 814	060	Shoe	1		Leather		Hand- made	Small strip of non- diagnostic leather; Other numbers: EU21/16 (11301)
44HE 814	061	Shoe	1		Leather		Hand- made	Boot or shoe lace; Other numbers: EU21/17 (11302)
44HE 814	062	Shoe	1		Leather		Hand- made	Quarter of a cheaply made man's shoe with 3 lace holes on either side; most likely a slave shoe made by a Richmond shoemaker of Bavarian descent, and crossmending with HE814/59, 46; Other numbers: EU21/18 (11303)
44HE 814	063	Shoe	1		Leather		Handma de	Narrow insole, possibly commercial, severely worn through heel, exhibiting pronation; superior quality shoe, suggesting high status; man's size 9; 10-3/4" long; Other numbers: EU21/B (11304)
44HE 814	064	Shoe	1		Leather		Hand- made	Upper fragment with pointed rounded toe, from pegged shoe; Other numbers: EU21/B (11305)
44HE 814	065	Shoe	1		Leather		Hand- made	Heel fragment with peg; Other numbers: EU21/3 (11295)
44HE 814	066	Shoe	1		Leather		Hand- made	Very small heel fragment with peg holes; Other numbers: EU21/3E (11306)

44HE 814	067	Cloth	7		Fabric			7 fragments of linen/linsey-woolsey
44HE 814	068	Cloth	1		Organic			Wool fragment
44HE 814	069	Cloth	1		Organic			Cotton fragment
44HE 814	070	Cloth	1		Organic			Felt fragment
44HE 814	071	Bucket	5		Wood			Fragments, 3--1 pine fragment curved and beveled on the interior edge of both ends, L: 17-1/2" x W: 5" x T: 1/2"; 1 oak D-shaped section with beveled exterior edge, circular hole through top, and 2 small attachment holes on interior edge, L: 16-5/8"
44HE 814	072	Plank	1		Wood			4 iron screws perforate and extend through the plank, L: 13-5/8" x W: 3" x T: 1"
44HE 814	073	Unknown	2		Wood			Fragments: 1 wedge- sectioned, L: 4 1/4 x W: 1-1/2 x T: 3/4"; 1 strip curved on one end and broken on the other, L: 7-1/16 x W: 1- 3/4" x T: 5/16"
44HE 814	074	Unknown	15		Wood			At least 115 fragments of unknown wood, including splinters
44HE 814	075	Unknown	7		Wood			7 narrow elongated fragments, milled

44HE 814	076	Cloth	1		Organic			Bag containing cotton fabric fragments
44HE 814	077	Cloth	1		Organic			Bag containing felt fabric fragments
44HE 814	078	Faunal	1		Organic			Bovine?
44HE 814	079	Faunal	8		Organic			Assemblage, likely related, probable feline, including: 1 right scapula; 1 right ulna; 1 right femur; 1 right tibia; 1 left ulna; 1 left radius; 2 vertebrae
44HE 814	080	Faunal	38		Organic			Assemblage containing canine bone, including: cranium; right mandible; left mandible; left scapulae; right humerus displaying thickening, spurs, and other deformities indicative of break and regrowth; left humerus
44HE 814	081	Faunal	2		Organic			Assemblage of unassociated bone, including: left innominate, and humerus
44HE 814	082	Faunal	1		Organic			Femur
44HE 814	083	Faunal	1		Organic			Coracoid

44HE 814	084	Faunal	7		Organic			Assemblage of 7 unassociated ribs
44HE 814	085	Faunal	7		Organic			Assemblage of 7 unassociated vertebrae
44HE 814	086	Faunal	4		Organic			Assemblage of 4 possibly unassociated teeth
44HE 814	087	Faunal	7		Organic			Assemblage of small unassociated bones including 2 epiphyses and 5 unidentified bones
44HE 814	088	Faunal	2		Organic			Assemblage including 1 left half of mandible, possible canine, and 1 right maxilla fragment, possible bovine
44HE 814	089	Faunal	3		Organic			Assemblage including mandible; ilium; vertebra
44HE 814	090	Faunal	5		Organic			Assemblage including possibly associated tibia, humerus, femur, long bone fragment, epiphysis
44HE 814	091	Shoe	1		Leather		Hand-made	Sole of a genteel boot, style of Viennese fancy boot; displays domed shank, channel construction, an 1840's shape, and wear past the point of repair; hobnails were added to retard wear due to supination on the heel; repaired at least once; man's size 5-1/2

44HE 814	092	Faunal	3		Organic			2 small unidentified bones and fibrous material
44HE 814	093	Faunal	1		Organic			Humerus From EU 18
44HE 814	094	Nail	1		Iron			Cut nail without head and a non-cultural quartz pebble –from EU20 –disturbed context
44HE 814	095	Faunal	1		Organic			Rib from EU 20--disturbed context
44HE 814	096	Faunal	1		Organic			Distal end of a right pleural scute, part of the carapace of a turtle. The fragment consists of the distal end of a pleural scute with a point bone protrusion that interlocks with the peripheral scutes. Based on the urban setting of the pit, the scute likely is from a box turtle.
44HE 814	097	Faunal	1		Organic			The distal end of a left anterior femoral condyle of a large mammal (cow or horse). The origin is difficult to assess due to the heavily fragmented nature of the bone.

44HE 814	098	Faunal	1		Organic			The proximal epiphysis of a left humerus of a subadult small mammal, probable canid. The fragment shows no sign of pathology and there are no other associated bones.
44HE 814	099	Faunal	1		Organic			The complete left radius of a canid, most likely a large dog. The radius has complete fusion of the epiphyses indicating an adult animal. There are no arthritic changes or pathological conditions.
44HE 814	100	Faunal	1		Organic			The sphenoid bone of a small to medium size mammal. The posterior portion of the sphenoid is not fused, indicating young age. The anterior articular portion of the sphenoid is eroded postmortem.
44HE 814	101	Faunal	2		Organic			Two rib fragments, most likely from a large canid. The first fragment (FAUNAL6-A) lacks both a proximal and distal end. The second fragment (FAUNAL6-B) lacks a proximal end, but has a partial distal end.
44HE 814	102	Faunal	1		Organic			The right humerus of a canid with a well-healed fracture. The bone was CT scanned



								<p>in December 2011 at NMNH. The fracture resulted in malalignment of the distal third of the bone relative to the proximal two-third of the shaft. This bone also part of Art. ID 80 assemblage</p>
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## **Appendix II.**

### **Crania and Mandible Descriptions**

#### **44HE814-EU21-V01C**

The cranium and mandible are that of a middle-aged male of African ancestry. When initially examined, the mandible was directly associated with the cranium; its incomplete left ascending ramus was lodged tightly under the broken left zygomatic arch. The mandible was carefully removed in order to examine the teeth for wear and pathology. Articulation and similar dental wear and pathology confirm association. The skull was discarded as a unit after removal of the left ascending ramus by dissection. This skull is in excellent condition and is the largest in the series. It was CT scanned in December 2011.

An age of 35 to 44 years is based on cranial and dental features including suture closure and tooth wear. Male features include overall robustness and large size, pronounced brow ridges, a moderately developed nuchal ridge and small occipital protuberance, slightly elevated supramastoid crests, and a large, deep palate. The bizygomatic breadth is 148 mm. The maximum cranial breadth is 151mm.

Morphology indicates African ancestry. Identifying features include alveolar prognathism, a moderately wide nasal aperture, a moderately wide interorbital distance, and a poorly defined nasal sill. The skull is heavy.

#### **Bone Pathology:**

The right maxilla has an open canal that communicates with the sinus. This lytic lesion is roughly circular and measures approximately 5 mm in diameter. It is slightly inferior and medial to the infraorbital foramen. The canal wall appears fairly dense and the external surface has a raised margin. The right first maxillary molar was lost following an abscess and its socket was in the process of remodeling. This abscess likely resulted in a sinus infection that drained through the

facial surface of the maxilla. The track was still open at the time of death with features suggesting a chronic condition.

The occipital condyles are asymmetrical. The left condyle is elongated relative to the right condyle, which is shorter in length with greater curvature.

#### Dental Pathology:

This individual had retained most teeth in the maxillae and mandible. Several teeth have decay and a few were abscessing at the time of death. Two teeth were lost antemortem and their sockets are remodeled (maxillary right first molar and the mandibular left first molar). Carious lesions are present in the maxillary right canine, second premolar, the second and third molars, as well as the left first, second and third molars. Alveolar resorption is moderately advanced for some teeth, particularly on the lingual aspect of the left maxillary molars. The left maxillary first molar has a broad band of slightly indented, polished and abraded cervical root below the cemento-enamel junction (CEJ); the upper two-thirds of the lingual root are exposed. This tooth has a periapical abscess. This individual actively rubbed this area in an abrasive manner that possibly helped alleviate pain. Pressure contributed to additional bone resorption on the lingual surface. The lingual surface of the right maxilla adjacent to the second and third molars has slight development of a torus.

The roots of the left maxillary second premolar and first and second molars show brown/black discoloration from tobacco use. Tobacco staining is evident on the lingual surfaces of several crowns and has discolored calculus deposits. There are no defined pipe wear facets. The teeth show slight wear with beginning dentin exposure.

In the mandible, cavities are noted in the right first and second molars. The first molar is represented by the root only due to complete carious destruction of the crown. Calculus deposits and dark staining are similar to the maxillary dentition.

### Taphonomy:

The skull is in good condition. The cranium is yellow to brown in color with darker discoloration on the posterior cranium. Slight black mottling is present on the frontal.

The left side of the mandible has two saw cuts behind the third molar at the base of the ascending ramus. The left ascending ramus was removed by dissection. The cadaver was probably positioned with the right side of the head against the table. The saw initially cut diagonally into the facial-inferior aspect of the mandible and progressed superiorly. The inferior third of the bone on the lingual surface (9.6 mm) and inferior two-thirds on the buccal surface (25 mm) were cut completely through. However, the blade was withdrawn before cutting through the superior ramus. A shorter, second cut from a different angle was initiated above and behind the first cut. Sawing at this location continued for 7 mm at its greatest depth on the superior facial surface. This second cut did not cut through the ascending ramus. Rather, the bone was manually fractured along the lingual-superior aspect of the ramus at the point of remaining union.

From the superior aspect of the longest cut, a small section can be measured to obtain the maximum width of the saw blade: 1.2 mm. The fact that the cranium was found with its mandible lodged under the left zygomatic bone indicates articulation at the time the remains were discarded.

These cuts are inconsistent with either surgical intervention or standard autopsy procedures. They follow a technique found in medical dissection. Removal of the left ascending ramus was possibly undertaken to partially remove the mandible in order to examine the infratemporal fossa. No other cuts are present on the skull.

### GRANT'S DISSECTOR—

"First saw cut--to detach the coronoid process, pass a probe or the blade of a forceps through the mandibular notch....cut obliquely through the coronoid process. Reflect it, together with the insertion of the temporalis muscle.

Second saw cut--to remove the superior part of the ramus of the mandible." [There are two different areas in which this cut may be made. One may be made across the lingula, and the other may be made lower at an angle as seen in this particular mandible.] "Third saw cut--[bone not recovered in V01C]--through the neck of the mandible, just inferior to the temporomandibular joint" (Sauerland 1984: 153-155).

Sauerland, Eberhardt K.

1984. Grant Dissector. Ninth edition. Williams and Wilkins, Baltimore, Md., pp. 153-155.

Photographs:

Frontal and left lateral views of the cranium and mandible

Occlusal views of the maxillae and mandible

Close-up of the sectioned mandible

Radiographs:

Cranium

#### **44HE814-EU21-V02C**

This cranium and mandible represent an adult male of African ancestry. The maxillae and left zygomatic were broken postmortem and later mended. The right malar is missing. The vault is in fair condition.

This individual was aged 35 to 44 years. This age assessment was based on dental features and cranial suture closure. The coronal, sagittal, and lambdoidal sutures have fused and are mostly obliterated. Male features include the overall size of the vault, slight development of the supraorbital ridges, a defined nuchal crest, and moderately developed supramastoid crests. However, the mastoid processes are small and the mandible exhibits a low body height that is more consistent with a female classification.

African ancestry is based on the elongated shape of the cranial vault, pronounced alveolar prognathism, wide interorbital breadth, absence of a sharp inferior nasal border, a well-defined post-bregmatic depression, and heavy bone density.

#### Dental Pathology:

The dentition shows antemortem and postmortem tooth loss, decay, and alveolar abscessing. Five maxillary teeth were lost antemortem and four were lost postmortem. Of the seven maxillary teeth that remain, four are carious. The right P1, P2, and M3 have small interproximal carious lesions and root decay. The left M2 has a small occlusal lesion.

Four mandibular teeth were lost antemortem, and three were lost postmortem. Three of the remaining teeth have decay. The right P2 and the left M2 and M3 show complete carious destruction of the crown with exposure of the pulp chambers. The right P2 has a periodontal abscess while the left M2 and M3 have periapical abscesses.

Dental wear is moderate. The right maxillary M3 has lingual drift and appears over-erupted.

#### Taphonomy:

The skull is golden brown in color with patches of black mottling. Minimal postmortem weathering is noted. The facial bones are slightly warped and broken postmortem, but were mended.

The left zygomatic process of the temporal bone was sawn through and the anterior zygomatic arch is missing. The cut is vertically oriented and similar to a cut on the right side of cranium V09C. This cut may have been done to remove a section of the arch in order to study the temporal and masseteric regions of the cranium. No cuts are noted on the corresponding mandible.

#### Radiographs:

## Cranium

### **44HE814-EU21-V03C**

This skull represents a male aged 35 to 44 years of African ancestry. The cranium and mandible are associated based on similarities in preservation, dentition, and temporomandibular joint (TMJ) articulation. The left malar and maxilla have postmortem breakage with repair. Right side facial bones were not recovered.

The represented skull is in good condition. Age estimation is based on suture closure and the dentition. The coronal, sagittal, and lambdoidal sutures show moderate bridging. Male features include the large size of the vault, very large mastoid processes, roughening of the nuchal area, and a mandible that is fairly large with a high symphysis height. Features of African ancestry include the elongated shape of the vault, pronounced alveolar prognathism, wide interorbital breadth, absence of a defined inferior nasal border, the presence of a post-bregmatic depression, slight parietal bossing, and heavy bone density.

#### Dental Pathology:

The dentition was examined for antemortem loss, carious lesions, and alveolar abscesses. In the left maxilla, the I1 was lost postmortem. The Pm1 and Pm2 and M3 were lost antemortem due to abscessing. The sockets were remodeling and show minimal resorption. The left M1 has nearly complete destruction of the crown on the occlusal, lingual, and interproximal sides. The root was carious and the pulp chamber exposed, causing a periapical abscess.

Two mandibular teeth were lost postmortem, and four were lost antemortem. The right and left mandibular first molars and the right M2 and left M3 were lost antemortem and the sockets have remodeled. Of the remaining teeth, the right M3 had occlusal, buccal, and root caries. The left second molar had occlusal, buccal and interproximal decay.

Dental wear is moderate with heavy calculus formation. Brown/black staining on the enamel and dark calculus reflect tobacco use.

#### Taphonomy:

The skull is golden brown in color with black discoloration on the frontal bone. A bright blue-green stain located left of the black stain may indicate contact with a metallic (cuprous) object in the well. The bone is well preserved with minimal postmortem erosion. No autopsy or surgical cuts are present.

#### **44HE814-EU21-V04C**

This is an incomplete cranium and partial mandible of a male of European ancestry aged 45 to 54 years. No facial bones are present. The vault is in poor condition with exfoliation of approximately two-thirds of the outer table and exposure of the underlying diploe.

The sagittal and lambdoidal sutures have fused and show advanced obliteration. The coronal suture is no longer visible on the ectocranial surface due to weathering. Pachionian depressions and meningeal artery depressions are moderately deep. Features consistent with a male sex include the overall large vault size, large mastoid processes, well-defined supramastoid crests, and a robust nuchal area. The shape of the cranial vault suggests European ancestry, which is supported by the morphometric analysis.

