Osteological Examination of Burials from the Avery's Rest Site, 7S-G-57

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Introduction

This report was prepared in fulfillment of the Memorandum of Agreement (MOA) with the Delaware Historical and Cultural Affairs (DHCA) dated September 3, 2014 pertaining to the excavation and analysis of eleven burials excavated at the site of Avery's Rest from September 8 to 13, 2014. Two previous reports (Griffith 2015; Owsley et al. 2016) on the archaeology, field recovery and conservation of the remains have been submitted to the DHCA. This final report draws on data from these previous reports and includes additional lab analysis and chemical testing of the bones. These data will be part of a comprehensive and on-going temporal analysis of Colonial-period European and African skeletal remains from the mid-Atlantic region. Although few in number, the Avery's Rest skeletal series is well-preserved, and provides important information about late 17th - early 18th century European immigrant and Euro American-born settlers and African and African American enslaved individuals in the mid-Atlantic.

Background

Burials at Avery's Rest were first identified in 2012 during an ongoing archaeological investigation of the site by the Archaeological Society of Delaware, Inc. (ASD). Upon discovery, the DHCA was notified and requirements of the Delaware Unmarked Human remains law (7DE CODE Ch.54) were followed, including publication of Public Notices in Delaware newspapers calling for the identification of descendants of John and Sarah Avery, the first documented

occupants of the habitation site. Consultation with all interested parties determined that additional excavation by the ASD was warranted, and in 2012, 2013 and 2014, the boundaries of the burial area were delineated and eleven graves were identified (Figure 1).

In September 2014 a combined team of ASD members and Smithsonian personnel excavated the graves in accordance with the DHCA MOA outlining the process for burial excavation and subsequent analysis of the human remains. Under the supervision of Archaeologist Dan Griffith, members prepared the site by removing burial soil backfill to the level of the coffin nails and digging trenches in the sterile sub-soil adjacent to each grave, allowing easier access during excavation. Seven Smithsonian staff members and volunteers led by Doug Owsley joined the excavation, and the combined team exposed the skeletal remains. In situ measurements were recorded along with bone and burial observations, and photography of each grave (Appendix A). ASD team members assisted with the burial excavation and were tasked with mapping and documenting both the grave shafts and placement of coffin nails.

The burial area measured approximately 55 feet in length by 20 feet in width. Deliberate planning and organization of the eleven graves was noted by their separation into a northern set of three burials and a southern group of eight (Figure 2). Burials in the southern group were located first and are numbered one through eight. Burials in the northern group are designated nine through 11. Each group is further organized into eastern and western rows. Burials 9, 10 and possibly 11 appear to post-date an early structure in that area. Plow zone artifact

distributions show window glass in the area of the structure (Figure 3) and Burials 9, 10, and 11 contained window glass in the fill, although in the case of Burial 11, the glass was displaced by a groundhog burrow. No burials in the southern cluster had window glass in the grave fill.

Soil at the site is a combination of primarily sand, both tan and creamy white, some silt, and a little yellowish-orange clay. The distinctive mottled color of the grave fill allowed easy identification of the burial features (Figure 4). Drainage of the sandy soil resulted in excellent bone and artifact preservation. The wooden coffins had deteriorated, but nails were preserved and generally complete. Based on the pattern of nail placement, all burials except Burial 8 were in similarly constructed hexagonal coffins (Figure 5). The floor of Burial 8's hexagonal coffin was attached by hammering the nails upward through the floorboard, rather than through the sidewalls. Burial 8 also had a greater number of nails. The average number of nails per coffin is about 44, whereas Burial 8 had 72 (Table 1). More nails may have been necessary to support the weight of the body since stature estimated from femur length indicates that this man is the tallest individual in the series. However, this less efficient construction and excess of nails may also indicate a less experienced carpenter and/or a different time period for this burial. The nail count for Burial 6 is also high, but not significantly so. The nail count of Burial 11 is low, probably due to disturbance of the grave and skeleton by the animal burrow.

Copper alloy "shroud" pins were associated with seven of the eleven burials (Table 1). Some of the recovered pins were in poor condition, having broken into small pieces. It is

possible that an absence of pins in some burials is due to poor preservation since ten of the eleven skeletons had green, copper-oxide staining on cranial and postcranial bones. Burials with pins generally had one to two pins present. Burial 2, an infant, is the exception with sixteen pins recovered, nearly all from the head region (Figure 6). The only other burial artifacts recovered were two buttons found in the pelvic region of Burial 9.

The eight burials of the southern group are aligned east-west with the skulls to the west/northwest and the feet to the east/southeast. The long axes of Burials 1, 3, 4, 6, 8, and particularly 5, are north of east, while Burials 2 and 7 are strongly aligned east-west. Burials 1, 3, and 4 are parallel with their heads in a straight line (Figure 7). Their placement suggests burial within a short time frame, such that the locations of proceeding graves were known. Burials 5 and 7 show similar positioning of the skeletons (Figure 8). In the southern group, all burials are in the western row, with the exception of Burial 8.

The three burials in the northern group (Burials 9, 10 and 11) are separated spatially from the main cluster to the south, but are also aligned east-west, with the skulls to the west/northwest and the feet to the east/southeast. Head and body positioning of all three burials are similar.

Complete skeletons were recovered from ten of the eleven documented burial features. Excellent preservation was the norm, although Burial 11 had postmortem disturbance from a groundhog and several bones were displaced and missing. Ten of the eleven skeletons had

green, copper-oxide staining on crania and postcranial elements. Most green stains were located on crania. Six skeletons had green stains on postcranial bones, and on one of these (Burial 9) the stains were associated with cuprous metal buttons. Burial 10 had no copper-oxide stains. Based on the pattern of staining and associated artifacts, the remains from Burial 10 were likely not shrouded; Burial 9 has evidence of being clothed.

Skeletal Analysis

Following excavation, each skeleton was cleaned and conserved by Conservation interns and staff of the National Museum of Natural History (NMNH) (Appendix B). The remains were then inventoried and evaluated for age, sex, ancestry, and bone and dental pathology. Data collection procedures follow standard methods in skeletal biology and forensic anthropology (Buikstra and Ubelaker 1994); inventory and coding procedures are those specified by Owsley and Jantz (1989). In addition to postcranial measurements, three-dimensional metric coordinate data were collected using a 3D digitizer for crania that possessed the required anatomical landmarks. Bone density was measured through Dual Energy X-ray Absorptiometry (DXA) analysis using the adult femora. Visual documentation included radiography, computed tomography (CT), and photography. Ten skeletons were analyzed for stable carbon, nitrogen, and oxygen isotopes. All data were entered into the Human Skeleton Database of the NMNH. This relational Database includes nearly 20 data categories capturing information on bone and tooth inventories, pathology, and chemical testing for over 13,000 individuals (Barca 2014).

Demographic Composition

Total bone counts for major elements in the Avery's Rest series are presented in Tables 2 and 3. Eleven individuals with complete or nearly complete skeletons are represented (Table 4). Of the eleven sets of remains, one is an infant aged less than six months. Also present is a child aged 4.5 to 5.5 years, of indeterminate sex. All other skeletons represent adults, two females and seven males, ranging in age from 27 to 50-plus years. Three individuals are in the general category of young adult (15–34 years) and six are classified as older adults (35+ years).

Ancestry is based on craniometric analyses and mitochondrial DNA (mtDNA) extraction and analysis. Each measurable skull was classified against reference samples of White Americans and Europeans, Black Americans and Africans, and Native Americans. Following this metric classification system, seven crania show features strongly characteristic of Europeans (Caucasian) and two crania show features characteristic of Africans. The infant and child were not included in the craniometrics analysis.

Mitochondrial DNA Extraction and Analysis

Extraction and analysis of mtDNA was performed on all 11 skeletons. Raquel Fleskes, a doctoral candidate at the University of Pennsylvania, conducted the extraction and sequencing in 2016 in Dr. Graciela Cabana's Ancient DNA Laboratory at the University of Tennessee-Knoxville. Genomic DNA was successfully extracted from all individuals and the entire mtDNA

control region was sequenced. No exogamous contamination was identified. The bone samples showed excellent preservation and appear ideal for additional future genomic testing.

Findings from the mtDNA analysis are summarized in Table 5. The mitochondrial DNA (mtDNA) results support the craniometric assessment and additionally identify the child as having African ancestry (maternal) and the infant as having European ancestry.

Five distinct European haplogroups (W4al, T1, U5b2a1a, H24, and H1af) are represented in Burials 1 through 8, suggesting diversity in persons migrating to the Chesapeake area from Western Europe. The same H1af haplotype is detected in four individuals (two adult females, one adult male, and one infant: AR06, AR07, AR08, and AR02), suggesting all share a genetic, maternal relationship. Burial context and mtDNA findings suggest the four individuals were no more than three generations apart, i.e., parent, child, grandchild. Today, these haplogroups are differentially distributed in the modern population from the same region. Haplotypes T1 and U5b2a1a are common, but haplotypes W4al, H1af, and H24 occur at relatively low frequencies.