#### Bone Pathology:

At the time of recovery a large piece of wood had penetrated and was lodged in the lateral margin of the left orbit, an apparent perimortem injury.

#### Dental Pathology:

The mandibular dentition was scored for antemortem and postmortem tooth loss. The right mandibular I1, I2, and C, were lost postmortem. The right P2, M1, and M2, and the left P2, M1,



M2, and M3 were lost antemortem with the alveolar bone remodeled. The represented teeth are stained black. No carious lesions are noted. Dental wear is moderate and calculus formation is heavy.

#### Taphonomy:

Approximately one-third of this cranium is golden brown in color and well preserved. The remaining two-thirds of the cranium are bleached white due to postmortem erosion and weathering. The cranium was not autopsied.

#### Photographs:

Frontal and lateral of cranium

Close-up views of perimortem injury in the lateral margin of the left orbit

#### **44HE814-EU21-V05C**

This incomplete cranium represents a male of African ancestry aged 35 to 49 years. No facial bones or mandible are associated. The vault was broken postmortem and partially reconstructed in the lab. The represented bone is in poor condition.

The age was based on features of the partial vault, including suture closure. The sagittal suture has partial bridging, with some areas no longer visible. The coronal and lambdoidal sutures are largely united with retention of slight bridging at bregma. Relatively deep pachionian depressions are present endocranially. Meningeal artery depressions are moderately deep. Male characteristics include overall size, a pronounced supraorbital ridge, thick, wide mastoid processes, well-defined supramastoid crests, and a moderately robust nuchal ridge. African ancestry is suggested by the extremely wide interorbital breadth, a post-bregmatic depression, and the long length of the cranial vault.

#### Bone Pathology:

The left temporomandibular joint has a remodeled anterior surface. This abnormal formation may be due to trauma or a chronic joint problem. Anterior dislocation of the left TMJ could have precipitated the development of a secondary facet for the mandibular condyle. The texture of this facet is rough, and it measures 19 mm by 18 mm. The TMJ was coded for osteophyte formation on the anterior surface and margin with slight surface microporosity.

The right temporomandibular joint shows very slight wear and remodeling on the anterior surface.

#### Taphonomy:

The vault is tan in color with brown/orange ferrous oxide (rust) staining posteriorly. Postmortem deterioration includes breakage and warping from the weight of the overburden within the well. Since no cuts are present, there is no evidence for autopsy or dissection.

#### **44HE814-EU21-V06C**

This cranium and mandible represent a male of African ancestry aged 45 to 54 years. Age is based on bone and dental features, including cranial suture closure. The coronal, sagittal, and lambdoidal sutures have significant closure with many areas fully bridged and no longer visible. Male features include the overall size of the vault, brow ridge and glabellar development, moderately large mastoid processes, and some supramastoid crest development. The high anterior mandibular body and large size of the condyles are consistent with a male identification. African ancestry is based on the cranium's wide interorbital breadth and nasal aperture with lack of a defined nasal sill, pronounced alveolar prognathism, presence of a post-bregmatic depression, a narrow, long vault, and heavy bone density. The cranium and mandible were CT scanned in December 2011.

#### Bone Pathology:

The nasal bones have healed fractures. A healed transverse fracture extends across the middle of the right nasal bone with the superior half depressed slightly relative to the inferior half. The

inferior third of the left nasal is raised due to a fracture. Both fractures likely occurred at the same time.

#### Dental Pathology:

The dentition was examined for decay, antemortem tooth loss, and abscessing. Four maxillary teeth were lost postmortem and seven were lost in life. Five maxillary teeth are present and all have cavities. The right maxillary C, Pm2, and left PM1 have exposed pulp chambers from carious destruction and all three have periapical abscesses. The left Pm2 and M2 have small occlusal lesions. Due to the earlier loss of the left M1 and the opposing mandibular tooth, the left M2 had over-erupted and drifted mesially.

The mandibular right M1, M2 and M3 and left Pm1, and M1, M2 and M3 were lost antemortem and the sockets have remodeled. The left Pm2 was scored for occlusal, interproximal, and root cavities. The right Pm2 was coded for occlusal and interproximal decay and a periapical abscess. The right Pm1 has complete carious destruction of the crown, also resulting in exposure of the pulp chamber. Interproximal carious lesions are present on the right I1 and I2, C, and Pm2, and the left I1 and I2 and Pm2. Dental wear is slight. Brown/black staining on the tooth enamel suggests tobacco use.

#### Taphonomy:

This skull is in good condition and yellow, mottled tan in color. It is slightly weathered. Trace amounts of a white residue, likely adipocere, are present in crevices of the cranial base and eye sockets.

Cuts are present on the mandible and temporomandibular joints. Mandible cuts are located on the anterior margins and lateral surfaces of the ascending rami, along the right mandibular notch below the condyle, and on the lingual surface of the symphysis. The cuts are very fine and were made with a sharp knife or scalpel. They occurred while dissecting the mandible from the vault.

Radiographs:

Cranium

#### **44HE814-EU21-V07C**

The cranium represents a male of African ancestry with an age range of 45 to 54 years. The assigned age is based on suture closure and dental features. A sex of male is based on its large size, slight to moderate brow ridge development, moderately large mastoid processes, moderately developed supramastoid crests, and slight development of a nuchal ridge. African ancestry is indicated by pronounced alveolar prognathism, a broad, U-shaped palate, a moderately wide nasal aperture with absence of a well-defined inferior nasal border, presence of a slight post-bregmatic depression and parietal bossing, and an elongated vault shape. The posterior vault has a small posteriorly projecting occipital squamous. The cranium has features characteristic of other African remains represented in Chesapeake region archaeological collections. The cranium was CT scanned in December 2011.

Bone Pathology:

This right temporomandibular joint was scored for minor erosion and porosity. Both TMJs show slight anterior extension of the normal joint surface. The condition is more pronounced on the right side.

The occipital condyles are slightly asymmetrical; the left condyle is larger than the right.

Dental Pathology:

The maxillae were coded for postmortem and antemortem tooth loss including multiple periapical abscesses. The maxillary left M1 and M2 were lost antemortem and show advanced alveolar bone resorption. Antemortem loss of the maxillary right M1 occurred later in life due to incomplete remodeling of its socket. This tooth has an abscess perforation into the maxillary sinus. The maxillary right C and Pm1 and Pm2 are present. None have carious lesions, but are heavily worn.

The right M3 was unerupted. The left M3 had partially erupted in a buccal orientation. Tooth loss and marked alveolar resorption eventually exposed the crown and contact was made with the left mandibular M3. As a consequence, the distal aspect of the tooth is heavily worn.

#### Taphonomy:

This cranium is in good condition. The vault is brown to reddish brown in color. Moderate weathering is evident on the superior and posterior cranium with erosion and surface exfoliation of the outer table. The region of erosion is white with patches of exposed diploe. This weathered area begins at the left frontal directly anterior to the coronal suture and extends posteriorly over the occipital bone to the foramen magnum. Variations in color and weathering reflect differential exposure within the well. This cranium shows no evidence of surgical procedures from dissection or autopsy.

#### Radiographs:

Cranium

#### **44HE814-EU21-V08C**

This cranium represents a male of African ancestry aged more than 60 years. The left maxilla is in normal articulation with the vault. The right maxilla had separated from the cranium and was later rearticulated. The age range was based on the dentition and cranial suture closure. Ectocranially, the coronal suture had begun to bridge with areas of obliteration. Most of the lambdoidal suture has disappeared and the sagittal suture is completely obliterated. Cranial features consistent with males include the moderately large size, robust brow ridge and nuchal area, and blunt supraorbital rims. The mastoid processes are relatively small for a male. African ancestry is based on the elongated shape of the cranial vault, slight parietal bossing, a faint postbregmatic depression, wide interorbital measurement, and a wide nasal aperture with lack of a well-defined inferior nasal border.

#### Bone Pathology:

The right temporomandibular joint has slight erosion on the anterior joint margin.

#### Dental Pathology:

Marked antemortem tooth loss and bone resorption has occurred. The maxillae are nearly edentulous. The sockets for the right maxillary M1 and M3 are both still visible and had abscessed.

The partial mandible associated with the cranium is also nearly edentulous. Sockets for the right C and I2 are still defined.

#### Taphonomy:

The cranium is yellow-tan in color with some brown discoloration on the occipital. The vault shows slight damage from postmortem erosion and the facial bones are warped from ground pressure and display postmortem breakage. This cranium exhibits no evidence of anatomical dissection or autopsy.

#### Radiographs:

Skull

#### **44HE814-EU21-V09C**

This cranium represents an adult female of African ancestry. The bone is well preserved and in good condition. An age estimate of 35 to 44 years was based on suture closure and dental wear. The gracile appearance of the vault and mandible, relatively small brow ridges and mastoid processes, sharp superior orbital rims, smooth occipital nuchal region, and the presence of slight parietal bossing are female characteristics. African ancestry is indicated by alveolar prognathism, a wide nasal aperture, broad interorbital width, lack of a sharp, inferior nasal border, and cranial bones that are relatively heavy.

#### Bone Pathology:

Both temporomandibular joints show pronounced anterior extension of the normal joint surface with moderate porosity and joint erosion.

The nasal bones have a healed, transverse fracture midway through their length. Above the fracture the upper halves of the nasals are recessed and the surface morphology is both irregular and lighter in color than the surrounding bone. This difference probably indicates loss of the outer bone layer. The internasal suture has begun to fuse superior to the transverse fracture. Below the fracture the distal third is fused and the bone contour is irregular. The frontal process of the right maxilla, which borders the nasal opening, is also recessed as a result of this injury.

#### Dental Pathology:

The represented teeth show slight wear. The alveolar bone of the posterior maxillary teeth shows moderate resorption from periodontal disease along with periapical abscessing. Calculus deposits are heavy. The posterior teeth show brown/black staining from tobacco use.

#### Taphonomy:

This cranium is yellow-brown in color with areas of darker and lighter discoloration. The cranium has undergone minimal postmortem weathering with most of the erosion damaging the superior and left vault.

Three cuts are present. The right zygomatic arch has been cut through the posterior zygomatic process of the temporal bone and the temporal process of the zygomatic bone. A fragment of the arch was removed and is not represented. This section may have been removed in order to study the temporal and masseteric region. In order to study the temporal region, the masseter muscle along with its bone of origin must be reflected downward. The zygomatic bone was cut at a slightly oblique angle. Another cut is located on the squamous of the right temporal bone. This nick was made while cutting through the zygomatic arch. It measures 7 mm in length and is located slightly anterior and superior to the posterior portion of the zygomatic arch.

Radiographs:

Cranium

#### **44HE814-EU21-V10C**

This skull represents a male aged 55-plus years of African ancestry. The cranium and mandible were tentatively matched based on similarities in preservation and joint articulation. A portion of the left frontal and zygomatic bones had separated from the cranium due to warping and compression from ground pressure. Cranial width measurements are unreliable due to this distortion.

The cranium is heavy and moderately robust. Male features include moderate development of the brow ridges, moderately large mastoid processes, a small occipital protuberance, and some development of the supramastoid crests. The height of the mandibular symphysis is high. African ancestry is suggested by the morphology of the vault, bone density, and moderately wide nasal aperture and interorbital distances.

Bone Pathology:

This individual has slight temporomandibular joint erosion and porosity on both the left and right sides.

Dental Pathology:

The maxillae are nearly edentulous with only a remnant of the right maxillary canine root still present in the socket. The root stub shows wear, but the crown was probably lost due to decay. Pulp chamber exposure resulted in periapical abscessing. The right maxillary M2 has one root socket still visible. This tooth was coded for postmortem loss, but in life was probably represented by a single buccal root stub and was abscessing at the time of death. The right maxillary M3 was scored for recent antemortem loss. The crown was likely missing due to caries, as only a tiny socket for the lingual root is still evident.



The mandibular I1s were lost postmortem. Six mandibular teeth remain in their sockets. The teeth present show moderate alveolar bone resorption and the roots are stained black from tobacco use. Well-defined pipe facets are present on the right I2 and C, the left I2 and C, and the left Pm1 and Pm2. The left Pm2 has a concave wear facet with a mesial-distal orientation that corresponds with heavy wear on the labial surface of P1. Together they form a pipe facet with the pipe resting in the left corner of the mouth. The mandibular teeth show marked wear.

#### Taphonomy:

No cuts are present on this skull. The vault exhibits some warping and compression due to ground pressure. Both compression and black staining on the right side of the vault indicate that the cranium was positioned on its right side in the well.

#### **44HE814-EU21-V11C**

This well-preserved cranium and mandible represent an elderly male with African ancestry. An age of 70-plus years is based on geriatric features of the skull including facial and vault suture closure, thin cranial bones, and near-complete loss of the dentition. The coronal suture is fused and only partially visible. The zygomaxillary suture is completely obliterated. The sagittal suture is completely obliterated with the midline defined by a sagittal keel, the result of biparietal thinning. The anterior portion of the keel is smooth and rounded, and extends posteriorly from the coronal suture. The keel becomes more pronounced as it follows the sagittal suture, terminates gradually in the middle half of the parietals, and resumes again directly above lambda. The posterior segment of the keel extends anteriorly from lambda along the sagittal suture, and terminates in the middle third of the parietals, giving the surrounding area a "pinched" appearance. The superior/anterior portion of the keel has slight microporosity, which the surrounding bone does not exhibit. The lambdoidal suture is no longer visible at lambda and just lateral to lambda. The occipital squamous protrudes posteriorly. The superior squamous portions of both temporal bones

project slightly outward from the vault due to inward curvature of the anterior parietals. The cranium and mandible were CT scanned in December 2011.

Male characteristics include the large size and robustness of the cranium, a prominent brow ridge, well-defined nuchal area and occipital protuberance, large mastoid processes, and prominent supramastoid crests. The lateral margins of the supraorbital border are thick and prominent, and the superior and inferior temporal lines are defined. The mandible has marked gonial flaring. The robust sagittal keel, temporal lines, and gonial flare reflect the older age of this individual and indicate strong development and use of the muscles of mastication earlier in life. Cranial features that reflect African ancestry include lack of a sharp, inferior nasal border, a U-shaped palate, a very wide nasal aperture, wide interorbital breadth, and low relief of the nasal bones.

#### Bone Pathology:

The left TMJ was coded for slight porosity and erosion of the anterior margin. A small button osteoma is present in the middle-posterior third of the left parietal.

#### Dental Pathology:

Extensive antemortem tooth loss and alveolar resorption has occurred. Only one tooth is present. The left maxillary Pm1 has a small carious lesion on its distal-interproximal surface. Two-thirds of the root is exposed and the tooth has rotated mesially in its socket. Calculus deposits have formed on the root indicating it was exposed below the gum line during life. The right maxillary I2 was lost postmortem and a periapical abscess is noted for its socket.

In the mandible, the left C was lost antemortem, and the socket had not yet filled in. The left M3 was lost postmortem. All other teeth were lost antemortem and the sockets had completely remodeled. At the time of death, only one tooth remained in the mandible. Alveolar bone resorption was extensive.

#### Taphonomy:

The skull is yellow-tan in color with brown/black staining on the mandible, the left lateral margin of the supra-orbital border, and the posterior left parietal. Postmortem erosion is minimal and preservation is excellent.

The skull exhibits no evidence of surgical procedures. No cuts are present on this skull.

#### **44HE814-EU21-V12C**

This cranium and mandible represent an adult female of African ancestry with an estimated age of 40 to 49 years. Age is based on cranial suture closure and dental wear. A sex of female was assigned based on the overall size and gracile appearance of the bones, small mastoid processes, sharp supraorbital margins, parietal and frontal bossing, and a smooth occipital protuberance. The brow ridge is slightly raised. African ancestry is indicated by alveolar prognathism, absence of a defined inferior nasal border, the presence of a slight post-bregmatic depression, a moderately wide interorbital breadth, a wide nasal aperture, and the shape of the cranial vault and hard palate. This complete skull was CT scanned in December 2011.