African mtDNA haplogroups were identified in the remaining three individuals, two adult males and one child, buried in the smaller cluster of graves: AR09 (L3e3), AR10 (L3), and AR11 (L0a1a2). The differences in African mtDNA haplotypes between the two adults and the child suggest these individuals originated from different maternal familial and/or geographic contexts. Previous genetic data suggest that early phases of the slave trade did not service direct routes to the Chesapeake from a single source population, but rather multiple areas

along the coast of Africa and the Caribbean before arriving in the Chesapeake. These mitochondrial haplogroups are found in present day western and central-southern Africans. Additional information on this genetic testing will be provided in Fleskes' doctoral dissertation.

Dentition

Teeth and alveolar sockets were examined for the presence of carious lesions, abscesses, and antemortem tooth loss. The degree of occlusal surface attrition and the presence of task activity wear (e.g., pipe stem facets) were also recorded. Table 6 summarizes the dental inventory and pathology of the adults (≥15 years). Carious lesions (Figure 9), ranging from small fissures to complete crown destruction, affected slightly less than a third of all represented teeth. Proportionately, maxillary premolars are most affected by carious lesions, whereas mandibular incisors and canines show no decay. Antemortem tooth loss (Figure 10) is relatively infrequent; only about 10% of observable tooth sockets show loss. Mandibular molars are most affected; represented maxillary incisor, canine, and premolar sockets have no antemortem tooth loss. Alveolar abscesses (Figures 9 & 10), visually or radiographically identified as draining sinuses or apical pocketing in the alveolar bone at the tooth root tip (periapical abscess), or less frequently, as deep cupping around a tooth root (periodontal abscess), were noted in about 19% of the represented sockets. Slightly more than half of maxillary molar sockets show abscessing, followed by maxillary premolars, which have slightly

less than half of their sockets affected. Dental abscesses do not affect mandibular incisor and canine sockets.

Examined by age (Table 7), younger adults have a higher proportion of carious lesions and alveolar abscesses, compared to the older adults. However, older adults had more antemortem tooth loss. Sample size is small in regards to comparisons of dental pathology by age and especially by sex; only two females are represented versus seven males, and both females are older adults. A comparison of older adult female and male dental disease shows female teeth and sockets were proportionately more affected by carious lesions, antemortem tooth loss and abscessing. These statistics will be more robust and meaningful when combined with other time-matched site samples from the Chesapeake, such as Patuxent Point and Historic St. Mary's City in Maryland.

Tooth wear is greatest in the older adults. The oldest individual in this series, a female age 50-plus years (Burial 6), has extensive antemortem tooth loss and marked wear from occlusion of the few remaining teeth. Distinctive pipe stem wear facets (Figure 11) are present in the seven males (Burials 1, 3, 4, 5, 8, 9, and 10). All men, but one (Burial 8) had at least two facets, most had both left and right side dentitions affected. One individual (Burial 10) had patterned pipe stem wear evident in four distinct locations, two on the left side dentition and two on the right side. In all of the men, pipes were clenched between the teeth with preference for the left side. Dark stains from tobacco were also observed on the teeth of several males.

Pathology

The bones from Avery's Rest were examined for the presence of lytic lesions, abnormal subperiosteal bone formation caused by periostitis, osteomyelitis, arthritic changes, evidence of muscle pulls and tears (enthesopathies), anomalies, markers of anemic conditions and nutritional status (i.e., cribra orbitalia, porotic hyperostosis, and osteopenia), and traumatic injuries (antemortem and perimortem). Relatively few pathological conditions are noted, with most characteristic of age and activity-related degenerative changes.

New bone formation due to subperiosteal inflammation is present on the bones of four individuals. Burial 3 has minor abnormal bone formation on the shaft of the right ulna near the insertion for the supinator muscle. Mild periostitis is also noted on the middle thirds of the left and right tibiae of Burial 8. The left fibula of Burial 9 and the right fibula of Burial 10 show slight abnormal bone deposition on their shafts. The appearance of these bones suggests a response to mild inflammation.

Burial 3 has possible bone loss in the form of lytic change in the cranium and scapula. A small, shallow, possibly remodeled lytic lesion measuring roughly 8 mm in diameter is located approximately 20 mm anterior to the coronal suture on the frontal bone of the cranium. This defect was originally identified as a healed depression fracture due to its location superior to a larger shallow depression scored as a fracture near the right orbit. However, further examination identifies the smaller lesion as more consistent with a stellate scar in the outer

table. Areas of postmortem erosion on the right side of the cranium obscure clear interpretation of the entire cranial vault, but other areas of bone loss are believed to represent additional lytic activity, some of which may have penetrated the inner table.

The left scapula of Burial 3 has a possible area of lytic response on the superior, mid-lateral spine. This erosive lesion is surrounded by increased microporosity, but its overall expression has also been altered by postmortem erosion. The appearance suggests a lytic cavitation measuring at least 10 mm medial-lateral by 7 mm superior-inferior, with a depth of approximately 3 mm.

Arthritic changes, characterized by bony lipping, porosity of a joint surface or margin, or both, were recorded in the bones of all nine adults. Most changes were slight, with older adults displaying the greatest degeneration. Burials 1, 6, 9 and 10 had the most advanced vertebral degenerative changes, with Burials 6 and 10 being the most severe. Schmorl's depressions (Figure 12) were also tabulated as a means of evaluating the severity of spinal column strain and trauma. Schmorl's depressions in intervertebral endplates occur when axial loading and compression of the spine results in herniation of the nucleus pulposus of the vertebral disk into the centrum (Resnick and Niwayama 1978). Schmorl's depressions were noted in the vertebrae of all adults. The seven males typically had multiple vertebrae with depressions. The two females were less affected; fewer vertebrae have depressions and the condition was slighter in severity. Burials 1, 4, and 8 had the most number of vertebrae affected.

Enthesophyte formations are present on seven bones of five individuals. In all cases, the expression was slight in severity.

One individual (Burial 3) has cranial lesions characteristic of cribra orbitalia, a probable indicator of anemia. The condition is expressed by slight porosity in the roof of the left eye orbit. Ectocranial porosis is also noted in the posterior parietals of the cranium.

The left and right tibia of Burial 10 show trace bowing of the shafts. This may be a marker of poorer childhood nutrition for this individual. In general, however, the burial series has relatively good bone density.

Trauma is present in three individuals. Burial 3 has a blunt, oval-shaped, healed depression fracture in the frontal bone. The defect measures 22 mm by 15 mm and overlies the inferior temporal line just above the right orbital margin. The shallow defect did not penetrate the inner table. Healed trauma is also noted for Burial 8. This individual's left tibia has an incomplete healed fracture in the surface of the distal joint.

Burial 10 has perimortem fracturing of the frontal, right maxilla and right zygomatic bones (Figure 13). These unhealed breaks to the right eye orbit and face are characteristic of a "tripod" fracture of the right zygomatic bone and usually occur from an impact during a fall or an assault (Galloway and Wedel 2013:148).

DXA Scan Results

DXA analysis of femora from each of the Avery's Rest adults was conducted at the Washington Hospital Center. The DXA scan was developed for clinical use and is currently the most widely used method for measuring bone density in patients at risk for osteoporosis. It has recently been used in a number of studies involving archaeological collections (Lees et al. 1993; Ekenman et al. 1995; Mays et al. 1998; Poulson et al. 2001; González-Reimers et al. 2002), as it offers a standardized, non-destructive, quantitative method of measuring bone mineral density. Testing was done through a grant from the Institute for Technology in Health Care for research on bone density in 17th and 18th century European American and African American skeletons. These data help assess whether under-nutrition was common during the historic period and whether osteopenia, or low bone mass, was present in Colonial period young adults.

The scanner directs x-ray energy from two different sources toward the bone, at which time the mineral density weakens or prolongs the transmission of the x-ray energy through a filter onto a photon counter in a degree related to the amount of bone mass present. The greater the bone mineral density, the greater the signal picked up by the counter. A DXA scan report compares the bone mineral density values with those of a normal young adult (T score).

Scanner results of femora from Avery's Rest adults are presented in T-scores (Table 8). Individuals with T-scores at or above -1.0 have normal bone density, while T-scores between -1.0 and -2.5 are osteopenic, indicating an early phase of bone mineral density loss and a

precursor to osteoporosis. Scores less than -2.5 indicate osteoporosis. None of the remains is osteopenic and all femoral neck densities fall within the normal or above-normal range.