#### **Bone Pathology:**

This individual was scored for a perimortem, sharp-edged cut in the posterior left frontal. The cut is oriented perpendicular to the coronal suture, and measures 30 mm in length, and 2.6 mm in width. This injury was caused by a sharp, bladed weapon such as a cleaver. The cut extends into the diploe. The inner-table was not damaged. No radiating fractures are present. The cause of death is undetermined, but may be linked to unknown wounds in the body. The severity of the head wound makes it unlikely that this injury was the cause of death. This skull shows no evidence of surgery, dissection, or autopsy. However, this woman may have been brought to the Medical College for treatment of injuries.

#### **Dental Pathology:**

Seven maxillary teeth and three mandibular teeth were lost in life. Several teeth are carious and five were abscessing. Alveolar resorption is advanced in both the maxillae and mandible. Periapical abscessing was present for the right maxillary M2, and both maxillary M3s had periodontal abscesses. The right mandibular M1 had a small occlusal cavity. The right mandibular M3 had a periodontal abscess.

Black staining indicative of tobacco use is noted on several tooth roots and crowns. It is especially evident on the lingual surfaces of the mandibular left M3, Pm1 and Pm2, the right M1 and M3, and Pm2, and the maxillary left M2 and M3 and right C, Pm1, and M2 and M3.

#### Taphonomy:

The skull is in excellent condition.

#### Photographs:

Frontal and left lateral views of the skull

Close-up of the traumatic cut in the left side of the frontal

Occlusal views of maxillae and mandible

#### **44HE814-EU21-V13C**

This vault represents an adult female with African ancestry. No facial bones or mandible are associated. The bones that are present are in relatively good condition.

The age range of 30 to 39 years was based on cranial suture closure. The coronal suture has fused, but remains visible. The sagittal and lambdoidal sutures have united and display moderate bridging, or obliteration. Remnants of the metopic suture are present and extend 25 mm anteriorly from the coronal suture. A female sex is based on the overall size and gracile appearance of the vault, very small brow ridges, and sharp superior margins of the eye orbits, small mastoid processes, and parietal bossing. The nuchal area is robust for a female and has a

defined ridge. This may be the result of labor involving carrying loads on the head or use of a tump-line. African ancestry is based on heavy bone density, elongated vault morphology, the presence of a post-bregmatic depression, and a wide interorbital distance.

**Bone Pathology:**

The right temporomandibular joint has slight erosion of its anterior aspect.

**Taphonomy:**

The cranium is light brown in color with areas of lighter discoloration from postmortem erosion of the outer table. Erosion is especially apparent on the basilar and posterior vault and its right side.

**44HE814-EU21-V14C**

Present is a well-preserved cranium of a male aged approximately 50 to 59 years. The age was based on advanced cranial suture closure and moderately heavy dental wear. Male features include the cranium's size, prominent brow ridge development, large mastoid processes, robust nuchal region, moderately developed supramastoid crests, and large maxillary palate and dentition. African ancestry is based on slight alveolar prognathism, a wide nasal aperture, lack of a defined inferior nasal border, wide interorbital breadth, slight parietal bossing, and an elongated vault shape. The occipital also has a posteriorly projecting occipital squamous.

**Bone Pathology:**

The vault has a small button osteoma on the right parietal medial to the temporal line and posterior to the coronal suture. It measures 7 mm by 8 mm.

**Dental Pathology:**

This individual shows extensive dental pathology. Antemortem loss has occurred for three maxillary teeth: the right I2 and the left I1 and Pm1. Of the remaining teeth, several are carious. The maxillary right I1 and left Pm2, and M1 and M3 have extensive decay resulting in complete

crown destruction and pulp exposure. Only the roots remain and all have periapical abscesses. The right M1 has undergone complete destruction of the crown on the lingual and distal interproximal sides, with only the buccal surface remaining intact. The pulp chamber was exposed, causing a periapical abscess. Smaller carious lesions are present on the right Pm2 and M2 and the left M2. Dark brown/black staining from tobacco use is present on the enamel, roots, and calculus deposits of several teeth. Dental wear was moderate.

#### Taphonomy:

The cranium is yellow to tan in color with slightly darker discoloration of the inferior aspect of the occipital. The bones show little weathering.

#### Photographs:

Frontal and right lateral views of the cranium

Occlusal view of maxillae

#### **44HE814-EU21-V15C**

This incomplete vault represents an adult male of African ancestry. No mid-facial bones, except the right and left nasals, are present. No mandible is associated. The bone is in fair condition and the individual was aged 45 to 54 years based on cranial features. Moderate bridging and obliteration of the sutures has occurred. Male characteristics include large mastoid processes and well-defined supramastoid crests. The nuchal area does not show a defined ridge or protuberance. African ancestry is suggested by the wide interorbital breadth, slight parietal bossing, and bone density.

#### Bone Pathology:

A small, healed, oval-shaped shallow depression fracture is present in the mid-frontal, 2.6 cm above the medial third of the right orbit. The depression measures 8 mm by 4 mm with a depth of .4 mm.

The cranium also scored has a fractured nasal bone. A healed transverse fracture extends across the inferior third of the left nasal, which is depressed.

A small button osteoma is present on the inferior half of the occipital, right of the midsagittal plane.

The right frontal and adjacent parietal have a probable perimortem fracture from blunt force trauma. The fracture includes the right lateral margin of the orbit and is characterized by a large oval-shaped puncture in the right frontal-parietal below the temporal line. X-rays of the defect show no embedded metallic particles.

#### Taphonomy:

The vault is golden brown in color with some darker brown discoloration on the posterior parietals and occipital. The bone shows slight weathering.

The partial cranium bears no evidence of having been used in any type of surgical procedure including dissection. No cuts are present.

#### Photographs:

Right lateral view of the cranial vault

#### Radiographs:

Cranium

#### **44HE814-EU21-V16C**

This partial cranium represents an adult male of European ancestry. No facial bones or mandible are associated. The left parietal is complete, but all other bones are incomplete including the

frontal, right parietal, right and left temporals, and the occipital. The vault is in three pieces and the bone is quite thick.

An age of 35-plus years is based primarily on suture closure. All sutures present have fused and have begun to obliterate. Pachionian and meningeal artery depressions are both moderately deep. Features indicative of a male sex include vault size, a large mastoid process, a defined right supramastoid crest, and a well-defined nuchal area. The cranium is relatively light in weight (not very dense) and the overall shape is most consistent with European ancestry. A small quantity of head hair (and possibly scalp) adheres to the posterior left parietal and supports the estimation of ancestry.

#### Bone Pathology:

The endocranial surface of the fragment containing a portion of the frontal bone has nodular thickening due to slight hyperostosis frontalis interna.

#### Taphonomy:

The vault is dark brown in color with tan mottling and areas of white, highly eroded bone. Due to ground pressure, water damage, and postmortem breakage, the fragmented bones are warped and cannot be refit together.

This vault has no evidence of dissection or autopsy.

#### **44HE814-EU21-V17C**

This well-preserved cranium represents a male of African ancestry aged 35 to 44 years. Represented teeth show only slight wear. Features consistent with a male classification include slight brow ridge development with a moderately sloping forehead, large mastoid processes, a well-defined nuchal ridge with a small occipital protuberance, and supramastoid crest development. The malars are small, but areas of muscle attachment on the cranium are fairly



pronounced. The length and height of the cranium is most consistent with males, however the face is not large and the cranium has a fairly small bizygomatic breadth. The foramen magnum seems small for a male, and the cranium also has a very low and flat cranial base. Features suggesting African ancestry include a narrow, long vault, slight alveolar prognathism, a moderately wide nasal aperture, lack of a sharp inferior nasal border, a U-shaped palate, and overall heavy, dense bone.

#### Bone Pathology:

A small button osteoma measuring 13 mm by 11 mm is located on the left side of the occipital squamous near the lambdoidal suture.

The vault is markedly narrow. It is possible that the sagittal suture closed prematurely causing slight scaphocephaly. The sagittal suture is mostly obliterated.

#### Dental pathology:

Two maxillary teeth were lost antemortem. The socket for the left maxillary I1 is almost completely remodeled. The right maxillary C is also remodeled.

Represented teeth include the right Pm2 and left Pm2 and the first, second, and third molars. All molars show decay and the left PM2 has a small interproximal lesion. The level of crown destruction is advanced in the second molars and left M3. At least four maxillary teeth were abscessing. The right I1 had an active abscess at the time of death. This individual suffered from slight to moderate alveolar bone resorption.

Calculus deposits are heavy, especially on the buccal surfaces of the right maxillary premolars and molars. The represented teeth show slight wear.

#### Radiographs:

Cranium

#### **44HE814-EU21-V18C**

The remains represent a female aged 21 to 24 years of African ancestry. This incomplete cranium was broken and separated into four large pieces. The left half of the frontal including most of the left orbit, the right temporal with an articulating fragment of the greater wing of the sphenoid, a nearly complete left parietal, and the articulated left temporal, greater wing of the sphenoid, left malar, and left maxilla are present. The individual bones are relatively complete and in good condition.

The estimated age was based on dental features, suture closure, and overall bone condition. A few, small Pachionian depressions are present. Meningeal artery depressions are slightly defined. Features consistent with female classification include size, trace brow ridge development, small teeth, and a very shallow palate. Characteristics that indicate African ancestry include slight parietal bossing, a subtle post-bregmatic depression, wide interorbital breadth, and a U-shaped palate.

#### **Dental Pathology:**

The right C and I1, and the left I1, I2, Pm2, and M1 and M2 have been lost postmortem. The represented teeth show slight wear.

The left M2 has cavities in the buccal surface of the crown and root. The left M3 is congenitally absent. Calculus formation is heavy, and black staining may indicate tobacco use.

#### **Taphonomy:**

The bones are golden brown in color with dark brown discoloration in some areas. The endocranial surface exhibits a golden brown color. The bones show little weathering. No cuts are noted on the cranium.

This autopsied vault cap represents a male aged approximately 50 to 59 years of indeterminate ancestry. No facial or inferior cranial bones are associated with the vault, which is comprised of portions of the frontal, parietals, and superior occipital squamous. The coronal and sagittal sutures are obliterated endocranially. The lambdoidal suture is still visible endocranially. Ectocranially, beginning bridging is noted for the coronal and sagittal sutures. Moderately deep Pachionian depressions are present and the meningeal artery depressions are well defined.

**Bone Pathology:**

Slight micro-porosity is noted on the endocranial surface, but not severe enough to note on the pathology form.

**Taphonomy:**

The vault is yellow-tan in color with no staining. The frontal, parietals, and occipital bones were evenly cut through horizontally. There was minor breakage of the diploe and inner-table along the cut edge. In particular, the cut margins of both parietals have chipped endocranial surfaces posterior to the coronal suture from using a prying tool to separate the superior vault near the coronal suture on both sides. The right parietal has small radiating fractures extending away from the cuts in these areas. The cut on the frontal bone is even, but did not completely extend to the endocranial surface; the inner edge was broken during separation. The saw marks on the occipital bone exhibit the same characteristics. The bone was not cut completely through, and there is inner table breakage in the middle of the occipital. The width of the cut (1.8 mm) can be measured on the occipital where the saw deviated from the main line of separation. The process suggests that caution was exercised not to cut completely through the bone.

The bones were not sawed through in one continuous cut. A cut was made and then the saw was repositioned and another cycle of cutting followed until complete separation had occurred. This

autopsy procedure and symmetrical vault detachment have the appearance of skilled work by an experienced technician.

#### **44HE814-EU21-V20C**

This vault cap represents an adult male of undetermined ancestry. No mandible or facial bones are associated with the calotte, which is comprised of superior portions of the frontal and parietals, and the occipital squamous. The individual was aged 30 to 44 years on the basis of suture closure and bone density. The coronal suture has fused endocranially. The lambdoidal and sagittal sutures remain visible on the endocranial surface. Ectocranially, all sutures are visible and not obliterated. A few small, shallow Pachionian depressions are present. The meningeal artery depressions are slight. The size and shape of the partial vault suggest a sex of male.

#### **Bone Pathology:**

Two holes that bisect one another are present on the posterior left parietal near lambda. The lateral hole measures 17 mm by 13 mm, and probably represents a low velocity projectile injury from a gunshot wound. The hole is round, but slightly irregular with internal beveling. Two small hairline fractures originate off the inferior margin of the opening; there are no large, radiating or circumferential fractures. No embedded metallic particles are evident in CT or radiographic images of the bone. The adjacent hole to the right measures 16.5 mm in diameter and was produced by a trephination saw. This surgical procedure was undertaken in response to the adjacent injury. The surgeon cut through the diploe, but left a small lip of the inner-table along the opening's interior margin. The trephination was likely performed while the patient was alive, presumably to remove the projectile and bone fragments, and to relieve endocranial pressure due to swelling. The patient died and the vault was then autopsied to evaluate the injury. There was no healing.

#### **Taphonomy:**

The bone is yellow-tan in color with a minimal amount of dark staining on the posterior parietals--mostly along the sagittal suture. The vault shows no damage from weathering or exposure.

In addition to trephination, the calvarium has knife or scalpel cuts and a sawed border from autopsy. Transverse sectioning symmetrically removed the superior aspect of the vault at a level about two centimeters higher than that seen in specimen V19C. The apparent objective was to assess the degree of damage caused by the injury. The ectocranial aspect of the vault's cut edge is smooth and fairly even across the vault. The saw cut through the outer table and through the majority of the diploe. The endocranial edge was not completely sawed through and was detached by prying causing inner table breakage. The direction of cutting is evident in the orientation of the striations produced by sawing. The blade was repositioned a minimum of nine times while circumscribing the vault.

The outer table has multiple fine cuts produced by a sharp knife or scalpel while preparing the vault for sectioning. The trephinated opening has three cuts extending away from the perforation toward the sagittal suture. These cuts and three small cuts lateral to the injury (six in total) were produced while reflecting the scalp in preparation for trephination.

#### Photographs:

Superior view of the calotte

Oblique view of trephination hole and injury (ectocranial and endocranial)

Overall frontal and left lateral views comparing V19C and V20C

#### Radiographs:

Left parietal injury to check for embedded metallic particles

#### **44HE814-EU21-V21C**

This autopsied, partial cranium represents a 30 to 39 year old female of African ancestry. No mandible or facial bones are associated. The vault was recovered in eight pieces; six pieces were later rearticulated. The left half of the frontal, left parietal (3 fragments), right parietal (2

fragments), right temporal, and left half of the occipital are present, but incomplete. Bone from above and below the dissection is represented and in fair condition. The age range was based primarily on suture closure. No Pachionian depressions are present, and the meningeal artery depressions are only slightly defined. The size of the vault suggests female, along with small mastoid processes. The shape and heavy bone density of the vault are consistent with African ancestry.

#### Bone Pathology:

Pathological changes on the cranium are identified as caries sicca due to tertiary syphilis.

Endocranial microporosity is extensive. Internally, the frontal bone also shows nodular thickening from hyperostosis frontalis interna (HFI). All bones present were scored for moderate bone loss and formation. The condition was both active and widespread.

The frontal and parietals are thickened from abnormal bone formation. Missing bone, caused by a small postmortem fracture located on the posterior/inferior portion of the mastoid, reveals that the inner diploe retains no characteristics of a healthy "honeycomb-like" appearance. Instead the diploe is dense and compact. On the ectocranial surface, several active (in life) lesions and a few stellate scars are present. Active lesions were located as follows:

1. Posterior frontal near bregma (6 mm by 7 mm).
2. Posterior frontal superior to the cut edge and anterior to the coronal suture, measuring 8 mm by 10 mm (active lesion, possibly in the initial stage of formation).
3. Left parietal above the cut edge and posterior to the coronal suture (9 mm by 15 mm).
4. Posterior left parietal above the cut edge, 35 mm left of lambda (18 mm by 20 mm).
5. Posterior right parietal medial/oblique to stellate scar #22, 53 mm superior to the lambdoidal suture, 41 mm lateral to the sagittal suture, measuring 8 mm by 11 mm.
6. Posterior right parietal, superior to stellate scar #26, 68 mm superior to the lambdoidal suture, 45 mm lateral to the sagittal suture, measuring 10 mm by 13 mm.
7. Posterior right parietal directly below and to the right of #6 along the line of postmortem breakage, measuring 4 mm by 10 mm.