Stable Carbon and Nitrogen Isotopes

The use of isotope analyses in studying diet has been well-documented (Vogel and van der Merwe 1977; van der Merwe and Vogel 1978; Ambrose and DeNiro 1986; Keegan 1989; Buikstra and Milner 1991; Tieszen et al. 1992). The method is based on differences in the isotopic signals of foods and the transmission of these differences to the tissues of the consumer (DeNiro and Epstein 1978). Dietary patterns are distinguishable by measuring these differences, with the results presented as $\delta^{13}C$ (delta carbon) and $\delta^{15}N$ (delta nitrogen) values in parts per mil (‰).

Previous research has shown a difference in the carbon isotope signatures of historic period Americans versus western Europeans, with the former having more positive values (Ubelaker and Owsley 2003). This difference has been traced to greater dependence on corn (maize) in the New World, versus cereal grains such as wheat, barley, and rye in Europe. The distinction between these plant groups is a biochemical difference in photosynthesis (i.e., C3 versus C4 photosynthesis pathways) that transfers through the food chain, resulting in a bone isotope signal that characterizes the place of origin. In the colonial Chesapeake a more positive isotopic signature generally indicates origin or long-standing residence in the Americas. Values that are more negative are characteristic of western European diets.

This study tested the collagen and apatite components of bone for stable carbon isotope values. Stable nitrogen and oxygen values were also analyzed. Isotope values in collagen (organic portion) are routed to bone primarily from dietary protein, and consequently, $\delta^{13}C_{collagen}$ and $\delta^{15}N_{collagen}$ values mainly reflect this source (Ambrose and Norr 1993; Tieszen and Fagre 1993; Jim et al. 2004; Fernandes et al. 2012). Isotope values in bone bioapatite (inorganic portion) derive chiefly from dietary carbohydrates and fats, and to a lesser extent, proteins. As such, $\delta^{13}C_{apatite}$ provides a different representation of the entire diet. The difference between the $\delta^{13}C$ value of the apatite and the collagen ($\Delta^{13}C_{ap\text{-}col}$) serves as a secondary indicator of protein input and grain source use (Balasse et al. 1999; Hedges 2003; White 2005). Tissues of consumers are enriched in $\delta^{15}N$ by approximately 2 to 4‰ relative to the nitrogen values of their foods (DeNiro and Epstein 1981; Minagawa and Wada 1984; Schoeninger and DeNiro 1984; Schoeninger 1985). As a consequence, human consumers and marine and terrestrial animals ecologically higher in food chains have higher $\delta^{15}N_{collagen}$ values, reflecting this trophic level increase. Oxygen isotopes from bone carbonates were analyzed to determine possible region of origin since the oxygen isotope values of drinking water are retained in the bones and teeth of the consumer.

Table 9 presents results for the nine adults and one child from Avery's Rest. The infant was not tested. The resulting mean $\delta^{13}C_{collagen}$ and $\delta^{13}C_{apatite}$ values are consistent with an American diet comprised of both C3 and C4 resources. The $\delta^{15}N_{collagen}$ mean value is consistent with a diet that includes a fair amount of animal protein.

Interesting differences are noted between the two groupings of burials in the cemetery. The burials representing individuals with European ancestry have more negative mean $\delta^{13}C_{collagen}$ and $\delta^{13}C_{apatite}$ values of -14.9‰ and -9.8‰, respectively, while the individuals with African ancestry have more positive mean $\delta^{13}C_{collagen}$ and $\delta^{13}C_{apatite}$ values of -11‰ and -7.4‰, respectively. These differences are also reflected in the mean $\Delta^{13}C_{ap\text{-}col}$ values for these group. Individuals of European ancestry have a mean $\Delta^{13}C_{ap\text{-}col}$ value of 5.9 and while individuals of African ancestry show a mean $\Delta^{13}C_{ap\text{-}col}$ value of 3.53. Theoretically, this suggests that the individuals with African ancestry consumed a different diet comprised of more maize and animals foddered on maize than the individuals of European ancestry, whose values reflect greater dependence on C3 plants, and animals consuming these plants. Grains such as wheat and rye would likely have contributed to their more negative isotope values. Greater consumption of wild game may also have been a factor in the diet of individuals with European ancestry. Another possibility, to be resolved using isotope values from other Chesapeake and African remains (e.g., the Elmina archaeological site in Ghana) is whether the values for Burials 9, 10, and 11 reflect African or Caribbean origins. Differences in the $\delta^{15}N_{collagen}$ mean values between these groups is less than 1‰. The difference reflects lower protein consumption for individuals with African ancestry, or the consumption of a different protein source. The individual with the highest $\delta^{15}N_{collagen}$ value is the Burial 5 male; the individual with the lowest $\delta^{15}N_{collagen}$ value (Burial 10) is the male with perimortem facial trauma.

Dietary differences between females and males are not evaluated due to the small number of females in the series. However, the two represented females have consistent isotope values for both carbon and nitrogen, while greater variation is noted for males.

None of the values suggest the European adults were recent immigrants. Rather, they reflect isotope values of individuals born and raised in the mid-Atlantic region, or long-term residence in the mid-Atlantic. Further evaluation of the series, including interpretation of the oxygen isotope data, may yield greater insight into the origins of these individuals.

Isolated teeth

In addition to the eleven discreet burials, isolated teeth were recovered from various locations throughout the Avery's Rest site. As previously reported (Owsley et al. 2016), human teeth are occasionally found at archaeological sites due to postmortem disturbance of earlier burials, natural exfoliation of deciduous (baby) teeth, teeth lost in life due to abscessing or periodontal disease, or intentional extraction and discard of diseased teeth. Avery's Rest has yielded one naturally shed deciduous tooth (Figure 14) and two permanent molars that show root damage from extraction (Figures 15-17).

Further Considerations

Expanded genetic testing focusing on autosomal and Y-chromosome markers will help clarify the parentage of the infant (AR02) African child (AR11) and potential further familial relationships of the adults. There is a possibility that the infant and child are related to one of

the adult males found at the site and some adults may also have paternal relationships to one another.

Historical court documents record the original ownership and settlement of Avery's Rest by mariner and planter, John Avery, who first occupied the site in the 1670s with wife, Sarah Browne Avery and their children (Lukezic 2013). After John Avery's death in 1682 at age 50, his wife remarries (justice of the peace Robert Clifton), and eldest daughter, Mary and her husband Hercules Shepherd, assume ownership of the property. Various members of John Avery's family maintain ownership throughout the following decades. In addition to Avery family members, tenet farmers, indentured servants and slaves are known to have lived at the site.

If the H1af haplotype represents the maternal genetic signature of the Avery's Rest extended family, the two females with the H1af haplotype (AR06, AR07) could represent John Avery's wife, Sarah Browne Avery Clifton, her daughters, or granddaughters. John Avery and Sarah had four daughters (Mary, Jemima, Elizabeth, and Sarah), and one son (John), who died as a minor. Elizabeth is also presumed to have died young, as she disappears from the record after 1682. Mary and Jemima Avery both married and lived at Avery's Rest after their father died in 1682. Mary and first husband, Hercules Shepheard had four children, a boy John who dies as an infant, and three daughters (Comfort, Sarah, and Alice). After Hercules dies in 1694, Mary marries Richard Hinman in 1698 and has two sons, John and Richard. In 1707 Mary gives land from her father's estate to son John Hinman. Jemima marries John Morgan in 1697; they

have no reported children. In 1698 they sue for a portion of her father's estate and live at Avery's Rest until 1715, when they sell their portion of the property and leave the area. Daughter Sarah marries John Kipshaven in 1690 and they have a daughter named Sarah, who later marries Henry Draper. In 1698 Sarah Avery Kipshaven receives 200 acres of her father's estate. This land is given to daughter Sarah Draper and her husband Henry. They sell the property in 1720 to Richard Hinman, the probable son of Mary and second husband Richard Hinman.

Three individuals are believed to be buried at the Avery Estate: John Avery (senior), Hercules Shepheard (first husband of John Avery's daughter Mary), and John Shepheard (infant son of Hercules Sheppard and Mary Avery; John Avery's grandson). If it is assumed that the H1af haplotype represents the maternal genetic signature of the Avery's Rest extended family, the infant (AR02) with this signature could be John Shepheard. This does not assist in narrowing down the identification of the females, however, since a maternal relationship can still be extended to the infant's mother, grandmother, aunts, or even cousins or sisters. The adult male (AR08) would be excluded as either Hercules Shepheard or John Avery since he would need to be related to the infant through the maternal line, and thus would be identified as a brother or cousin. Possibilities include John and Richard Hinman, half-brother to infant John Shepheard and sons of Mary Avery Shepheard Hinman (Table 10).

Historic documentation and burial context do not provide conclusive proof that the eight individuals with European ancestry are members of the Avery family structure. Further extensive genealogical research, (in progress at the National Museum of Natural History), analysis of the nuclear DNA from the eight burials with the European haplotype, and genetic comparison to living descendants, may eventually make it possible to establish the identities of these individuals.

Grants requesting support for nuclear DNA, mitogenome, and Y-chromosome sequencing are currently in preparation. Results from these tests, in conjunction with the known mtDNA haplogroups will help confirm whether or not the eight European individuals are part of the Avery family. Research in this and other areas will continue for Avery's Rest.

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51) Skull of Burial 9 (7SG57-AVERYSREST-09). (Smithsonian Institution)

52) Occlusal views of the maxillary (*left*) and mandibular (*right*) dentition (7SG57-AVERYSREST-09). (Smithsonian Institution)

53) Skull of Burial 10 (7SG57-AVERYSREST-10). (Smithsonian Institution)

54) Occlusal views of the maxillary (*upper left*) and mandibular (*upper right*) dentition, with pipe stem wear facets noted in the right (*lower left*) and left (*lower right*) sides of the mouth (7SG57-AVERYSREST-10). (Smithsonian Institution)

55) The articular facets of the fifth lumbar vertebra and first sacral unit show erosion, porosity and eburnation (contact polishing) from lower back wear and tear (7SG57-AVERYSREST-10). (Smithsonian Institution)

56) Left and right lateral-oblique X-rays of the maxillary dentition of Burial 2 show development consistent with a child approximately 4.5 to 5.5 years of age (7SG57-AVERYSREST-11). (Smithsonian Institution)

57) No lines of arrested growth are visible in posterior-anterior X-rays of the long bones (7SG57-AVERYSREST-11). (Smithsonian Institution)

Table 1. Coffin nails and copper alloy pins associated with each burial at Avery's Rest (7SG-57)

Burial #	Mapped coffin nails	Coffin nails from sifter[1]	Total nails[2]	Copper alloy pins
1	39	15	54	1
2	40	0	40	16
3	38	2	40	1
4	45	6	51	0
5	35	4	39	0
6	55	5	60	2
7	35	4	39	2
8	61	11	72	2
9	45	2	47	0
10	43	2	45	0
11[3]	15	2	17	1[4]

[1] Coffin nails from the sifter had been removed during the excavation prior to mapping. Only nails recovered between the coffin lid and base were counted. Nails were also recovered in shaft fill, but these are not clearly associated with coffin construction and are not included in counts.

[2]Total coffin nails includes all nails used in coffin construction, including side walls, head and foot boards, bases and lids. Only nails with heads were counted, as a number of nail shafts and points could not be assigned to individual nails.

[3]Burial 11 was heavily disturbed by an animal burrow. Many nails were displaced in burrow fill and adjacent plow zone test units.

[4]The copper alloy pin found in Burial 11 was in the animal burrow running through the burial. The pin may be from overlying soils.

Table 2. Avery's Rest Cranial and Mandibular Bone Counts

	Frontal		Parietal				Occipital		Temporal				Zygomatic				Maxilla				Mandible	
			Left		Right				Left		Right		Left		Right		Left		Right			
	C	P	C	P	C	P	C	P	C	P	C	P	C	P	C	P	C	P	C	P	C	P
Number	11	0	11	0	10	1	10	0	10	1	9	2	10	1	10	0	10	0	10	0	10	0
Total	**11**		**11**		**11**		**10**		**11**		**11**		**11**		**10**		**10**		**10**		**10**	

C = complete; P = partial.

Table 3. Avery's Rest Postcranial Bone Counts

	Manubrium		Sternum		Scapula				Clavicle			
					Left		Right		Left		Right	
	Complete	Partial	Complete	Partial	Complete	Partial	Complete	Partial	Complete	Partial	Complete	Partial
Number	5	4	5	2	5	6	1	9	10	1	10	0
Total	9		7		11		10		11		10	

	Humerus				Radius				Ulna			
	Left		Right		Left		Right		Left		Right	
	Complete	Partial	Complete	Partial	Complete	Partial	Complete	Partial	Complete	Partial	Complete	Partial
Number	11	0	10	1	9	1	9	0	9	1	9	0
Total	11		11		10		9		10		9	

	Innominate				Acetabulum				Sacrum	
	Left		Right		Left		Right			
	Complete	Partial	Complete	Partial	Complete	Partial	Complete	Partial	Complete	Partial
Number	6	5	7	4	8	3	8	2	6	4
Total	11		11		11		10		10	

	Femur				Tibia				Fibula			
	Left		Right		Left		Right		Left		Right	
	Complete	Partial	Complete	Partial	Complete	Partial	Complete	Partial	Complete	Partial	Complete	Partial
Number	10	1	11	0	10	1	10	1	9	1	9	1
Total	11		11		11		11		10		10	

	Patella				Talus				Calcaneus			
	Left		Right		Left		Right		Left		Right	
	Complete	Partial	Complete	Partial	Complete	Partial	Complete	Partial	Complete	Partial	Complete	Partial
Number	9	0	8	1	7	1	8	1	4	4	7	2
Total	9		9		8		9		8		9	

Table 4. Summary of Skeletal Remains from Avery's Rest

Burial No.	Sex	Age	Ancestry	Preservation	Anomalies and/or Pathological Conditions
1	Male	30-40	European	Good / Green staining	Minor spinal degeneration, Schmorl's depressions in 5th thoracic through 3rd lumbar vertebrae
2	Indeterminate	0-.5	European	Good / Green staining	-
3	Male	35-45	European	Good / Green staining	Healed depression fracture in frontal, lytic lesions in frontal and left scapula, right ulna bone formation and loss, degenerative changes in spine, Schmorl's depressions in thoracic vertebrae 6-10
4	Male	38-48	European	Good / Green staining	Spinal degeneration, Schmorl's depressions in thoracic vertebra 4 through 4th lumber vertebra, widespread degenerative joint disease
5	Male	35-45	European	Good / Green staining	TMJ erosion and porosity, spinal degeneration, Schmorl's depressions in thoracic vertebrae 11 and 12 and lumbar vertebrae 2 through 4
6	Female	50-60	European	Good / Green staining	Enthesophyte on left radius and right calcaneus, porosity on distal joint of right ulna, patellae with marginal lipping, spinal degeneration, small Schmorl's depressions in the 7th through 9th thoracic vertebrae
7	Female	35-45	European	Good / Green staining	Schmorl's depression in thoracic vertebra 8, trace degenerative joint disease
8	Male	30-40	European	Good / Green staining	Spinal degeneration, Schmorl's depressions in the 5th thoracic through 1st lumbar vertebrae
9	Male	32-42	African	Good / Green staining	Spinal degeneration, Schmorl's depression in the 5th thoracic and 4th lumbar vertebrae, left fibula periostitis
10	Male	27-37	African	Good	Tripod fracture involving the right frontal, maxilla and temporal, tibiae and right fibula periostitis, bowing of tibiae, spinal degeneration, Schmorl's depression in 12th thoracic, enthesophytes on the patellae
11	Indeterminate	4.5-5.5	African	Good	-

Table 5. Mitochondrial DNA (mtDNA) Results

ID	MTDNA HAPLOGROUP	SEX	AGE	ANCESTRY
AR01	T1	Male	Adult	European
AR02	H1af	Indeterminate	Infant	European
AR03	W4a1	Male	Adult	European
AR04	U5b2a1a	Male	Adult	European
AR05	H24	Male	Adult	European
AR06	H1af	Female	Adult	European
AR07	H1af	Female	Adult	European
AR08	H1af	Male	Adult	European
AR09	L3e3	Male	Adult	African
AR10	L0a1a2	Male	Adult	African
AR11	L3	Indeterminate	Child	African

Table 6. Decayed, Missing, and Abscessed Teeth in Avery's Rest Individuals (≥15 years) by Tooth Type.

TEETH & ARCADE	NO. TEETH	NO. CARIOUS TEETH	CARIOUS (%)	NO. SOCKETS	ANTEMORTEM LOSS	ANTEMORTEM LOSS (%)	ALVEOLAR ABSCESSES	ALVEOLAR ABSCESSES (%)
Incisors								
Maxillae	31	7	22.58	32	0	0	2	6.25
Mandible	28	0	0.00	32	4	12.50	0	0.00
Canines								
Maxillae	17	4	23.53	16	0	0.00	2	12.50
Mandible	14	0	0.00	16	2	12.50	0	0.00
Premolars								
Maxillae	31	17	54.84	32	0	0.00	15	46.88
Mandible	30	9	30.00	32	2	6.25	1	3.13
Molars								
Maxillae	43	19	44.19	47	5	10.64	25	53.19
Mandible	32	11	34.38	46	14	30.43	2	4.35
Total	226	67	29.65	253	27	10.67	47	18.58

Table 7. Decayed, Missing, and Abscessed Teeth in Avery's Rest by Age and Sex.