8. Right temporal on the mastoid process below stellate scar #28, measuring 8 mm by 11 mm.
9. Left lateral occipital fragment, 20 mm inferior to the superior line of breakage, 25 mm right to left line of breakage, measuring 6 mm by 4 mm.
10. Superior margin of occipital fragment, 8 mm inferior to superior line of breakage, 10 mm superior to #9, measuring 10 mm by 21 mm.
11. Left of midsagittal plane on occipital fragment, 14 mm inferior to superior line of breakage, 23 mm left of right line of breakage, measuring 14 mm by 13 mm.
12. Left of midsagittal plane on occipital fragment, 3 mm inferior to #11, 20 mm left of right line of breakage, measuring 12 mm by 7 mm.

Remodeled stellate scar lesions are as follows:

13. Anterior third of the frontal directly lateral to the line of breakage, measuring 4 mm by 4 mm.
14. Left parietal above active lesion #3, and posterior to the coronal suture, measuring 4 mm by 7 mm.
15. Anterior left parietal adjacent to the coronal suture and 45 mm lateral to the sagittal suture, measuring 3 mm by 4 mm.
16. Anterior third of the left parietal 22 mm posterior to the coronal suture and 19 mm lateral to the sagittal suture, measuring 3 mm by 8 mm.
17. Anterior third of the left parietal lateral to #12, 28 mm posterior to the coronal suture, 38 mm lateral to the sagittal suture, measuring 3 mm by 7 mm.
18. Mid-third of the left parietal posterior to #12, 45 mm posterior to the coronal suture and 20 mm lateral to the sagittal suture, measuring 3 mm by 7 mm.
19. Mid-third of the left parietal 48 mm posterior to the coronal suture and 23 mm above the sawed margin, measuring 3 mm by 4 mm.
20. Posterior left parietal 14 mm lateral to the sagittal suture and 11 mm superior to lambda, measuring 3 mm by 4 mm.
21. Posterior left parietal inferior to lambda and 8 mm lateral to the sagittal suture, measuring 3 mm by 3 mm.
22. Posterior third of the left parietal 36 mm superior to lambda and 15 mm lateral to the sagittal suture, measuring 2 mm by 3 mm.

23. Posterior right parietal, superior to lambda and 6 mm lateral to the sagittal suture, measuring 4 mm by 5 mm.
24. Posterior right parietal along the lambdoidal suture, 21 mm lateral to lambda, measuring 3 mm by 4 mm.
25. Posterior right parietal 12 mm superior to the lambdoidal suture and 50 mm lateral to lambda, measuring 5 mm by 6 mm.
26. Posterior third of the right parietal 27 mm superior to lambda and 13 mm lateral to the sagittal suture, measuring 2 mm by 6 mm.
27. Posterior third of the right parietal 36 mm superior to lambda and 1 mm lateral to the sagittal suture, measuring 2 mm by 2 mm.
28. Posterior third of the right parietal, 16 mm superior to lambda and 18 mm lateral to the sagittal suture, measuring 3 mm by 6 mm.
29. Posterior mid-third of the right parietal 57 mm superior to lambda and 17 mm lateral to the sagittal suture, measuring 4 mm by 5 mm.
30. Posterior right parietal above the sawed extension, left of the postmortem breakage, 53 mm superior to the lambdoidal suture and 53 mm lateral to the sagittal suture, measuring 9 mm by 19 mm.
31. Lateral inferior right parietal 33 mm below the sawed margin and 17 mm above the lambdoidal suture, measuring 5 mm by 5 mm.
32. Right temporal directly above the mastoid process and posterior to the external auditory meatus, measuring 9 mm by 16 mm.
33. Posterior mid-third of the right parietal 65 mm above lambda, 11 mm lateral to the sagittal suture, and 10 mm posterior to the line of postmortem breakage, measuring 4 mm by 5mm.
34. Posterior third of the right parietal 13 mm above lambda and 34 mm lateral to the sagittal suture, measuring 5 mm by 9 mm.
35. Inferior left parietal fragment posterior to the squamous portion of the temporal and 11 mm below the cut margin, measuring 5 mm by 6 mm.
36. Inferior left parietal fragment posterior-inferior to #31 and 12 mm below the cut margin, measuring 3 mm by 3 mm.



37. Mid-third of the occipital fragment 3 mm directly left of #12, 26 mm inferior to the superior line of breakage, measuring 5 mm by 2 mm.

From the appearance of the bone, the disease process was a prolonged, chronic condition attributable to treponemal infection. Complications from tertiary syphilis were the likely cause of death.

#### Taphonomy:

The bone is light yellow-brown in color with mottled brown and black discolorations on the endocranial surface. Postmortem breakage and weathering are evident.

All bones present have been cut, with the exception of the right temporal and fragments of the occipital. The cuts incompletely circumscribe the vault cap (calotte) in an apparent attempt to section the vault. The major cut on the right parietal is higher than the corresponding cut on the left parietal. The posterior parietals have cuts in the bones that terminate 35 mm left and 37 mm right of lambda. The cut on the right parietal is more than a centimeter higher than that on the left parietal. Several nicks are present on the parietals that are superior and inferior to the sawed margin. These cuts represent false starts and areas where the saw blade skipped from its main path.

The cuts are inconsistent with standard autopsy procedure. They were crudely made and incomplete. The top of the cranium was not successfully removed. Cranial autopsy was the apparent objective. However, the procedure was abandoned before completion. The right half of the frontal and the anterior right parietal are missing postmortem. The frontal shows recent breakage in the midsagittal plane. The distal right parietal fragment was broken postmortem, and at the time of autopsy was attached to the superior portion of the calotte. A section of the left parietal inferior to the sawed margin, the right temporal, and an occipital fragment are also present. Their presence indicates that the vault was disposed of as a unit. The completion of the

procedure was disrupted, and the cranium was discarded without examining the brain. The procedure reflects the limited experience of the technician.

#### Radiographs:

Cranium

#### **44HE814-EU21-V22C**

This autopsied vault cap represents a female aged 20 to 29 years of African ancestry. No facial or inferior cranial bones are associated. Portions of the frontal, parietals, and superior occipital are present and are in good condition. The sutures are open endocranially and ectocranially. No Pachionian depressions are evident and the meningeal artery depressions are faint. Parietal bossing, a narrow frontal width, and small size are consistent with a sex of female. A post-bregmatic depression and the weight of the vault cap suggest African ancestry.

#### Taphonomy:

The bone is yellow-brown in color with darker brown discolorations. Postmortem weathering on both the endocranial and ectocranial surfaces is evident by loss of color and surface deterioration. The endocranial surfaces of the frontal and anterior parietals are most affected with lighter areas of minor surface damage. The ectocranial surface has similar light colored patches of outer table erosion.

Scalpel and saw cuts are present from cranial autopsy. The frontal, parietals, and occipital were sawed through horizontally to remove the superior vault. Based on changing orientations of striations made by the saw, the blade was repositioned at least nine times to complete the separation. The locations of the saw cuts are asymmetrical from cutting higher on the posterior right half of the vault than on the left side.

The frontal bone was sawed completely through except for the endocranial surface of the neural crest, which was broken at separation. The right parietal was sawed through above the squamous suture without breakage except along the very posterior endocranial margin. An incomplete cut measuring 1.3 mm in width extends from the right parietal into the superior occipital squamous. The left parietal was sawed through (incompletely) with the saw passing through the superior portion of the squamous suture. Endocranial breakage indicates that a wedge was used to detach the superior vault. Cuts on the parietals are uneven, with the cut on the posterior left parietal located more inferiorly. Because of uneven sawing, an oblique cut approximately 27 mm long and breakage on the occipital was required to join the main cuts on the sides of the cranium. The technician or student performing the procedure had limited experience.

#### **44HE814-EU21-V23C**

This right parietal fragment, originally recovered as two pieces, represents the vault of an adolescent of indeterminate sex. No other cranial bones are present. The age range of 12 to 17 years was based on youthful characteristics of the bone including completely open sutures. Slight parietal bossing is present. No Pachionian depressions are present, and meningeal artery depressions are faint.

#### **Taphonomy:**

The ectocranial and endocranial surfaces are yellow-tan in color. Darker brown discoloration is present on the ectocranial surface near lambda and the sagittal suture. The bone shows little weathering, but exhibits slight warping due to ground pressure and postmortem breakage.

There are no cuts on this fragment or evidence that the vault was autopsied.

#### **44HE814-EU21-V24C**

This partial autopsied vault represents a male of unknown ancestry. No facial bones or mandible are associated. Present are portions of the frontal, right parietal, and a small piece of left parietal near bregma. The bone is in fair to poor condition with postmortem breakage. This partial vault was recovered in four fragments that were rearticulated. An age of 40 to 54 years is based on complete ectocranial and endocranial closure of the coronal and sagittal sutures. The vault is thick and the meningeal artery depressions are moderately defined. There are no Pachionian depressions.

#### Bone Pathology:

The right parietal shows a healed depression fracture in the anterior third of the bone above the temporal line. The defect is oval in shape and measures 23 mm by 12 mm. The vault is light in density relative to its thickness. Slight ectocranial porosity is evident on the superior portion of the frontal and the right parietal near the sagittal suture.

#### Taphonomy:

The bone is brown in color with an area of dark brown discoloration on the outer table of the right parietal and patches of dark brown/black discoloration on the endocranial surface. Moderate weathering, warping from ground pressure, and postmortem breakage are evident.

The right half of the frontal and the right parietal were been sawed through horizontally in a manner consistent with autopsy or anatomical dissection. The cut is smooth and even with only a tiny terminal snap located on the endocranial margin of the right parietal near the coronal suture. The right parietal was cut just below the superior portion of the squamosal suture. One continuous cut is present on the right parietal and frontal.

#### **44HE814-EU21-V25C**

This left parietal fragment represents a young adult female. No other bones are associated. An age range of 16 to 24 years is based on the overall condition of the bone. The bone is small and has

slight parietal bossing. No Pachionian depressions are present and the meningeal artery depressions are faint.

**Taphonomy:**

The ectocranial and endocranial surfaces are yellow-tan in color with brown discoloration near the squamosal suture. The bone has undergone minimal weathering. There are no cuts, but recovery-related postmortem breakage is evident.

**44HE814-EU21-V26C**

This left temporal and right parietal fragment represent the inferior portion of an autopsied cranium of a female aged 20 to 34 years. The bones are associated based on similarities in color, texture, and density. The bone is in good condition with no postmortem breakage, only separation along the sutures. Female features include a small mastoid process and lack of a defined supramastoid crest.

**Taphonomy:**

The ectocranial surfaces of the two bones are light brown in color, and reddish-brown endocranially. Neither piece shows significant postmortem change.

The superior left temporal squamous was sawed through horizontally at a level and manner consistent with autopsy. The cut surface is smooth. The saw passed completely through the bone with the exception of one small endocranial terminal snap located at the approximate mid-point of the cut.

The right parietal is represented by a small posterior/inferior fragment near asterion along the lambdoidal and squamosal sutures. It was sawed through and detached in a manner consistent with autopsy. The outer edge of the cut surface is smooth with endocranial margin irregularity, which may indicate the use of a wedge to remove the vault cap.

## **Unassociated Cranial Bones**

### **44HE814-EU21-X01L**

This partial left maxilla represents an older adult probable female. The bone is represented by its anterior portion, including the left inferior nasal border. This bone could not be matched with other cranial bones.

## **Mandibles Not Matched With Crania**

### **44HE814-EU21-M01C**

This is a complete mandible of a male aged 40 to 55 years. Features of the bone and teeth are consistent with African ancestry. Tooth wear is slight to moderate in severity and some posterior teeth were lost antemortem. Marked buccal wear on the left first premolar may represent a pipe wear facet. The left and right condyles show erosion and porosity.

### **44HE814-EU21-M02C**

This complete mandible represents a male aged 40 to 59 years. African ancestry is based on its morphology. Tooth wear is severe and several posterior teeth were lost antemortem.

Small, fine cuts are present on the anterior margin of the right ascending ramus and on the anterior margins of the left and right condyles. At least 19 cuts are present on the right ascending ramus and nine cuts are on the left side. The purpose of the dissection was to separate the jaw from the cranium.

### **44HE814-EU21-M03C**

This nearly complete mandible represents a female aged 50 to 59 years. The left ascending ramus has broken off postmortem and is missing. The morphology is consistent with African ancestry. Significant antemortem tooth loss has occurred for the posterior dentition.

#### **44HE814-EU21-M04C**

This edentulous mandible represents a female of African ancestry aged 50-plus years. The right ascending ramus has broken off postmortem and is missing. The left condyle has slight erosion and porosity.

#### **44HE814-EU21-M05C**

This partial mandible is represented by the anterior and left body. Only three tooth sockets are visible; the remaining were damaged postmortem. Sex is identified as probable male with an estimated age of 30 to 49 years.

Two very fine scalpel cuts are present on the lingual surface of the left horizontal ramus.

#### **44HE814-EU21-M06C**

This partial mandible represents an elderly female of African ancestry. The right half of the mandible is present but the right condyle is missing. The posterior dentition was lost antemortem.

The symphysis has a diagonal fracture that may represent perimortem trauma.

#### **44HE814-EU21-M07C**

This partial mandible represents an elderly female of African ancestry aged 60-plus years. Both ascending rami are missing due to postmortem breakage. The mandible is edentulous.

**44HE814-EU21-M09C**

This is the right half of a mandible of a female aged 25 to 29 years. The mandible was sectioned through the mental symphysis. A terminal snap is present on the lingual margin of the cut. The left ramus is missing.

**44HE814-EU21-M10C**

This is the right half of a mandible of a female aged 30 to 34 years. The mandible is small and gracile. It has been sectioned through the mental symphysis. The cut progressed anterior to posterior with a terminal break along the superior lingual margin.



### Appendix III.

#### Craniometric and Postcraniometric Tables

**Table A-1. Cranial Measurements for each VCU Individual**

	VO1 C	V02 C	V04 C	V06 C	V07 C	V08 C	V09 C	V10 C	V11 C	V12 C	V14 C	V17 C
	M	M	M	M	M	M	F	M	M	F	M	M
GOL		197	182	190	186	195	177	191	192	176	186	185
NOL		196	182	187	184	190	178	188	190	175	185	183
BNL	113	107	104	105	101	106	94		112	97	109	102
BBH	143	144	135	137	131	128	127		141	133	133	130
XCB	149	141	152	145	137	128	143	132	132	136	133	129
XFB	130	116	129	116	116	114	122	116	109	113	112	110
ZYB	149			128		125			134	116	140	119
AUB	133	115		121	118	111	123	106	119	115	125	113
ASB	126	99	118	115	113	107		101	109	105	103	104
BPL	115	107			103		93		100	101	98	98
NPH	75	66			60		67	60	75	62	69	69
NLH	47	50		48	46	49	49	48	59	41	54	52
JUB	129			114		112	115		119	108	122	107
NLB	21	28		27	27	24	26		32	30	21	27
MAB	71	63		73			65			64	69	69
MDH	31	24		29	30	28	25	28	34	26	32	30
OBH	34	34		30	33	33	39	34	39	32	37	39
OBB	46			41	40	42	44	43	40	38	39	42
DKB	21			25	22		23	24	27	21	30	21
NDS				12				10	10	7	13	9
WNB	10.1			8.8	10.5	6.5	8.9	6.5	12.6	11.7	9.4	9.4
SIS				2.5				1.6	4.2	1.8	3.8	3
ZMB	102			93	95	89	95		98	87	108	92
SSS	27			25	22	25	31		25	23	23	26
FMB	110	102		99	100	100	103		104	95	107	97
NAS	20	18		19	18	17	24		20	16	21	19
EKB	108			100	100	99	102		104	95	107	97
DKS	17			12	10	15	18		14	9	10	14
IML	42			35	37	37	27		41	35	34	34
XML	61			57	52	53	44		57	47	55	49
MLS				9	11	13			13	12	12	12
WM H	21	20		22	20	19	18	24	25	19	22	20

GLS	2	2	1	4	2	6	1	3	3	1	3	2
STB	127	117	129	114	113	105	117	113	103	111	108	109
FRC	111	125	110	114	113	110	119	116	113	113	101	114
FRS		30	27	22	26	25	24	25	23	28	21	28
FRF		58	55	53	53	47	47	50	45	46	49	54
PAC	128	125	109	121	118	114	98	106	129	110	105	119
PAS		30	22	27	24	23	20	17	29	25	19	25
PAF		58	62	68	71	56	51	55	75	62	61	61
OCC	101	102	99	103	97	99	99		97	98	108	89
OCS		27	31	30	26	31	28		27	28	32	28
OCF		59	50	46	49	55	47		45	49	50	45
FOL	38	38	38	36	36	37	37		34	32	36	33
NAR	95	99	102	99	94	95	97	107	102	91	101	99
SSR	100	101		102	95	93	98	106	99	97	99	100
PRR	110	108			102		104	108	105	105	103	103
DKR	86			85	82	84	86	95	87	80	84	88
ZOR	85	84		88	80	81	78	93	81	79	85	83
FMR	80	81		79	77	77	75	87	82	75	80	82
EKR	75	74		76	73	73	68	84	74	72	75	76
ZMR	76	76		75	75	70	66	84	72	73	76	75
AVR	94			88			83				88	86
BRR	122	127	123	126	119	112	117	120	119	117	114	118
VRR		136	123	129	124	121	121	121	121	121	119	120
LAR	117	120	101	113	112	114	106	106	106	105	111	100
OSR	52	43	38	41	41	45	32		43	36	41	35
BAR	21	16	13	11	12	16	13		22	16	19	12

**Table A-2. Full Classification Results for V01C**

Variables

XCB XFB ZYB AUB ASB NPH NLH JUB NLB MAB OBH OBB DKB WNB ZMB SSS FMB NAS EKB DKS  
WMH GLS FRC PAC OCC FOL NAR SSR PRR DKR ZOR FMR EKR ZMR BRR LAR OSR BAR

Group	D <sup>2</sup>	P-Prob	T-Prob
BlackL19	101.225	.849	.000
AMBLACK	105.825	.085	.000
BlackE19	106.961	.048	.000
WhiteE19	110.020	.010	.000
WhiteL19	111.974	.004	.000
AMWHITE	113.090	.002	.000
NORSE	117.551	.000	.000
Croat19	117.742	.000	.000
ZALAVAR	119.083	.000	.000
Portuguese	121.333	.000	.000
Farrst	124.813	.000	.000
ASHANTI	126.513	.000	.000
GOLDCOAST	128.571	.000	.000
ZULU	130.480	.000	.000
CALABAR	131.200	.000	.000
BERG	132.073	.000	.000

Atypical of all samples. Very large skull. Wide and high face, wide vault, and wide orbits. Even though atypical, classification is patterned to American Blacks and then American Whites. All Old World populations rank after Americans.

**Table A-3. Full Classification Results for V02C**

Variables

GOL NOL XCB XFB AUB ASB NPH NLH NLB MAB OBH FMB NAS WMH GLS FRC FRS PAC PAS OCC  
 OCS FOL NAR SSR PRR ZOR FMR EKR ZMR BRR LAR OSR BAR

Group	D <sup>2</sup>	P-Prob	T-Prob
CALABAR	30.074	.752	.671
ZULU	32.347	.241	.515
ASHANTI	40.976	.003	.198
BlackE19	41.183	.003	.196
GOLDCOAST	43.880	.001	.140
BlackL19	47.386	.000	.053
AMBLACK	53.768	.000	.015
ZALAVAR	61.648	.000	.002
NORSE	64.710	.000	.001
WhiteE19	68.112	.000	.001
WhiteL19	69.004	.000	.000
AMWHITE	69.429	.000	.000
Farrst	71.044	.000	.000
Portuguese	72.308	.000	.000
Croat19	73.922	.000	.000
BERG	77.780	.000	.000

Very narrow, especially at the base and posterior vault, a low face, wide nose, and prognathic.

**Table A-4. Full Classification Results for V04C**

Variables

GOL NOL XCB XFB ASB GLS FRC FRS PAC PAS OCC OCS FOL NAR BRR LAR OSR BAR

Group	D <sup>2</sup>	P-Prob	T-Prob
BERG	22.005	.883	.241
ZALAVAR	27.904	.046	.068
NORSE	28.736	.030	.055
Croat19	28.970	.027	.060
AMWHITE	31.500	.008	.026
WhiteL19	32.974	.004	.018
WhiteE19	35.850	.001	.012
Portuguese	38.158	.000	.004
BlackE19	38.769	.000	.005
AMBLACK	38.954	.000	.003
Farrst	39.721	.000	.003
ZULU	42.543	.000	.001
BlackL19	44.441	.000	.001
CALABAR	53.842	.000	.000
GOLDCOAST	55.701	.000	.000
ASHANTI	56.721	.000	.000

**Table A-5. Full Classification Results for V06C**

Variables

GOL NOL XCB XFB ZYB AUB ASB NLH JUB NLB MAB OBH OBB DKB NDS WNB SIS ZMB SSS FMB  
 NAS EKB DKS GLS FRC FRS PAC PAS OCC OCS FOL NAR SSR DKR ZOR FMR EKR ZMR BRR LAR OSR  
 BAR

Group	D <sup>2</sup>	P-Prob	T-Prob
Am_Black20	37.173	.820	.706
AM_BlackL19	41.334	.102	.511
Am_BlackE19	41.933	.076	.540
NORSE	51.844	.001	.152
Croat19	52.055	.000	.170
WhiteL19	52.928	.000	.126
AMWHITE	53.420	.000	.117
GOLDCOAST	55.275	.000	.126
Farrst	55.310	.000	.093
ZALAVAR	55.739	.000	.084
ASHANTI	57.024	.000	.084
ZULU	57.165	.000	.066
BERG	59.563	.000	.042
Portuguese	59.743	.000	.040
WhiteE19	61.263	.000	.047
CALABAR	62.540	.000	.034

**Table A-6. Full Classification Results for V07C**

Variables

GOL NOL XCB XFB AUB ASB NPH NLH NLB OBH OBB DKB WNB ZMB SSS FMB NAS EKB DKS WMH  
 GLS FRC FRS PAC PAS OCC OCS FOL NAR SSR PRR DKR ZOR FMR EKR ZMR BRR LAR OSR BAR

Group	D <sup>2</sup>	P-Prob	T-Prob
ZULU	18.838	.567	.998
ASHANTI	21.202	.174	.995
BlackE19	21.778	.130	.994
GOLDCOAST	23.600	.052	.989
CALABAR	24.132	.040	.984
AMBLACK	25.807	.017	.965
BlackL19	27.161	.009	.942
ZALAVAR	27.962	.006	.930
NORSE	28.989	.004	.908
Farrst	33.995	.000	.756
Croat19	34.151	.000	.768
WhiteE19	36.502	.000	.701
BERG	37.380	.000	.604
Portuguese	37.808	.000	.582
AMWHITE	39.544	.000	.501
WhiteL19	39.541	.000	.501

**Table A-7. Full Classification Results for V08C**

Variables

GOL NOL XCB XFB ZYB AUB ASB NLH JUB NLB OBH OBB WNB ZMB SSS FMB NAS EKB DKS WMH  
 GLS FRC FRS PAC PAS OCC OCS FOL NAR SSR DKR ZOR FMR EKR ZMR BRR LAR OSR BAR

Group	D <sup>2</sup>	P-Prob	T-Prob
BlackL19	47.041	.441	.184
Farrst	48.493	.213	.157
Portuguese	48.619	.200	.147
AMBLACK	50.173	.092	.123
WhiteE19	52.050	.036	.117
BlackE19	54.293	.012	.075
AMWHITE	57.625	.002	.030
ZULU	58.405	.002	.027
WhiteL19	58.553	.001	.024
ASHANTI	59.804	.001	.026
NORSE	63.343	.000	.009
GOLDCOAST	64.889	.000	.011
ZALAVAR	65.769	.000	.005
BERG	74.752	.000	.001
Croat19	75.880	.000	.001
CALABAR	79.009	.000	.000

Mid-line landmarks, sss and nas, project beyond facial plane. Cranium is relatively short and wide. Long frontal and short parietals.



**Table A-8. Full Classification Results for V09C**

Variables

GOL NOL XCB XFB AUB NPH NLH JUB NLB MAB OBH OBB DKB WNB ZMB SSS FMB NAS EKB DKS  
WMH GLS FRC FRS PAC PAF OCC OCS FOL NAR SSR PRR DKR ZOR FMR EKR ZMR BRR LAR OSR  
BAR

Group	D <sup>2</sup>	P-Prob	T-Prob
Am_BlackE19	74.058	.435	.002
Am_Black20	74.251	.395	.001
Am_BlackL19	77.146	.093	.001
Croat19	79.048	.036	.001
Farrst	80.676	.016	.000
CALABAR	81.049	.013	.000
NORSE	82.029	.008	.000
WhiteE19	84.756	.002	.000
BERG	87.045	.001	.000
ZULU	87.075	.001	.000
AMWHITE	90.329	.000	.000
WhiteL19	91.634	.000	.000
Portuguese	92.309	.000	.000
ZALAVAR	94.595	.000	.000
GOLDCOAST	97.124	.000	.000
ASHANTI	107.529	.000	.000

Atypical. Large skull. Large orbits, wide mid and upper face, long flat frontal, short flat parietal, facial forwardness.

**Table A-9. Full Classification Results for V10C**

Variables

GOL NOL XCB XFB AUB ASB NPH NLH OBH OBB DKB NDS WNB SIS WMH GLS FRC FRS PAC PAS  
 NAR SSR PRR DKR ZOR FMR EKR ZMR BRR LAR

Group	D <sup>2</sup>	P-Prob	T-Prob
ZULU	70.940	.920	.000
CALABAR	77.762	.030	.000
GOLDCOAST	78.252	.024	.000
BlackE19	79.218	.015	.000
ASHANTI	80.355	.008	.000
BlackL19	83.074	.002	.000
NORSE	85.649	.001	.000
AMBLACK	86.159	.000	.000
Farrst	91.855	.000	.000
ZALAVAR	95.034	.000	.000
Portuguese	99.741	.000	.000
WhiteE19	99.958	.000	.000
Croat19	100.687	.000	.000
BERG	101.056	.000	.000
WhiteL19	101.081	.000	.000
AMWHITE	102.213	.000	.000

Atypical of all groups. Very narrow vault, low face, prognathic.

**Table A-10. Full Classification Results for V11C**

Variables

GOL NOL XCB XFB ZYB AUB ASB NPH NLH JUB NLB OBH OBB DKB NDS WNB SIS ZMB SSS FMB  
 NAS EKB DKS WMH GLS FRC FRS PAC PAS OCC OCS FOL NAR SSR PRR DKR ZOR FMR EKR ZMR  
 BRR LAR OSR BAR

Group	D <sup>2</sup>	P-Prob	T-Prob
ASHANTI	70.674	.539	.011
ZULU	72.417	.225	.005
BlackL19	74.104	.097	.003
AMBLACK	74.905	.065	.003
GOLDCOAST	74.919	.064	.006
BlackE19	79.041	.008	.002
Portuguese	83.207	.001	.000
ZALAVAR	84.931	.000	.000
Farrst	88.356	.000	.000
WhiteL19	88.511	.000	.000
CALABAR	89.280	.000	.000
NORSE	90.743	.000	.000
AMWHITE	91.612	.000	.000
WhiteE19	95.955	.000	.000
Croat19	98.654	.000	.000
BERG	101.889	.000	.000

Atypical of all groups. Narrow vault, wide nose, wide interorbital, prognathic, high face.

**Table A-11. Full Classification Results for V12C**

Variables

GOL NOL XCB XFB ZYB AUB ASB NPH NLH JUB NLB MAB OBH OBB DKB NDS WNB SIS ZMB SSS  
 FMB NAS EKB DKS WMH GLS FRC FRS PAC PAS OCC OCS FOL NAR SSR PRR DKR ZOR FMR EKR  
 ZMR BRR LAR OSR BAR

Group	D <sup>2</sup>	P-Prob	T-Prob
ZULU	46.612	.998	.424
Am_BlackE19	60.067	.001	.094
Am_Black20	64.326	.000	.037
ZALAVAR	65.864	.000	.026
CALABAR	66.134	.000	.035
Portuguese	67.189	.000	.019
ASHANTI	68.866	.000	.020
BlackL19	69.884	.000	.011
GOLDCOAST	71.023	.000	.016
BERG	74.629	.000	.004
Farrst	75.871	.000	.003
Am_WhiteE19	78.640	.000	.003
Am_White20	81.525	.000	.001
Czech20	83.213	.000	.001
WhiteL19	91.263	.000	.000

Narrow base and posterior vault, low face, wide nose, prognathic.

**Table A-12. Full Classification Results for V14C**

Variables

GOL NOL XCB XFB ZYB AUB ASB BPL NPH NLH JUB NLB MAB MDH OBH OBB DKB NDS WNB SIS  
ZMB SSS FMB NAS EKB DKS WMH GLS FRC FRS PAC PAS OCC OCS FOL NAR SSR PRR DKR ZOR  
FMR EKR ZMR BRR LAR OSR BAR

Group	D <sup>2</sup>	P-Prob	T-Prob
NORSE	94.624	.306	.000
Am_Black20	94.644	.303	.000
ZALAVAR	95.699	.179	.000
BlackE19	96.428	.124	.000
BlackL19	97.736	.065	.000
Farrst	101.458	.010	.000
ZULU	103.718	.003	.000
BERG	103.956	.003	.000
GOLDCOAST	104.741	.002	.000
WhiteE19	105.252	.002	.000
Croat19	106.210	.001	.000
ASHANTI	106.802	.001	.000
Portuguese	107.913	.000	.000
WhiteL19	108.344	.000	.000
AMWHITE	108.377	.000	.000
CALABAR	109.173	.000	.000

Very atypical skull. Narrow vault, especially posterior. Very broad mid and upper face, short, flat frontal.

**Table A-13. Full Classification Results for V17C**

Variables

GOL NOL XCB XFB ZYB AUB ASB NPH NLH JUB NLB MAB OBH OBB DKB NDS WNB SIS ZMB SSS  
 FMB NAS EKB DKS WMH GLS FRC FRS PAC PAS OCC OCS FOL NAR SSR PRR DKR ZOR FMR EKR  
 ZMR BRR LAR OSR BAR

Group	D <sup>2</sup>	P-Prob	T-Prob
Portuguese	61.685	.600	.054
Am_Black20	63.482	.245	.043
BlackL19	65.524	.088	.026
ZULU	68.253	.023	.016
BlackE19	68.792	.017	.021
NORSE	70.036	.009	.011
Farrst	70.932	.006	.010
ZALAVAR	71.367	.005	.009
ASHANTI	71.639	.004	.011
GOLDCOAST	72.233	.003	.013
AMWHITE	77.617	.000	.002
Croat19	78.399	.000	.003
BERG	81.451	.000	.001
WhiteL19	84.057	.000	.000
WhiteE19	86.528	.000	.001
CALABAR	87.639	.000	.000

Atypical, but not an extreme. Typical African narrow vault, low face and prognathic. Very narrow face, lacks posterior protrusion of occipital. Anterior projection of lateral face, ekr and fmr. Unusual pattern of affinities. The similarity to Portuguese is not strong, followed by American Blacks.