CARIOUS LESIONS	Male			Female			Total		
Age	No. Teeth	No. Carious	%	No. Teeth	No. Carious	%	No. Teeth	No. Carious	%
15–34	103	38	36.9	0	0	0.0	103	38	36.9
35+	93	14	15.1	30	15	50.0	123	29	23.6
Total	196	52	26.5	30	15	50.0	226	67	29.6

ANTEMORTEM LOSS	Male			Female			Total		
Age	No. Sockets	No. Lost Antemortem	%	No. Sockets	No. Lost Antemortem	%	No. Sockets	No. Lost Antemortem	%
15–34	112	8	7.1	0	0	0.0	112	8	7.14
35+	96	2	2.1	45	17	37.8	141	19	13.5
Total	208	10	4.8	45	17	37.8	253	27	10.7

ALVEOLAR ABSCESSES	Male			Female			Total		
Age	No. Sockets	No. Alveolar Abscess	%	No. Sockets	No. Alveolar Abscess	%	No. Sockets	No. Alveolar Abscess	%
15–34	112	24	21.4	0	0	0	112	24	21.4
35+	96	15	15.6	45	8	17.8	141	23	16.3
Total	208	39	18.8	45	8	17.8	253	47	18.6

Table 8. DXA Results for Femoral Necks from Avery's Rest.

Burial ID Sex and Age	Femur	BMD* (g/cm^2)	T-score	Femur Maximum Length	Stature***	Age-adjusted Stature
7SG57-AVERYSREST-01 Male 30–40	Right	1.639	4.4	463**	172.94 ±3.94cm	172.64 ±3.94cm
7SG57-AVERYSREST-03 Male 35–45	Left	1.327	2.0	431	165.52 ±3.94cm	164.92 ±3.94cm
7SG57-AVERYSREST-04 Male 38–48	Right	1.339	2.1	431	165.52 ±3.94cm	164.74 ±3.94cm
7SG57-AVERYSREST-05 Male 35–45	Left	1.656	4.5	445**	168.77 ±3.94cm	168.17 ±3.94cm
7SG57-AVERYSREST-06 Female 50–60	Left	1.215	1.3	408	154.88 ±3.72cm	153.38 ±3.72cm
7SG57-AVERYSREST-07 Female 35–45	Left	1.433	2.8	448	164.76 ±3.72cm	164.16 ±3.72cm
7SG57-AVERYSREST-08 Male 30–40	Left	1.265	1.5	503	182.23 ±3.94cm	181.93 ±3.94cm
7SG57-AVERYSREST-09 Male 32–42	Right	1.43	2.8	456	167.98 ±3.91cm	167.86 ±3.91cm
7SG57-AVERYSREST-10 Male 27–37	Left	1.24	1.3	450	166.72 ±3.91cm	166.60 ±3.91cm

*Bone mineral density of femur neck.

**measurement only available for the femur that was not scanned.

***Stature estimation calculated using formulae given by Trotter and Gleser (1952, 1958). Stature for individuals estimated to be older than 30 years was adjusted by subtracting .06(age in years -30) cm. Age is based on the mid-point of the estimated age range.

Table 9. Avery's Rest Stable Carbon, Nitrogen and Oxygen Isotope Values.

BURIAL NO.	COLLAGEN YIELD (%)	$\delta^{13}C_{COLLAGEN}$ ‰[a]	$\delta^{15}N_{COLLAGEN}$ ‰[a]	WT % N	WT % C	ATOMIC C/N[b]	$\delta^{13}C_{APATITE}$ ‰	$\Delta^{13}C_{AP\text{-}COL}$	$\delta^{18}O_{PDB}$
7SG57-AVERYSREST-01	12.6	-12.8	9.3	15.2	41.1	3.2	-7.9	4.9	-4.6
7SG57-AVERYSREST-03	20.1	-13.7	9.5	15.8	42.8	3.2	-9.6	4.1	-4.5
7SG57-AVERYSREST-04	23.4	-16.2	9.7	16.1	43.7	3.2	-9.5	6.6	-5.0
7SG57-AVERYSREST-05	23.5	-16.5	11.9	16.2	44.3	3.2	-13.3	3.2	-4.9
7SG57-AVERYSREST-06	10.9	-14.8	11.4	15.7	42.6	3.2	-8.5	6.3	-6.1
7SG57-AVERYSREST-07	25.7	-14.2	11.0	15.5	41.9	3.2	-9.4	4.8	-5.4
7SG57-AVERYSREST-08	7.1	-16.0	9.3	13.9	38.2	3.2	-10.3	5.7	-5.0
7SG57-AVERYSREST-09	4.7	-10.4	10.3	12.6	35.6	3.3	-7.5	2.9	-5.5
7SG57-AVERYSREST-10	3.9	-11.5	8.8	13.0	36.6	3.3	-7.3	4.2	-5.6
7SG57-AVERYSREST-11	14.0	-10.9	9.4	16.4	44.5	3.2	-7.5	3.5	-6.1
mean		**-13.7**	**10.1**				**-9.1**	**4.6**	**-5.3**
sd		**2.2**	**1.0**				**1.8**	**1.3**	**0.6**
max		**-10.4**	**11.9**				**-7.3**	**6.6**	**-4.5**
min		**-16.5**	**8.8**				**-13.3**	**2.9**	**-6.1**

[a]Delta values are expressed as $\delta R = [(R_{sample}-R_{reference})/R_{reference}]*1000$, where R is the ratio of interest (i.e., $^{13}C/^{12}C$ or $^{15}N/^{14}N$) relative to the reference standards of V-PDB and atmospheric air for C and N, respectively.

[b] C/N ratios in the range of 3.2–3.3 and percent carbon and nitrogen in the ranges of 35.6–44.5 and 12.6–16.4, respectively, reflect bone collagen unaltered by significant diagenesis (DeNiro 1985; McNulty et al. 2002).

Table 10. Possible Avery Family Identifications Based on the mtDNA Results.

ID	MTDNA HAPLOGROUP	SEX	AGE	ANCESTRY	POSSIBLE ID
AR01	T1	Male	Adult	European	Hercules Sheppard / John Avery
AR02	H1af	Indeterminate	Infant	European	John Sheppard
AR03	W4a1	Male	Adult	European	Hercules Sheppard / John Avery
AR04	U5b2a1a	Male	Adult	European	Hercules Sheppard / John Avery
AR05	H24	Male	Adult	European	Hercules Sheppard / John Avery
AR06	H1af	Female	Adult	European	Sarah Avery, or daughter or granddaughter of John and Sarah Avery
AR07	H1af	Female	Adult	European	Daughter or granddaughter of John and Sarah Avery
AR08	H1af	Male	Adult	European	Son of Mary Avery
AR09	L3e3	Male	Adult	African	
AR10	L0a1a2	Male	Adult	African	
AR11	L3	Indeterminate	Child	African	

APPENDIX A

Archaeological Excavation Notes of Historic-Period Human Skeletal Remains from Avery's Rest (7S-G-57), Delaware

(from Owsley et al 2016)

Burial 1

Excavators: Jackie Cuyler, Terri Lottmann, and Kari Bruwelheide

In September 2012, Dan Griffith and his crew exposed and photographed Burial 1 to assess bone preservation and the cultural and historic context of the cemetery. From the base of the plow zone, the approximate depth to the coffin lid nail pattern was 28'' and the final depth of the grave was 37''. The skeletal remains were well preserved. Examination by the University of Delaware's physical anthropologist determined that the remains are those of an adult male of European ancestry.

The bones of this male of European ancestry are in good condition. The skeleton is in an extended, supine position with the bones of the arms, pelvis, and legs undisturbed and in anatomical position (Figure 18). However, the ribs and several vertebrae are jumbled within the thorax, and the right first metacarpal and first proximal phalanx were found in fill dirt above the burial. The patellae are out of place. The right patella is between the distal femora. The left patella had shifted superiorly and is located about five centimeters above and north of the mid left femur.

The cranium rests on its mid-posterior right side with the face directed toward the southeast and slightly up. There appears to have been ample room at the head end of the coffin, but based on the position of the foot bones, the feet were against the coffin's footboard. The upper arms are closely drawn in against the

sides of the body and the elbows are slightly flexed. The forearms are pronated and the hands are palm-down over the lower abdomen.

The knees and ankles are together, with the knees closer together than the ankles. Based on the nail pattern, this coffin was narrow and allowed little room for spacing between the legs and feet. As stated, the feet were originally positioned with the bottoms of the feet against the foot board of the coffin. With decomposition, the toe and foot bones collapsed downward. The right calcaneus has settled onto its right side; the left calcaneus is directed up and toward the left. The heels are still in place but the phalanges and metatarsals have fallen medially and downward. A few foot phalanges are out of place and distributed above the lower leg bones.

A soil sample was taken from the lower abdomen above the sacrum.

Burial 2

Excavator: Kari Bruwelheide

This burial contains the skeleton of an infant aged less than one year (Figure 19). Sex and ancestry are indeterminate based on the skeletal remains, but given the location of the burial in this southern cluster of graves, this infant likely has European ancestry. The grave is relatively shallow and overlies the left foot end of Burial 1. Its presence did not impact Burial 1's skeletal remains. From the base of the plow zone, the approximate depth to the coffin lid nail pattern is 12'' and the depth of the grave is 18''. The alignment of Burial 2 is almost due east-west with the head to the west. Based on the location and shallow context of the grave, Burial 2 is more recent than Burial 1.

Numerous shroud pins are recorded around the skull of the infant and one is present between the knees. Associated copper-oxide stains are evident behind bregma and along the coronal suture. Staining from the pins is also present on the lower right mid-parietal, occipital squamous, right mastoid process, and left

temporal. While there must have been a pinned covering over the head, the body was not tightly wrapped. This infant body is lying supine, with relaxed limb positioning. The cranium has rolled toward the left side and is resting on its left base. The right parietal and temporal are crushed inward from overlying soil. The frontal bone has separated along the metopic suture; the right half of the frontal collapsed inward, but not to the level of the right parietal. The left half of the frontal and left parietal and midface are articulated. As the cranium collapsed, the right malar shifted medially over the nasal opening and the maxillae shifted downward toward the left. The mandible remained in approximate anatomical position below the right maxilla.

The postcranial skeleton has semi-flexed elbows and pronated forearms. The left hand was placed on the lower abdomen and the phalanges have fallen onto the anterior sacrum. The right hand bones are alongside the right hip. Although a coffin burial, the horizontal disposition of the skeleton varies, with the lower legs slightly higher at the knees and the left arm slightly higher than the right elbow. Both ilia are lying flat on what was once the floor of the coffin. The femora diaphyses extend straight down with wide spacing between the knees. The distal thirds of the humeri and femora are degraded and not recoverable. The femora are measured in situ. Tibia preservation is poor. The proximal and distal ends of the right tibia are degraded. The left tibia is even less intact, and is represented by the middle diaphysis only. The lower legs appear to be directed toward the north. Specifically, the right tibia has rolled onto its lateral surface and is directed medially. The left tibia also shows diagonal placement with the distal end shifted laterally. No foot bones are preserved.

A soil sample was taken from the lower abdomen. A fine white crystalline matrix was present between the ribs on the left side, and to a lesser degree on the right side. A small sample was collected for identification.

Burial 3

Excavators: Glen Mellin, Heidi Krofft, Dale Brown, and Tom Boyle

The grave shaft of Burial 3 is not as deep as those measured for Burials 1 and 4. From the base of the plow zone, the approximate depth to the coffin lid nail pattern is 24'' and the final depth of the grave is 33''. This individual is an adult aged 22 to 29 years, with features indicative of European ancestry. The skeleton (Figure 20) is supine with the cranium resting on its left side. The face is directed toward the north and very slightly up. The maxillae and mandible are widely spaced, with the mandible resting on its left side and the chin directed inferiorly.

The skeleton shows minor postmortem disturbance. The proximal and middle phalanges of the left hand are scattered on top of and along the medial side of the left femur. Also, the left foot bones are disturbed and out of place. The left first metatarsal is alongside the middle left fibula.

The shoulders are compressed. The elbows are widely separated and follow the contours of the hexagonal coffin walls. This slight transverse compression at the shoulders relates to the placement of the body within the coffin. The medial clavicles are touching one another with their shafts more vertically aligned. The elbows are slightly flexed. The left arm has postmortem disarticulation at the ulna and minor shifting of the radius and ulna toward the north sideboard. At the time of burial, the left forearm was slightly pronated with medial bending of the wrist such that the hand originally draped over the left proximal femur. The right distal ulna and radius have separated slightly with the distal radius settling onto the right anterior sacral ala. The distal ulna is located slightly inferior and lateral – essentially above the sacro-iliac joint. The right hand was prone on the lower abdomen. Right metacarpals and phalanges have settled onto the anterior sacrum.

The legs are extended with the long bones resting on their posterior surfaces. The left foot is disturbed and the bones are out of place. The right foot has settled into a flexed position. There was sufficient room in the foot end of the coffin for hyper-flexion of the feet.

A soil sample was taken from below the hands.

Burial 4

Excavators: Jim Mellin, Jill Showell, Dale Brown, Kari Bruwelheide, Kristen Pearlstein, and Katie Barca

From the base of the plow zone, the approximate depth to the coffin lid nail pattern was 30'' and the final depth of the grave was 39''.

This skeleton of European ancestry is in excellent condition (Figure 21). The skull is resting on its right inferior aspect in the west end of the grave. The face is directed toward the southeast. The maxillae and mandible are articulated.

The spine and ribs are in anatomical order with the sternum resting on the thoracic vertebrae. The vertebral column has subtle postmortem deviation, with the upper thoracic vertebrae toward the north and the upper lumbar vertebrae oriented slightly toward the south. The arms are semi-flexed at the elbows. The forearms are pronated with the hands palm down on the lower abdomen. The elbows are widely separated, suggesting a wide coffin relative to the size of the chest. The bones of the pelvis have relaxed posteriorly. The femoral heads are held in the acetabulae.

The right patella has shifted laterally to the side of the right femur. The left patella is superior and medial to the left femur. The legs are extended with the knees and ankles spaced tightly together. The feet have settled into a flexed position.

A soil sample was taken from this burial.

Burial 5

Excavators: Heidi Kroft and Glenn Mellin

From the base of the plow zone, the approximate depth to the coffin lid nail pattern was 30'' and the final depth of the grave was 37''.

The skeleton of this adult male is lying supine in an extended positioned (Figure 22). The skull is resting on its posterior left side and the head is facing northeast. The chin is tucked into the left shoulder. The mouth is slightly open and a well-defined pipe facet is visible in the anterior dentition.

The cervical and upper thoracic vertebrae are out of alignment with some displacement toward the right side. The ribs have collapsed into the chest area. The spine exhibits moderate postmortem curvature with the thoracic and lumbar vertebrae shifted toward the north. The lower vertebrae are deviated to the left, such that the spine forms an "S-shaped" pattern.

The arms are semi-flexed and separated from the body. The forearms are pronated such that the palms are down. The hands are placed over the sacrum and hip bones. The finger bones have collapsed onto the pelvis. The legs are extended with relaxed positioning. Moderate spacing is maintained between the knees and ankles. The feet were originally positioned with the toes directed superiorly, but the foot bones have collapsed downward and toward the left and right sides.

A tiny shroud pin fragment was found at the crown of the head. Its presence is reflected in copper-oxide staining at bregma.

A soil sample was collected from below the coffin.

Burial 6

Excavator: Kristen Pearlstein, Katie Barca, and Jackie Cuyler

This grave is the deepest in the series. From the base of the plow zone, the approximate depth to the coffin lid nail pattern is 34'' and the final depth of the grave is 44''. Fifty-five coffin nails from this burial were mapped.

This is the skeleton of a middle-to-older aged female of European ancestry. The approximate height of this individual is 4'11''.

The individual is lying supine in an east-west orientation with the head in the west end of the grave (Figure 23). The cranium has rolled back and the face is directed superiorly. The mandible is resting on its inferior surface, having settled onto the cervical vertebrae.

Only a few teeth are present; most have been lost antemortem (Figure 24). Those present include the right mandibular P1, left mandibular P1, right maxillary M2 and M3, left maxillary M1, and one left maxillary, heavily worn, upper anterior tooth. The mandibular teeth were in situ. The left P1 is abscessing. The right canine exhibits marked distal-slope tooth wear. The maxillary molars are not heavily worn, likely because they lost their opposing mandibular teeth.

The wooden floorboards of the coffin had deteriorated, however, the proximal humeri and glenoids and the scapula are slightly raised as a result of resting on intact coffin nails. The diaphysis of the right tibia was also resting on an intact coffin nail.

The right clavicle is in anatomical position. The left clavicle shifted and is in vertical alignment parallel to the lateral border of the scapula. The manubrium is displaced onto the left anterior aspect of two lower thoracic vertebrae.

The arms are semi-flexed at the elbows and lie loosely along the body with space maintained between the humeri and ribs. The forearms are pronated with the hands palm-down on the lower abdomen. The distal ulnae, radii and carpals are against the posterior ilia. The metacarpals remain in approximate anatomical position and are draped over the anterior-superior sacrum. Most of the phalanges have fallen onto the anterior sacrum. The distal left and right phalanges are touching on the anterior-inferior sacrum within the pelvic opening. The bones of the pelvis are supported by the underlying matrix that settled underneath the body. The pubic bones are still in close proximity with the anterior ilia directed up.