**Table A-14. Summary Statistics for all Postcranial Measurements**

Variable	Males			Females		
	N	Mean	sd	N	Mean	Sd
<b>Scapula</b>						
Max height left	1	159	0			
Max height right	3	157.667	2.082			
Max breadth left	2	108.5	9.192			
Max breadth right	6	108.833	6.369			
Spine length left	2	150	14.142			
Spine length right	6	147.333	11.587			
Supraspinous length left	1	58	0			
Supraspinous length right	3	54	5			
Infrspinous length left	2	117.5	9.192			
Infrspinous length right	6	121.5	9.138			
Glenoid cavity breadth left	3	30	2			
Glenoid cavity breadth	6	28.833	2.639			
Glenoid cavity height left	3	43.333	5.686			
Glenoid cavity height right	6	41.333	3.882			
Glenoid to inferior angle left	3	154.333	10.693			
Glenoid to inferior angle right	6	146.5	11.167			
<b>Humerus</b>						
Max length left	10	336.1	8.608	7	302.571	9.624
Max length right	11	336.273	10.11	9	310	5.339
Proximal epiphysis breadth left	10	51.2	2.821	7	45	2.828
Proximal epiphysis breadth right	11	50.818	2.136	7	44	1.414
Max diam midshaft left	11	25.091	2.343	7	21.143	0.69
Max diam midshaft right	12	25.083	1.782	9	21.556	0.726
Min diam midshaft left	11	20.364	1.859	7	16.857	1.345
Min diam midshaft right	12	19.75	1.485	9	16.444	1.13
Max vertical diam head left	10	46.7	3.234	7	40.571	3.505
Max vertical diam head right	11	45.727	2.284	8	39.5	2.619
Epicondylar breadth left	10	66.8	3.853	7	56.286	1.799
Epicondylar breadth right	11	66.091	4.182	8	57.5	2.204
Min shaft circumference left	11	71.182	5.326	7	59.571	2.637
Min shaft circumference right	11	70.727	4.735	9	59.667	2.598
<b>Radius</b>						
Max length left	5	267.2	14.55	9	240.444	7.418
Max length right	9	267.222	7.259	4	232.5	13.796
Max head diam left	5	25	1	8	22	1.195
Max head diam right	8	25.125	2.475	4	21	0.816
Ant-Post diam shaft left	6	13.833	0.983	9	11.778	0.667

Ant-Post diam shaft right	9	13.667	1.5	4	11.25	0.5
Med-lat diam shaft left	6	16.333	1.751	9	14.222	1.641
Med-lat diam shaft right	9	16.444	1.878	4	13.5	1.291
Neck circumference left	5	53.2	2.864	9	44.444	3.321
Neck circumference right	9	52.556	4.64	4	41.75	2.062
<b>Ulna</b>						
Max length left	6	289.167	20.769	10	250.1	11.77
Max length right	11	287.727	11.951	6	257.667	6.653
Physiological length left	8	253.5	18.936	11	223.364	11.792
Physiological length right	11	256.455	9.543	6	228.833	6.585
Max breadth olecranon left	6	29.833	2.483	9	35.667	32.427
Max breadth olecranon right	11	28.182	2.359	6	41	42.157
Min breadth olecranon left	8	22.125	3.044	11	19.091	1.446
Min breadth olecranon right	11	22	2.408	6	19.667	1.211
Max width olecranon left	7	25.286	2.289	11	23.636	1.629
Max width olecranon right	11	25.545	2.252	6	23	1.265
Olecranon to radial notch left	7	38.857	2.545	11	33.727	2.24
Olecranon to radial notch right	11	38.455	2.622	6	32.667	1.862
Olecranon coronoid length left	6	25.833	2.317	12	30.833	29.064
Olecranon coronoid length right	10	26.9	2.558	6	19.833	4.021
Ant-post diam shaft left	8	15.625	1.506	11	12.727	1.104
Ant-post diam shaft right	11	15.091	1.514	6	13	1.095
Med-lat diam shaft left	8	18.375	1.061	11	14.909	1.446
Med-lat diam shaft right	11	18.091	1.446	6	18.667	8.664
Min circumference shaft left	8	40.5	3.207	11	34.636	2.501
Min circumference shaft right	10	41.6	3.098	5	34.2	2.95
<b>Sacrum</b>						
Anterior length	4	113.75	6.238	3	100	13.229
Anterior breadth	4	111.25	6.397	3	108	5.292
Max breadth S1	4	53	3.162	3	45.667	2.517
<b>Innominate</b>						
Height left	5	220.4	7.057	2	200.5	0.707
Height right	1	212	0			
Iliac breadth left	5	156.4	5.03	2	146	0
Iliac breadth right	1	162	0			
<b>Femur</b>						
Max length left	4	458.75	18.518	5	433.8	9.039
Max length right	6	460.833	17.657	4	430.75	18.518
Bicondylar length left	4	455.75	18.554	5	430	8.803
Bicondylar length right	6	457.5	16.171	4	424.75	17.251
Trochanteric length left	4	437	19.356	5	413.2	7.085
Trochanteric length right	6	440.667	19.947	4	408	14.166



Subtroch ant-post diam left	4	26.75	1.708	5	22.8	0.837
Subtroch ant-post diam right	6	27.5	1.225	4	23	1.414
Subtroch med-lat diam left	4	32.5	2.38	5	30.8	1.304
Subtroch med-lat diam right	6	34.167	1.835	4	30.75	2.062
Midshaft ant-post diam left	4	29.5	2.646	5	25.4	1.817
Midshaft ant-post diam right	6	30.667	2.338	4	24	1.414
Midshaft med-lat diam left	4	28.5	2.38	5	25.2	0.447
Midshaft med-lat diam right	6	28.167	1.329	4	25.25	0.5
Vertical head diam left	4	47.5	2.517	5	41	2
Vertical head diam right	5	48	2.121	4	41.75	0.957
Horizontal head diam left	4	47.5	2.082	5	40.4	2.074
Horizontal head diam right	6	47.5	1.871	4	41.25	1.5
Lateral condyle ant-post diam left	4	64.75	2.217	5	59	3.742
Lateral condyle ant-post diam right	6	65.667	3.141	4	59.25	3.202
Medial condyle ant-post diam left	5	67	3.162	5	57.2	2.49
Medial condyle ant-post diam right	4	64.75	1.5	4	58.25	1.5
Epicondylar breadth left	5	85.8	5.586	5	72	1.581
Epicondylar breadth right	4	82.5	5.686	3	73.667	2.082
Bicondylar breadth left	5	80.8	5.495	5	68	1.732
Bicondylar breadth right	5	78.2	3.633	4	68.75	2.062
Vertical diam neck left	5	32.8	1.924	5	28.8	1.304
Vertical diam neck right	5	33.4	2.702	4	28.5	2.38
Midshaft circumference left	5	92.6	6.804	5	79.4	2.51
Midshaft circumference right	5	91.4	3.847	4	78.25	1.708
<b>Tibia</b>						
Condylar-malleolar length left	3	394.667	23.861	5	356.6	16.441
Condylar-malleolar length right	4	388.5	9.849	3	348	14.731
Max breadth proximal epiphysis left	2	79.5	3.536	5	70.4	3.975
Max breadth proximal epiphysis right	4	80.75	6.185	3	69.333	1.528
Max breadth distal epiphysis left	3	51.667	3.512	5	47.4	3.13
Max breadth distal epiphysis right	3	54.333	3.512	3	46.333	2.082
Nutrient foramen ant-post diam left	3	37	2.646	5	31.6	1.817
Nutrient foramen ant-post diam right	4	38	1.826	3	31.333	1.155
Nutrient foramen med-lat diam left	3	27	1	5	21.8	1.095
Nutrient foramen med-lat diam right	4	25.25	2.5	3	22.333	1.528
Position nutrient foramen left	3	124.667	4.726	5	121.2	10.183
Position nutrient foramen right	4	123.5	11.733	3	117	9.539
Circumference nutrient foramen left	3	105	6.928	4	88.25	3.862
Circumference nutrient foramen right	4	101.75	3.594	3	89	5

## **APPENDIX IV.**

### **Descriptions of Cut Bones**

#### **44HE814-EU21-CL14L (CB01)**

This is the left clavicle of a young adult female. The medial third of the bone is missing due to complete sectioning through the shaft, or body of the clavicle. A terminal snap is characterized by a small projection along the cut margin of the inferior aspect.

#### **44HE814-EU21-S21 (CB02)**

This partial sacrum of a young adult probable female is represented by the left side of its first three segments. More inferior segments are missing due to postmortem breakage. The first, second and third segments are fully united. The maximum length of this partial sacrum is 82 mm (superior-inferior).

The sacrum was vertically sectioned along the mid-sagittal plane. The left ala and sacro-liliac joint are present, but no left innominate articulates with the sacrum.

The anterior surface of the sacrum has a small patch of abnormal bone that was actively forming at the time of death. The area of periostitis that borders the left sacral foramen has a diameter of 8 mm.

Photography:

Anterior view of the sacrum

Right anterior-oblique view of the sacrum showing the cut surface

#### **44HE814-EU21-R31L (CB03)**

This is the distal half of a left radius of a child of indeterminate sex aged 6.5 to 7.5 years. A complete cut is present through the mid-shaft. Fine striations are visible on the cut surface and indicate the sectioning began antero-lateral and progressed to the postero-medial aspect of the

bone. A terminal snap is present on the posterior-medial cut edge. Two small false starts, or nicks, are adjacent to the cut edge on the antero-lateral aspect.

The estimated length of the complete bone is approximately 180 mm. The length of the represented bone section is 89 mm, as measured from the distal growth plate to the cut edge. The distal epiphysis was unfused and not present. No matching proximal half of radius is present and no sectioned ulna of a child that matches this specimen is represented in the series.

#### **44HE814-EU21-R29L & U27L (CB04 A & B)**

This is the proximal half of a left radius and ulna of an older adult female aged 35 to 49 years. Both bones have complete cuts through their mid-shafts. The portion of represented radius measures 129 mm and the represented ulna measures 155 mm. No matching distal ends are present.

The left radius (R29L) shows striations on the cut surface consistent with an anterior-posterior progression of the saw through the shaft. A terminal snap located on the posterior edge of the cut. The head of the radius is partially compressed.

The cut surface of the left ulna (U27L) has striations indicative of sawing from the lateral-anterior aspect of the bone to the medial-posterior aspect. A terminal snap is present on this bone's medial cut edge. A cut is also located on the postero-lateral surface of the shaft, 1.6 mm superior to the sectioned end.

The associated radius and ulna have terminal snaps in different locations. The terminal snap on the radius is on the posterior edge; on the ulna the terminal snap is on the medial edge. Both bones also show evidence of false starts. A false start is present on the posterior-lateral aspect of the ulna (under the microscope one can see that the instrument used was serrated). The radius has a false start on its medial aspect. The pattern evident on each bone indicates the saw

did not move uniformly through the bones; it began in the radius, snapping the bone along the posterior margin. The saw then progressed from the lateral aspect of the ulna toward the medial edge. The two bones appear to have been cut separately, although the exact position of the forearm during sectioning is unknown.

#### **44HE814-EU21-FB39R (CB05)**

This is a right fibula diaphysis of an older adult probable female (35 to 60 years). The proximal and distal ends are missing. The distal end displays old breakage. The proximal end has been completely cut through immediately below the head (proximal joint surface). Some of the cut edge is irregular due to breakage. The breakage appears old and may have occurred at the time of sectioning. The length of this sectioned bone is 307 mm. No matching tibia with a cut at this location is present.

#### **44HE814-EU21-FB40R (CB06)**

This is a right fibula of an older adult male (35-plus years). A majority of the bone is present; only the proximal end and joint are missing. The length is 349 mm. The head of the fibula has been removed by complete sectioning through the bone's proximal end. Striations on the cut surface indicate the saw began cutting on the medial aspect of the bone and progressed to the lateral aspect. A small terminal snap is visible on the lateral aspect of the cut edge. A small cut representing a false start is present on the medial surface 2 mm inferior to the sectioned edge. The proximal end of the bone has four longitudinal cracks continuing from the cut end as far as 60 mm down the shaft.

Trace degenerative changes are noted along the distal joint margin. No association with a tibia from the series can be made with certainty.

#### **44HE814-EU21-T18R (CB07)**

This is an incomplete right tibia of a male aged 25 to 39 years. A complete transverse cut is present in the proximal fourth of the shaft. The posterior aspect of the proximal two-thirds of

the shaft and the distal joint are missing due to postmortem breakage. The proximal joint and upper shaft, including the tibial tuberosity, are missing due to a cut through the proximal end. This bone segment has a length of 313 mm.

Only the anterior half of sectioned surface is present. The posterior cut surface is missing due to postmortem breakage near the time of recovery. Blade striations are extremely faint on the flat, smooth cut surface. Cutting progressed from medial to lateral. No terminal snap is present. No matching distal end of a tibia is identified in the series.

#### **44HE814-EU21-R10L, U08L, T12L, FB12L (CB08 A, B, C, & D)**

This set includes four cut bones of a male aged 40 to 60 years. The bones were reassociated on the basis of iron (rust) stains, similarities in color, age-related features, and the vestiges of adipocere on the different bones. Distinctive surface erosion is also evident. The bone color is distinctive and may help identify other bones belonging to this individual.

##### **Left radius (R10L)/ulna (U08L):**

The left forearm bones have cuts through the proximal and lower middle thirds of the shafts. The sectioned radius has a length of 153 mm and includes the proximal tuberosity. The more proximal cut was made through the radial neck and is oriented at an angle rather than perpendicular to the shaft. A slight shift in the angle of sawing is visible on the radius as a discontinuity on the cut surface (a small plateau is present on the lateral aspect of the proximal radius cut disrupting the flat surface). The distal cut is also at a slight angle, but not as pronounced as the proximal cut. Both cuts show surface features consistent with the blade moving from anterior to posterior. The sectioned ulna measures approximately 158 mm. The more superior cut was made below the proximal joint and removed the olecranon and coronoid processes. As evidenced on the proximal cut surface, the saw blade progressed from front to back at an oblique orientation relative to the long axis of the bone. When the radius is anatomically aligned with the ulna, this proximal cut was made slightly higher (more superior) on the ulna and more distal on the radius. The proximal cut surface of the ulna has a terminal

break along the posterior edge. Tiny cuts are also visible on the proximal ends of both bone diaphyses, inferior to the primary cut edge. The cuts on this forearm set are consistent with training amputations.

**Left tibia (T12L)/ fibula (FB12L):**

This left tibia and fibula show sectioning through the proximal fourths of their diaphyses. The saw blade progressed from front (anterior-medial) to back (posterior-lateral) based on visible striations. A pronounced terminal snap is present on the posterior cut margin of the fibula. The terminal snap is approximately 2.5 mm wide with a height of 3 mm. On the left tibia, fine cuts are also visible on the anterior crest, 2.5 mm inferior to the proximal cut edge and below the tibial tuberosity (near the insertion of the patellar ligament). The length of the partial tibia is 325 mm and the length of the partial fibula is 343 mm.

**44HE814-EU21-T23R (CB09)**

This is a nearly complete right tibia of a probable female aged 40 to 59 years. The assigned age is based on the presence of fine striae on the shaft's surface. The proximal joint of the bone is missing due to a complete transverse cut through the proximal diaphysis at the base of the tibial tuberosity. The distal end of the bone has slight postmortem crushing. The maximum length of the represented shaft is 333 mm.

Striations on the cut surface are very fine and visible under a microscope. They show that the saw blade did not move evenly through the tibia. Cutting began on the medial-anterior aspect of the bone and progressed posteriorly with slight breakage along the posterior margin. Fine scalpel or knife marks are visible on the anterior aspect of the shaft immediately below the cut

margin. One cut is located 1.2 mm below the main cut edge; a second fine cut is located 2.2 mm below the main cut. The medial aspect of the upper diaphysis shows possible lytic activity.