The legs are extended and resting on their posterior surfaces. They are not tightly drawn together. The left patella is in anatomical position. The right patella has flipped upside down and is displaced superiorly and to the right (about three inches higher in the fill) of the middle right femur. The lower legs and feet also show disturbance. The proximal end of the right tibia is positioned closely to the distal end of the left femur. Several foot bones are over the right tibia (left and right calcanei, left talus, navicular, cuboid, first cuneiform, first left metatarsal with the proximal articulation facing upwards). Displacement may have been caused by roots that were removed from the lower end of the grave. However, the roots did not seem to be intertwined with the bones themselves. The displaced bones (right patella and foot bones over the right tibia) were removed in order for excavation to continue in the region of the lower legs. No foot bones are recovered below the left tibia – all are shifted to the right.

Two shroud pins are present; one near the left and one near the right temporal squamous. There is corresponding bright green staining on the bone under the left pin. A third shroud pin is present anterior to bregma; there is a corresponding green stain on the cranium at this location. A fourth shroud pin was found in the fill. A copper-oxide stain is also noted on the sternal end of a middle right rib.

A soil sample was collected from the right side, lumbar region.

Burial 7

Excavated by Terri Lottmann, Glen Mellin, Tom Boyle, and Kari Bruwelheide

From the base of the plow zone, the approximate depth to the coffin lid nail pattern is 28'' and the final depth of the grave is 35''.

The grave shaft for this interment is unusual. The original shaft was dug too small for the coffin of this individual. Once realized, instead of lengthening the shaft from the top down, a pocket was cut into the bottom of the shaft in order to slip the foot-end of the coffin into the extended hole.

This skeleton of a middle-aged to older adult of European ancestry is lying supine with the face and maxillae directed superiorly (Figure 25). Pressure from the coffin lid collapsing against the face caused breakage and separation of the mid-face. The mandible is resting with the occlusal surfaces of the teeth positioned superiorly. Several teeth have been lost antemortem, including the mandibular left first, second, and third molars, and mandibular right first and third molars.

Several neck vertebrae are displaced and positioned to the right of the cranium near the right scapula. The arms are semi-flexed with the hands resting over the lower abdomen. The radii and ulnae are pronated. The hand bones have fallen onto the sacrum and lower vertebrae. The spine is straight and from the atlas to the L5, shows no significant postmortem distortion. The vertebral bodies are eroding and difficult to remove; there is no visible lipping.

The left and right innominates are large and have postmortem separation at the pubic symphysis. The legs are extended and straight with some spacing maintained between the knees and the ankles. The feet were originally positioned with the toes pointing upward. The bones of the feet, with the exception of the calcaneus and talus, have collapsed downward and are jumbled. Several foot bones were displaced along the medial aspects of the legs – probably due to rodent disturbance.

The skeleton is fairly robust. The bones are not long but are sturdy and the muscle attachment areas display well-developed bone. The ribs are not as well preserved as the other bones of the skeleton and several have deteriorated sternal ends.

Green copper-oxide staining is noted on the cranium at right pterion. The head of a shroud pin was recovered from the screened soil of this burial.

Burial 8

Excavator: Dale Brown

Burial 8 was excavated through a trash pit containing mid-17th-century tobacco pipes and ceramics, as well as a hollowed-out box turtle shell. From the base of the plow zone, the approximate depth to the coffin lid nail pattern is 25'' and the final depth of the grave is 34''.

As indicated by directionality of the recovered nails, this hexagonal coffin has of a different construction pattern than others at the site. The base was attached by hammering the nails through the floorboard, rather than securing the floorboard with nails hammered horizontally through the side walls. As such, the structural integrity of the coffin was diminished and more nails were required. In some stretches along the south side, the nails are only two inches apart. It seems likely that the carpenter who constructed this coffin was less experienced, as he also misjudged the size required to accommodate the body. The coffin is long enough but the width is too narrow. This variation could indicate construction by a different carpenter and possibly a subtle temporal difference.

This skeleton represents an adult male of European ancestry. He was placed in a supine position with the legs extended (Figure 26). The length of the coffin was sufficient, but the width was small for the body, creating a tight fit. The upper body is slightly higher than the legs and the head is elevated relative to the thorax. Upward inclination of the cervical vertebrae and head indicates intentional elevation. Some type of cushion, such as straw, may have been used to support the upper body and head. This supporting material required time to degrade, as the coffin floor gradually silted in and preserved the head, neck, and shoulders in a raised position. The cranium was not held in place by the head board, as that end and the cranial vault were spatially separate.

The bones are well preserved. Copper-oxide stains are evident on the left mastoid process and the anterior-lateral left parietal and adjacent temporal squamous. The copper preserved an adhering wood fragment. A pin is present in dirt on the right temporal.

The head rolled laterally toward the left and the face is directed toward the northeast. The raised skull is resting on its base and left side and the neck is inclined toward the left. The left arm is against and extended along the side of the thorax. The left glenoid and lateral border of the scapula are elevated. The right humerus and scapula are similarly elevated relative to the elbow with medial rotation of both humeri. The coffin width at the shoulders was especially snug, preventing subsidence onto the floor of the coffin. Left hand carpals and metacarpals are out of place due to rodent disturbance. While the metatarsals are near the distal radius and ulna, a left navicular was located at mid-thigh level above and outside the left wall of the coffin. The left lunate is also out of place.

The pronated right forearm is located along the right side wall of the coffin with the palmar surface of four metacarpals on top of the proximal right femur. Phalanges are on the floor of the coffin below and between the widely spaced ischia.

The ribs and vertebrae have settled, with anomalous postmortem curvature of the spinal column, particularly right lateral shifting of the first three lumbar vertebrae. The innominates have settled laterally, with wide spacing between the pubic bones.

The legs are extended with the posterior surfaces down and both patellae in anatomical position. The feet have settled in a flexed position with the toes directed laterally. The tarsals are articulated.

A soil sample was recovered from the pelvic region.

Northern Burial Group

The three coffin burials in this area are separated spatially from the main cluster to the south and are basically aligned east-west, with the skulls to the west/northwest and the feet to the east/southeast. Head and body positioning of all three burials are similar.

Burial 9

Excavated by Kari Bruwelheide and Katie Barca

Burial 9 is the deepest of the northern graves. From the base of the plow zone, the depth to the coffin lid nail pattern is 29'' and the final depth of the grave is 38''.

The first bones exposed are a well-preserved frontal and right zygomatic of the cranium. The remainder of this adult male is articulated and for the most part undisturbed, with the exception of the lower leg bones and left foot (Figure 27). The body is supine with the head resting on its posterior left side. The face is directed toward the northeast. The lower left body of the mandible is positioned against the vertically oriented antero-lateral surface of the left clavicle and body of the left scapula.

The clavicles are nearly vertically oriented from transverse shoulder compression. The shoulders have shifted toward the head end of the coffin, creating a compressed ("scrunched") appearance of the head and shoulders. The head is also tightly positioned against the left wall of the coffin. In a left to right diagonal alignment, the left femur is directed toward the right coffin wall and the right lower leg is up against the right wall of the coffin.

The upper arms are positioned along the thorax with the left arm against the wall of the coffin. The right arm is extended along the side of the body with the forearm pronated and the wrist flexed with the proximal phalanges draped over the anterior surface of the proximal right femur. The left humerus is resting on its posterior surface, which is against the wall of the coffin. The forearm is slightly flexed with the distal radius and ulna resting on the innominate. Left hand bones are on top of the pubic bones.

The legs are extended with the posterior femora down. The transverse distance between the distal femora indicates relaxed placement, rather than close spacing produced by tightly shrouding the body. The lower left tibia and fibula were disturbed after decomposition. Both bones are positioned toward the south,

approximately half a foot in the case of the tibia. The left tibia has rolled medially and the fibula crosses over the distal anterior right tibia in a diagonal alignment relative to the left tibia. The disturbance that produced this movement was localized, as some left metatarsals are in situ, while others have been displaced. The right tibia and fibula also shifted toward the south, but by only a couple of inches. The right patella came to rest along the distal lateral diaphysis of the right femur. The right fibula is resting against the right lower side of the coffin.

The right talus and tibia are articulated, but the calcanei are out of place. The right calcaneus is against the left tibia.

A copper-alloy button is located on the right posterior ilium near the auricular surface (Figures 28 and 29). A second matching button with an intact shank and no backing had slipped through the sciatic notch and was found under the left ilium. Relative to the first button, the second button is offset a few inches to the east. Copper-oxide staining appears on the left side innominate and sacral body. Based on their recovery locations, it is likely that these buttons were affixed to trousers or breeches.

The atlas and axis vertebrae exhibit dark staining and a possible fabric fragment.

In the grave fill outside the coffin, an oyster shell is located along the right coffin wall south of mid-humerus.

A soil sample was taken from the lower abdomen/pelvic region.

Burial 10

Excavated by Kristen Pearlstein, Jackie Cuyler, and Terri Lottmann

From the base of the plow zone, the depth to the coffin lid nail pattern is 17'' and the final depth of the grave is 27''.