#### **44HE814-EU21-T12R (CB10)**

This is the proximal two-thirds of a right tibia of a probable male aged 20-29 years. The distal joint and distal third of the shaft are missing due to a complete cut through the lower diaphysis. The represented tibia segment measures 267 mm in length. The outer cortex of the shaft is smooth and the proximal epiphysis is fully united. No degenerative changes are noted on the proximal joint. These features are consistent with a young adult age.

The bone was sectioned through the lower third of the diaphysis. Very fine striations are visible on the cut surface and indicate the saw traveled from anterior-medial to posterior. Slight chipping is noted along the posterior cut edge and may represent tiny terminal breaks in the bone. No matching distal right tibia is present in the series.

#### **44HE814-EU21-T19L and FB20L (CB11A & B)**

This set of three pieces represents a left tibia and fibula of a female aged 50-plus years. Complete cuts have been made through the proximal shafts of both bones. On the tibia, the proximal joint was scored for severe degenerative lipping along the joint margin. The distal joint was scored for moderate degenerative lipping. Similar degenerative changes are noted on the distal joint of the fibula.

The tibia (T19L) is represented by two pieces separated by a transverse cut through the proximal fourth of the shaft. The cut travelled through the anterior crest approximately 55 mm inferior to the tibia's proximal joint margin. The saw produced very fine striations as it progressed through the bone with the cut starting on the anterior surface and continuing posteriorly. The posterior margin of the cut on the proximal bone piece has a slightly raised plateau of bone indicating a terminal snap or slight shift in the saw blade as the cut terminated. A false start in the cutting is noted on the anterior aspect of the lower segment of bone, 2.4

mm inferior to the cut edge. The length of this false start is 7 mm with a width of 0.9 mm. The lower three-fourths of the diaphysis is complete. The total reconstructed length of the tibia (both pieces together) is approximately 380 mm.

A sectioned fibula (FB20L) is matched with the tibia and is missing its proximal end above the cut. When anatomically aligned with the tibia, the proximal cut through the fibula corresponds with the cut surface in the larger segment of tibia, both in location and in the direction of striations on the cut surface. These features indicate the sectioning was done at the same time, separating the entire lower leg below the knee. The partial fibula has a maximum length of 333 mm.

This tibia and fibula were cut close the knee. Because the proximal joint portion of the tibia is present, this was a practice amputation and not done to treat a living patient.

#### **44HE814-EU21-F29L (CB12)**

This is the partial left femur of an adult female. Sex is assigned based on the relative size of the represented shaft, which is small and gracile. The distal third of the shaft is represented. The bone piece has a maximum length of 153 mm. The distal joint is missing due to postmortem breakage. The proximal two-thirds is missing due to a complete cut through the lower diaphysis. Based on striations evident on the cut surface and a terminal snap on the posterior edge, sawing progressed from the anterior to posterior aspects. Raised bone at the linea aspera edge may represent a small terminal snap.

#### **44HE814-EU21-F35L (CB13)**

This is the left femur of a sub-adult probable female aged 9.5 to 11.5 years. The bone is linear and gracile and the femoral head and greater and lesser trochanter epiphyses are unfused and missing. The femur has a complete cut through the lower third of the diaphysis. The length of



the represented bone is 220 mm. The distal joint and lower third of the diaphysis below the cut are missing. No matching distal third diaphysis is present.

The saw was not perpendicular to the bone during cutting as there is a slight diagonal inclination of the cut surface. The medial aspect of the cut is positioned more inferiorly relative to the lateral aspect. Striations on the cut surface indicate the saw progressed anterior to posterior. A terminal snap on the posterior cut margin is evident. It measures 8 mm by 1 mm.

#### Photography:

Overview of a partial sub-adult left femur missing the distal third of the shaft due to complete sectioning through the inferior diaphysis.

Close-up of cut surface showing coarse striations from the saw blade. A terminal break is evident on the posterior margin of the cut edge.

#### **44HE814-EU21-F44R (CB14)**

This is a partial right femur of a sub-adult probable female aged 9.5 to 10.5 years. The bone is gracile and represented by the proximal two-thirds of the diaphysis including the neck and proximal metaphysis. The femoral head and greater and lesser trochanter epiphyses are missing. No matching distal diaphysis is present.

The distal diaphysis of the femur was cut through approximately 25 mm below the nutrient foramen. The sectioned bone has a length of 220 mm. The saw was positioned perpendicular to the diaphysis and progressed posterior-laterally to anterior-medial. Striations on the cut surface are fairly coarse and a tiny terminal snap is present.

#### **44HE814-EU21-F35R (CB15)**

This is a partial right femur of a female aged 30 to 45 years. Sex is based on the femur's relatively small size. The distal third of the diaphysis is represented with the distal joint missing

due to postmortem breakage. The proximal two-thirds was separated by a complete cut through the diaphysis. The represented femur has a length of 178 mm.

The cut through the distal third of the shaft progressed from anterior to the posterior. The medial margin of the cut is oriented slightly inferior to the lateral margin, indicating the saw was positioned at a slight angle and not perpendicular to the shaft. A small terminal snap is present near the linea aspera.

Abnormal, subperiosteal bone formation indicative of active periostitis is present on the distal end of the bone. No matching proximal right femur diaphysis was identified. This may be evidence of an amputation done in response to a pathological condition affecting the lower leg.

#### **44HE814-EU21-F27L (CB16)**

This is a partial left femur of a female aged 60-plus years. The bone is small and there is thinning of the cortical bone. Microporosity is widespread on the outer bone surface. The represented distal shaft has a maximum length of 183 mm. The distal joint is missing due to postmortem breakage. A transverse cut through the bone slightly inferior to the mid-shaft separated this piece from the proximal half of the bone. No matching proximal left femur is present.

Sawing progressed from anterior to the posterior. The posterior edge of the cut has a raised terminal snap with a height of 1.2 mm and a width of 8 mm. This break is centered on the linea aspera. The cut surface has smooth, fine striations.

#### **44HE814-EU21-F33R (CB17)**

This is a partial right femur of a female aged 50 to 65 years. The bone is represented by the proximal half of the shaft including the neck and greater trochanter (although some postmortem damage is noted on the greater trochanter). The head of the femur has broken off postmortem. The length of the represented shaft is 218 mm. The sex of this individual is based

on the smaller size of the bone. Age is based on bone loss and density. Microporosity is widespread on the outer cortex.

Striations on the cut surface indicate the saw progressed from anterior to posterior. The posterior cut margin has a small, raised ledge of bone with breakage indicative of a terminal snap at the linea aspera. The anterior surface of the middle diaphysis has a cut representing a “false start” 9 mm superior to the main cut edge. This partial cut has a transverse length of 10 mm and an approximate width of 1 mm.

Photography:

Overview of right partial femur with a complete cut through the lower-middle diaphysis.

#### **44HE814-EU21-F28L (CB18)**

This is a partial left femur of a young adult female aged 25 to 35 years. The proximal third of the bone is missing due to a complete transverse cut through the upper diaphysis. A small amount of postmortem damage is present on the distal medial condyle. The represented section has a length of 286 mm.

Features of the cut surface indicate the blade progressed from the lateral-posterior aspect of the bone to the anterior-medial aspect (individual positioned on the stomach). A terminal snap, or break, is clearly evident on the anterior-medial edge of the cut end. A plateau on the cut

surface marks a slight shift in the motion of the saw blade. No proximal left femur matches this bone.

#### **44HE814-EU21-T04L and FB11L (CB19 A & B)**

This is a left tibia and fibula of an older male (60+ years). Both bones have complete cuts through their proximal diaphyses. Both show abnormal bone formation due to periostitis.

The left tibia (T04L) has a cut through its proximal diaphysis, below the tibial tuberosity. The cut progressed from the anterior aspect of the bone to the posterior aspect. Fine cuts from a scalpel are present on the medial surface inferior to the transverse cut. The distal end of the bone, including the joint, is broken off postmortem. The length of the represented segment is 271 mm.

The left fibula (FB11L) has a cut through its proximal diaphysis and the proximal joint is missing due to postmortem breakage. The saw progressed from the lateral-anterior aspect of the bone to the posterior aspect. The length of the represented fibula is 304 mm.

#### **44HE814-EU21-FC (CB20 A, B, C, & D)**

These are cut bones from a Black male aged 35 to 45 years. The set of cut bones includes a complete right fibula sawn into two sections (FB41R), a right tibia that is complete, but also comprised of two pieces separated by a cut (T01R), a right femur missing the proximal third (F03R) due to a cut through the diaphysis, and a left femur represented by two cut pieces comprising the distal two-thirds of the bone (F04L).

The right fibula has a complete cut through the proximal fourth of the diaphysis. The proximal section has a length of 104 mm; the distal section length is 313 mm. The distal joint is complete and has a small enthesophyte extending from the anterior aspect of the distal tuberosity. Striations on the cut surface indicate the saw blade progressed anterior to posterior. The anterior edge of the cut has a small gouge from a false start. The posterior edge has irregular

breakage indicative of a terminal snap. This cut is aligned with a complete cut through the associated right proximal tibia.

The right tibia is represented by two sections separated by a complete cut through the proximal third of the diaphysis. The lower two-thirds of the bone measures approximately 305 mm. The cut surface of the lower section exhibits striations indicating the saw blade progressed from the medial-anterior aspect to the lateral-posterior aspect. A terminal cut in the sectioning is characterized by a small shelf of bone on the posterior lateral edge measuring 8 mm by 3 mm. This shelf has a smooth surface, indicating it was cut through and not snapped.

The proximal third of the tibia has a length of 142 mm. The proximal joint is complete with slight postmortem breakage around its margin. A small enthesophyte extends from the anterior aspect of the proximal joint's lateral condyle. The cut surface of this section corresponds to that described for the opposing lower section. Striations on the cut surface show the blade traveled from the anterior-medial aspect of the bone and terminated on the posterior-lateral aspect. Surface striations also reflect a shift in the angle of the saw with the blade starting at an angle and becoming more perpendicular to the long axis as the cut progressed.

The right femur has a complete cut through the proximal diaphysis that removed the head, neck and trochanters. The length of this partial femur is 385 mm. The cut was oriented diagonally with the medial aspect lower than the lateral aspect. Sawing striations are visible and a terminal snap is evident on the posterior edge. These features indicate the blade progressed from the anterior to posterior aspects. The medial condyle has become detached due to postmortem breakage.

The left femur is partially represented by two separate pieces divided by a cut through the distal fourth of the diaphysis. The larger piece with a length of 245 mm represents the middle third of the shaft and the lower half of the proximal third of the diaphysis. The smaller piece measures 155 mm in length and represents the lower third of the diaphysis including the distal

joint. The proximal third of the bone is missing due to a complete cut through the upper shaft. This proximal cut shows faint striations indicating the saw started cutting on the anterior aspect and terminated at the posterior aspect. The cut was diagonally oriented instead of perpendicular to the shaft. The lateral cut edge superior to the medial edge. A terminal snap is characterized by a small ledge on the posterior cut margin measuring 19 mm by 3 mm.

The distal end of this femur section has two transverse cuts; the more superior cut is only through the lateral half of the femoral shaft, 52 mm above the inferior cut. Striations on this surface indicate sawing from lateral to medial aspects. Approximately half way through the shaft the transverse cut stops. The inferior transverse cut is partially represented by the medial half of its surface. This cut separated the distal end of the bone from the shaft. Striations on this edge reflect sawing from anterior to posterior. This surface corresponds with the cut edge in the femur's separate distal third. The lateral half of the cut edge is missing due to a vertical cut that removed a section of bone about 52 mm in length and 33 mm in width. This vertical cut in the sagittal plane of the bone progressed from the inferior to superior transverse cuts, removing a small section of the shaft.

The distal third of the left femur has a cut surface on its proximal end that corresponds with the partially represented cut surface on the distal end of the larger middle diaphysis piece described above. The cut on the distal end piece has striations similar in direction to the matching cut edge of the corresponding piece. These striations reflect sawing from the anterior-lateral to the posterior-medial aspect of the bone. A terminal break on the posterior-medial edge of the cut surface is characterized by an irregular ledge of bone measuring 18 mm by 3 mm.

#### **44HE814-EU21-R24R (CB21)**

This is a partial right radius of a probable female aged 30 to 45 years. The radius is represented by approximately one-third of its diaphysis. The length of the represented bone is 111 mm. Complete transverse cuts were made through the proximal and distal diaphysis. On the

proximal end, the cut surface has striations indicating the saw progressed lateral to medial, ending with a terminal snap at the interosseous crest. On the segment's distal end, the cut was again lateral to medial with a terminal break on the medial edge.

#### **44HE814-EU21-R08L (CB22)**

This is a partial left radius of an adult male. The bone is missing its proximal end above the radial tuberosity due to post-mortem damage. The distal third of the radius was cut completely through; bone below the cut is missing. The represented section has a length of 194 mm.

Striations in the cut surface indicate the saw blade progressed from anterior to posterior. Fine cuts are also present approximately 2 mm superior to the cut edge on the anterior surface. These may represent false starts.

#### **44HE814-EU21-U21R (CB23)**

This is the right ulna of an older adult male. Degenerative lipping is present on the margin of the proximal joint.

The distal third of the bone is missing due to a complete transverse cut through the diaphysis. The represented bone has a length of 201 mm.

Striations on the cut surface indicate that sawing progressed from the bone's medial-posterior surface to its lateral-anterior aspect. No terminal break is noted.

#### **44HE814-EU21-H09R (CB24)**

This is a right humerus of a male aged 30 to 39 years. The bone is represented by two pieces separated by a complete transverse cut through the distal third of the shaft. The length of the two bone segments together is 351 mm. They articulate at a small terminal break on the

posterior surface. The proximal piece has a length of 229 mm and the distal piece measures 122 mm.

Striations on the cut surfaces indicate the blade progressed from anterior to posterior with a slightly oblique orientation. A terminal snap is present on the lateral-posterior edge of the cut.

Photography:

Anterior view of the sectioned humerus

Cut surfaces close up

#### **44HE814-EU21-F17R (CB25)**

This is a partial right femur of a female aged 60+ years. The distal third of the bone is missing due to a complete cut through the distal diaphysis. The represented section has a length of 283 mm. Enthesophyte formation is noted on the greater and lesser trochanters. The posterior aspect of the subtrochanteric region also has roughening and accentuation of bony ridges representing muscle attachment sites. Degenerative lipping is noted on the margin of the femoral head.

The cut through the distal third of the shaft exhibits faint striations and a terminal break at the linea aspera. Sawing progressed from the medial-anterior aspect of the bone to the lateral-posterior aspect. The matching distal femur is not present.

#### **44HE814-EU21-V01C (CB26)**

The skull is that of a middle-aged male of African ancestry. When initially examined the mandible was directly associated with the cranium, with the incomplete left ascending ramus lodged tightly under the broken left zygomatic arch. This linkage indicates partial articulation at the time of disposal. The cranium and mandible were discarded as a unit after the left ascending ramus was removed by dissection.



The left side of the mandible has two saw cuts located behind the third molar at the base of the ascending ramus. The left ascending ramus is missing. The cadaver was positioned with the right side of the head against the table during the procedure. Initial sawing cut into the facial-inferior aspect of the mandible. Sawing at an angle produced a diagonal cut in the buccal surface of the ramus with the blade progressing superiorly. Nearly the entire length of the buccal surface was cut with the inferior half bisecting the ramus. The inferior one-third of the mandible on the lingual surface (9.6 mm) and inferior two-thirds of the buccal surface (25 mm) were cut through. The blade was withdrawn before cutting completely through the ramus. A second cut was initiated above and posterior to the first cut into the ascending ramus. Renewed sawing continued for 7 mm at its greatest depth in the superior facial surface of the mandible, but did not cut through the ascending ramus. The mandible was manually fractured along the lingual-superior aspect of the ramus at the point of remaining union. In the superior aspect of the longest cut is a small section that can be measured to obtain the width of the saw blade (1.2 mm).

These cuts are inconsistent with either surgical intervention or standard autopsy. They follow cutting procedures found in medical dissection for studying the infratemporal fossa. No other cuts are present on the cranium or mandible.

#### **44HE814-EU21-F20L (CB27)**

This is a complete left femur of a Black female aged 60-plus years. The femur was sectioned in the upper third of the bone. The proximal section of bone has a length of 190 mm. The lower two-thirds measures 255 mm. The combined length of the two segments is 445 mm. The two pieces articulate along the posterior cut margin.

The saw cut anterior to posterior through the shaft with a terminal snap at the linea aspera. This bone pairs with F17R (not a cut bone) based on size and similar degenerative changes.

Photography:

Left femur cut through the lower proximal third of the diaphysis

Close-up of the smooth saw surfaces and terminal snap

Side view showing width of saw blade

#### **44HE814-EU21-I20R (CB28)**

This is a right innominate of an older adult male with two superior-inferior cuts through the illiopubic ramus. The cut on adjacent to the acetabulum has a penetration depth of approximately 42 mm. The cut thickness is 1.1 mm. Anterior to this incomplete cut is a complete cut through the superior ramus of the pubis. The inferior ramus has postmortem damage.

Photography:

Right innominate with cuts in and through the superior pubic ramus.

#### **44HE814-EU21-T46R (CB29)**

This is a partial right tibia diaphysis of a female, aged 25 to 39 years. Complete transverse cuts are present on both proximal and distal ends. This segment has a length of 137 mm. Based on its gracile appearance the woman was small.

The proximal end was cut below the tibial tuberosity. Cut striations are faint, but indicate the saw progressed from the anterior-lateral to posterior-medial aspect. A terminal snap is present on the posterior-medial edge of the cut. The distal end was cut at about mid-shaft. Striations on this cut surface show that the blade progressed medial to lateral. Fine cortex cuts on the medial aspect near the completed cut represent false starts. Differing orientations indicated by the

striae of the proximal and distal cuts indicate the leg was turned between sections. These features suggest practice or training with amputation procedures.

#### **44HE814-EU21-T16L (CB30)**

This is a partial left tibia of a male aged 35 to 49 years. The bone is missing its proximal third due to a complete cut below the tibial tuberosity. The length of the represented piece is 300 mm.

Striations on the cut surface and two surface cuts near the completed cut edge indicate the saw blade progressed anterior-medial to posterior-lateral. A terminal break is evidenced by a small irregular lip of bone on the posterior-lateral margin of the cut edge.

Two cortex cuts near the primary cut represent false starts. The deeper one is located 3 mm inferior to the primary cut. It measures 27 mm in length and 1 mm in width. A smaller surface cut is located 7 mm inferior to the primary cut and measures 11 mm in length and 1 mm in width.

#### **Photography:**

Overview of a left tibia with a complete cut through the diaphysis below the tibial tuberosity.

Close-up of two surface cuts located near the primary cut. These are false starts.

Oblique view of the cut surface to show the superficial cuts and terminal break along the postero-lateral margin.

#### **44HE814-EU21-F47R (CB31)**

This partial right femur of an older adult male is represented by two articulating segments of diaphysis separated by a transverse cut. The circumference of the diaphysis suggests identification as female. The linea aspera is moderately raised and irregular, reflecting both age and a history of physical activity. The cross section of the bone cortex shows visible macroporosity from loss of density and the external surface is characterized by subtle

irregularities, which although not pathological, are indicative of advanced age, likely 50 years or older.

The proximal segment representing the middle third of the diaphysis has a length of 112 mm. Cuts are present through both its proximal and distal ends. The proximal end has surface striations indicating that the saw progressed from anterior to posterior. The cut was made with a slightly diagonal orientation. The lateral aspect of the cut is superior to the medial aspect. The distal end cut was perpendicular to the shaft and not obliquely oriented. Striations indicate sawing from anterior to posterior. A terminal break is present at the linea aspera. This cut surface articulates with a second segment of this femur.

The second piece represents the distal third of the shaft and has a length of 135 mm. The distal end was broken postmortem and the joint is missing. The proximal end was cut. Striations on this transversely cut surface reflect sawing from anterior to posterior. A slight lip of bone at the linea aspera matches the break on the corresponding segment. In summary, this femur was sectioned at least twice through the shaft with cuts progressing from anterior to posterior. This repetition suggests practice with amputations.

Photography:

Overview of the two articulating pieces of right femur.

#### **44HE814-EU21-F08R (CB32)**

This is a partial right femur of a male aged 35 to 49 years. The bone is relatively large and the cortex shows some thinning. The length of this femur section is 305 mm. The head was broken

off postmortem. The greater trochanter and external cortex show postmortem damage. The distal fourth of the bone was removed by cutting and is not represented.

Striations on the cut surface show the saw blade traveled from the anterior-medial aspect of the bone to the posterior-lateral aspect. Breakage along the linea aspera region of the cut edge may represent a terminal break.

#### **44HE814-EU21-V20C (CB33)**

This is an autopsied vault cap of an adult male aged 30 to 45 years. A male sex is assigned based on the thickness of the vault cap, its large size, and the moderately low slope of the forehead. Endocranial suture closure has occurred for a majority of the coronal suture. Slight ectocranial bridging is evident for the sagittal and lambdoidal sutures.

The cut is relatively even around the entire perimeter of the vault, although removing the cap required repositioning the saw at numerous locations to avoid cutting into the brain. The internal (inner table) edges of the cut have areas of irregularities consistent with terminal breaks. This is especially true on the right and posterior margins of the vault cap's inner cut edge.

Two adjacent circular defects are present in the posterior left parietal. The more medial defect is uniformly circular with a sharply defined outer margin made by drilling (trephination). The uniform margin does not extend all the way through the inner table. This inner margin is irregular and smaller than the drilled perforation, which has an outer table diameter of 17 mm. Adjacent to the drilled perforation is another roughly circular defect with a diameter of 16 mm. The external margin of this defect is sharply defined with beveling of the internal margin. A faint partial circumferential fracture is present along the external margin's inferior edge. No

radiating fractures extend from the defect. This may represent a gunshot injury with trephination done to relieve swelling of the brain. The cranium was autopsied after death.

#### **44HE814-EU21-F05L (CB34)**

This left femur represents a male aged 15 to 18 years. The proximal and distal epiphyses have not begun to unite with the diaphysis, which is large and long and has a length of 430 mm. The posterior femoral neck has two fine cuts from a knife or scalpel. The longest one measures 12 mm and the shorter 10 mm. No additional cuts are noted.

#### **44HE814-EU21-U36R (CB35)**

This is the proximal half of the right ulna of a child aged 9 to 11 years. The bone was sectioned at mid-shaft and the distal half is missing. The length of the represented piece is 107 mm.

Striations on the cut surface indicate the saw blade traveled anterior-lateral to posterior-medial. A terminal break is indicated by an irregular bone margin on the postero-medial edge.

#### **44HE814-EU21-SC19R (CB36)**

This nearly complete right scapula of a male aged 25 to 39 years has a metal hook in the glenoid fossa. The iron insert would have been used for anatomical mounting of the right humerus. This bone may have been part of an articulated specimen used as a teaching aide. This is the only bone with a metal insert in the series.

Photography:

Oblique view showing the metal hook in the glenoid cavity

Overview of the scapula showing the hook

#### **44HE814-EU21-FB08L (CB37)**

This large, partial left fibula of an older male has a cut through the proximal fourth of the shaft. Bone superior to the cut is missing. The distal end of the fibula has some postmortem damage.

The length of the represented bone is 299 mm. This bone has widespread plaque-like bone due to periostitis that was active at the time of death.

The cut was made at an oblique orientation, sawing from anterior to posterior. Cutting on the anterior margin began on a slightly different plane, after which the blade was repositioned. Terminal breakage is present along the posterior and medial margins of the cut edge.

#### **44HE814-EU21-T19R and FB20R (CB38 A & B)**

This is a right tibia and fibula of a male aged 25 to 39 years. Both bones have a complete cut through the proximal one-fourth of their shafts below the tibial tuberosity. The distal ends of both bones have postmortem damage. The length of the incomplete fibula is 284 mm. The length of the tibia is 289 mm.

Sectioning of the bones was done simultaneously with perfect alignment when positioned anatomically. Striations from the saw are visible on both cut surfaces and indicate the blade traveled anterior to posterior. Terminal breaks are present on the posterior cut margins of the tibia and fibula with the fibula having a larger terminal snap.

#### **44HE814-EU21-V02C (CB39)**

This cranium and mandible represent an adult male of African ancestry. The left zygomatic process of the temporal bone was cut through and the zygomatic arch anterior to the cut is missing. The cut is vertically oriented and similar to a cut at the same location on the right side of V09C. This cut may have been done to remove a section of the arch in order to study the temporal and masseteric regions of the skull. No cuts are noted on the mandible associated with this cranium.

#### **44HE814-EU21-V06C (CB40)**

This skull represents a male of African ancestry aged 45 to 55 years. Cuts are present on the mandible and temporomandibular joints. Cuts are located on the anterior margins and lateral surfaces of both ascending rami, along the mandibular notch below the condyles, and on the

lingual surface of the symphysis. On the vault, multiple small cuts are present anterior to the temporomandibular joints. The cuts are very fine and were made with a sharp knife or scalpel while separating the mandible from the vault.

#### **44HE814-EU21-V09C (CB41)**

This cranium represents an adult female of African ancestry. Three cuts are present. The right zygomatic arch has been cut through in two locations (the posterior zygomatic process of the temporal bone and the temporal process of the zygomatic bone). A fragment of arch was removed and is not represented. This segment may have been removed to study the temporal and masseteric regions of the skull. In order to examine the temporal region, the masseter muscle along with its bone of origin must be reflected downward. The zygomatic bone was cut at a slightly oblique angle. Another tiny, fine cut is located on the squamous of the right temporal bone. This nick was made while cutting through the zygomatic arch. It measures 7 mm in length and is located slightly anterior and superior to the posterior portion of the zygomatic arch.

#### **44HE814-EU21-V19C (CB42)**

This autopsied calotte of a middle-aged male is comprised of portions of the frontal, parietals, and superior occipital squamous. The frontal, parietals, and occipital were evenly cut through horizontally. No facial or inferior cranial bones are associated. There is minor breakage of the diploe and inner-table along the cut edge. In particular, the cut margins of both parietals have chipped endocranial surfaces posterior to the coronal suture. Bilateral chipping resulted from using a prying tool to separate the superior vault near the coronal suture. The right parietal has small radiating fractures extending away from the cut. The cut in the frontal bone is even, but not completely through the endocranial surface; this edge was broken during separation. The occipital bone exhibits the same characteristics. The bone was not cut completely through, and there is inner table breakage in the middle of the occipital. The width of the cut (1.8 mm) can be measured on the occipital where the saw deviated from the main line of separation. The overall process suggests that caution was exercised not to cut completely through the bone.



The bones were not sawed through as one continuous cut. A cut was made and then the saw was repositioned and another cycle of cutting followed until complete separation had occurred. This autopsy procedure and symmetrical vault detachment have the appearance of having been performed by an experienced technician.

#### **44HE814-EU21-V21C (CB43)**

This autopsied, partial cranium represents a female of African ancestry. No mandible or facial bones are associated. The vault was recovered in eight pieces; six pieces were later rearticulated with one another. The left half of the frontal, left parietal (3 fragments), right parietal (2 fragments), right temporal, and left half of the occipital are present, but incomplete. Bone from above and below the dissection is represented and in fair condition. All bones present have been cut, with the exception of the right temporal and fragments of the occipital. The cuts incompletely circumscribe the calotte in an attempt to section the vault. The major cut on the right parietal is higher than the corresponding cut on the left parietal. The posterior parietals contain cut marks that extend medially into the bones, but terminate 35 mm left and 37 mm right of lambda. The cut on the right parietal is more than a centimeter higher than that on the left parietal. Several nicks are present on the parietals that are superior and inferior to the sawed margin. These cuts represent false starts and areas where the saw blade skipped from its main path.

The cuts are inconsistent with standard autopsy procedure. They were crudely made and left incomplete. The top of the cranium was not successfully removed. Although cranial autopsy was the apparent objective, the procedure was abandoned before completion. The right half of the frontal and the anterior right parietal are missing due to postmortem loss. The frontal shows recent breakage in the midsagittal plane. The distal right parietal fragment was broken postmortem, and at the time of autopsy would have remained attached to the superior portion of the calotte. A section of the left parietal inferior to the sawed margin, the right temporal, and an occipital fragment are also present. Their presence indicates that the vault was disposed of as a unit. The completion of the procedure was disrupted, and the cranium was discarded without examining the brain. The procedure reflects limited technical experience.

**44HE814-EU21-V22C (CB44)**

This autopsied cranial cap represents a female of African ancestry. No facial or inferior skull bones are associated. Portions of the frontal, parietals, and superior occipital are represented. Scalpel and saw cuts are present from the cranial autopsy. The frontal, parietals, and occipital were sawed through horizontally to remove the superior vault. Based on the orientations of striations made by the saw, the blade was repositioned at least nine times to complete the separation. The locations of the saw cuts are asymmetrical; cutting was done higher on the posterior right half of the vault than on the left side. The frontal bone was completely sawed through, except for the endocranial surface of the neural crest, which was broken during separation. The right parietal was sawed through above the squamousal suture without breakage except along the very posterior endocranial margin. An incomplete cut measuring 1.3 mm in width extends from the right parietal into the superior occipital squamous. The left parietal was incompletely sawed through with the blade passing through the superior portion of the squamousal suture. Endocranial breakage indicates that a wedge was used to pry off the superior portion of the vault. Cuts on the parietals are uneven, with the cut on the posterior left parietal located more inferiorly. Because of uneven sawing an oblique cut with breakage on the occipital approximately 27 mm long was required to join the main cuts on either side of the cranium. The technician or student performing the procedure had limited experience.

**44HE814-EU21-V24C (CB45)**

This partial autopsied vault of a male has no facial bones in association. The vault piece includes portions of the frontal, right parietal, and a small portion of the left parietal near bregma. The right half of the frontal and the right parietal have been sawed through horizontally, resulting in the superior portion of the skull being transversely sectioned in a manner consistent with an autopsy. The cut is smooth and even with only a tiny terminal snap located on the endocranial margin of the right parietal near the coronal suture. The right parietal was cut just below the superior portion of the squamousal suture. One continuous cut is present on the right parietal and frontal.

**44HE814-EU21-V26C (CB46)**

This left temporal and right parietal fragment represent the inferior portion of an autopsied cranium of a female aged 20 to 34 years. The superior squamous of the temporal was sawed through horizontally in a manner consistent with autopsy. The cut surface is smooth. The saw passed through the bone with the exception of one small endocranial terminal snap located at approximately the mid-point of the cut.

The right parietal is represented by a small posterior- inferior fragment near asterion along the lambdoidal and squamosal sutures. It has been sawed through completely and separated from the rest of the bone. This cut is also consistent with autopsy. The outer edge of the cut surface is smooth with some endocranial irregularity, which may indicate the use of a wedge to remove the vault cap.

**44HE814-EU21-M02C (CB47)**

This is a complete mandible of a male aged 40 to 59 years. Fine cuts are present on the anterior margin of the right ascending ramus and on the anterior margins of the left and right condyles. At least 19 small cuts were counted on the right ascending ramus and nine cuts are documented on the left side. The purpose was to separate the condyles and jaw from the cranium.

**44HE814-EU21-M05C (CB48)**

This is a partial mandible represented by the anterior and left horizontal ramus. Two fine cuts are present on the lingual surface of the left horizontal ramus. The cuts are consistent with knife or scalpel marks.

**44HE814-EU21-M09C (CB49)**

This is the right half of a mandible of a female aged 25 to 29 years. The mandible was sectioned through the mental symphysis. A terminal snap is present on the lingual margin of the cut. The left half is missing.

**44HE814-EU21-M10C (CB50)**

This is the right half of a mandible of a female aged 30 to 34 years. The mandible is small and gracile. It has been sectioned through the mental symphysis. The cut progressed anterior to posterior with a terminal break noted along the superior aspect of the lingual margin.