This hexagonal coffin has more interior space than that observed in Burial 9. The skeleton is supine (Figure 30) with the skull resting on its left posterior aspect. The face is directed toward the east. The cranium

and mandible remain in anatomical articulation. The skull is tilted slightly to rest on the left cheek. The shoulders are not tightly compressed and the clavicles are in approximately normal anatomical position. The body is supine. The elbows are positioned away from the body and are slightly flexed with the forearms pronated. The hands are positioned palm-down with the carpals on the proximal femora and metacarpals and phalanges in the pelvic area. The pelvis has relaxed with separation of the bones at the sacro-iliac joints and pubic symphysis.

The lower body has been disturbed by an unknown mechanism. The legs are extended and the knees are closely spaced, but the patellae are out of place and located along the mid left femur. The tibiae and fibulae are in normal anatomical position, but the bones of both feet have been moved superiorly and are disarticulated. Of the set, the left calcaneus is displaced toward the east and elevated, with its lateral surface up and distal joint surface directed toward the north. This left calcaneus is located between the distal thirds of the tibiae. The left talus is also located between the distal ends of the tibiae, with its distal articular surface facing south and the medial surface directed superiorly. An in situ coffin nail points north-east by south-west and is positioned under the distal end of a metatarsal in the south-east corner of the burial. The left metatarsals are compressed but articulated and situated above the right calcaneus. The right calcaneus is upside down, as are the metatarsals, which are directed against the right lower wall of the coffin.

Fragments of a tobacco pipe stem and bowl, tin-glazed earthenware vessel, and window glass were found in the burial fill. Other than coffin nails, no artifacts were found directly associated with the remains.

A soil sample was taken from the right side of the lumbar region.

Burial 11

Excavated by Dale Brown, Heidi Krofft, and Nia Fortier

From the base of the plow zone, the depth to the coffin lid nail pattern is 15'' and the final depth of the grave is 23''.

This child's burial is disturbed by a groundhog burrow that brought bones to the surface (Figure 31). Recovered pieces included the right temporal, partial left scapula and clavicle, humeri diaphyses, the proximal thirds of both the left radius and ulna, right ilium, rib fragments, and partial thoracic and upper lumbar vertebrae. These were recovered by the ASD and transferred to the NMNH prior to the current excavation.

This child is in a supine position with the head in the west end of the coffin and facing due east. The head is resting on its left side. The legs are extended with the femora and tibiae in situ. The foot bones are poorly preserved.

The rodent burrow not only disturbed the chest area of the burial, displacing bone, but it also brought remnants of modern trash into the grave. Identifiable trash includes pieces of frayed, blue tarp in the thoracic region and the cap of a plastic bottle in the south wall of the grave shaft.

APPENDIX B

Final Report: Treatment and Documentation of 17th Century Human Remains for the Anthropology Department and Museum Conservation Institute, Smithsonian Institution

Breann Young

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January 17, 2017

The Avery's Rest Burial Site Treatment Project was initiated in 2015, with the goal of cleaning and stabilizing recently excavated 17th century human remains. The eleven burials from this site varied in age, sex, and ethnicity, as well as preservation. All remains displayed signs of erosion, exposed cancellous bone, heavy amounts of natural soil deposits, cracking, copper staining, and delamination. Because of prior conditions during excavation, some burials displayed the slight growth of white mold.

In 2015, numerous interns and contractors assisted with the assessment, photo-documentation, and treatment of the eleven burials under the supervision of Catharine Hawks, Museum Conservator; Rebecca Kaczkowski, then Kress Fellow; and Kari Bruwelheide, Museum Specialist of the Physical Anthropology Department. Each burial underwent a condition report to assess initial damages, and a treatment proposal was submitted after proper evaluation. Photo-documentation of the post-cranial remains was separated into two categories: anterior (face up) and posterior (face down); from there, the remains were grouped by part of the body (Figure 32):

- Upper body (arms, hands, scapula, clavicles, sternum)
- Lower body (legs, feet, patellae)
- Hips (sacrum, pelvis)
- Chest (vertebrae, ribs)

The cranium was photographed from four angles:

- Front (anterior)
- Proper Left
- Proper Right
- Back (posterior)

Following photo-documentation, the burials were treated in order to stabilize the fragile remains. Treatment included a full cleaning of each burial, which included the following steps:

- Dry surface cleaning with hog's hair brushes
- Wet cleaning with 50% Ethanol in RO water, applied with a small sponge to the remaining dirt and removed with brushes

Following cleaning, consolidation was performed on exposed cancellous bone and at-risk areas with B-72 dissolved in acetone, to varying percentages (Figure 33). Different concentrations of B-72 were used for different purposes. The highest concentration was 35% B-72, for mending broken ribs or long bones (Figure 34). The teeth were held into their respective sockets in the mandible and maxilla with 20% B-72 (Figure 35). The lowest concentration, 5-10%, was used for minor consolidation of the exposed cancellous bone and minor cracking in tooth enamel. Two metacarpals and one metatarsal from each adult burial were simply dry cleaned and separated from the rest of the remains for future chemical testing, including DNA.

From January 2015 to April 2016, all of the burials were assessed and documented prior to treatment; in addition, two burials (9 and 10) had received treatment and post-treatment photo-documentation. In May, intern Irene Finkelde (Figure 36) took on the project, increasing productivity by completing burial treatments more efficiently than the previous year. Small groups of burials were transported to the Anthropology Conservation Lab, located at the Museum Support Center in Suitland, MD, for the treatment. During her eight week stay, she accomplished the treatment of 1.5 burials (4 and, half of 1). Her process involved cleaning then consolidating each bone individually. Following her internship, she passed the project to Breann Young (Figure 36), who conducted the remaining treatment and photo-documentation of the burials until September of 2016. Over the course of 3.5 months, Young, with the assistance of a few summer volunteers and interns, completed the treatment and photo-documentation of the remaining 7.5 burials, increasing productivity to an even higher standard than previously set. The most efficient process involved cleaning the entire set of remains first, then consolidating using the lowest concentration and working towards more significant mending of bones. This reduced the amount of time between treatments. After a small group of burials had completed treatment, usually three or four skeletons, Young would complete the post-treatment photo-documentation in bulk.

Following completion of the treatment and photo-documentation of all eleven burials, the sets of remains were returned to the Natural History Building to be rehoused and placed back into storage. All post-cranial remains were placed in archival long boxes, with ethefoam padding. Hands, feet, clavicles, and any other smaller remains were placed in labelled archival bags; the long bones and pelvis were wrapped in ethefoam and places in a separate box to prevent over-packing. Each skull was fitted into its own supported archival tray, and the mandible placed in front with a protective layer of ethefoam to prevent rubbing. Conditions reports for each set of remains are on file in the Department of Anthropology, NMNH.

Irene Finkelde, Breann Young, and two other interns who assisted with the project have since submitted a poster abstract of their work to an international conference, discussing proper techniques and materials for cleaning and stabilizing excavated human remains. This extends to both the anthropology and conservation communities.

APPENDIX C

Lab Summaries of Skeletons from Avery's Rest (7SG57)

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March 2017

7SG57-AVERYSREST-01

Present is the complete skeleton of a male with European ancestry, aged 30 to 40 years (assigned age code 23). The bones are in excellent condition, with postmortem erosion evident on the posterior surfaces of the long bones near the epiphyses, along the anterior bodies of the upper vertebrae, and on the spines of the scapulae. Fine lines of dark root etching are widespread on the cranium.

Three green copper oxide stains are present. One lies above the spheno-temporal suture and extends onto the lateral left frontal, the adjacent anterior-lateral parietal, and more faintly across the left temporal squamous. A second, faint stain is present on the right inferior occipital, lateral to the occipital condyle. The third oval-shaped stain is located on the antero-lateral surface of the proximal left femur.

Sex

Sex is based on cranial morphology (Figure 37), features of the pelvis, and the overall size and robusticity of the skeleton. The supraorbital ridges are well-developed. The nuchal ridge is defined with a small protuberance. The mastoid processes are long with distinct supramastoid crests. The mandible is

moderately robust, with a thick body, a square mental eminence, and prominent tubercles. The ascending rami are wide and the gonial angles are relatively acute with slight gonial eversion and ridging. The greater sciatic notches are narrow and preauricular sulci are absent. The auricular surfaces are flat. Femoral head diameters measure 53 mm. Overall, the postcranial skeleton is large and robust, with pronounced development of the muscle attachment sites. The bones are heavy and noticeably dense.

Age

Age is based on features of the skull, dentition, and joint surfaces. Ectocranial closure of the coronal suture is minimal. The sagittal suture is visible and partially closed ectocranially. The anterior dentition has slight to moderate wear. The third molars have light wear due to antemortem loss of the maxillary posterior teeth, resulting in lack of occlusion.

The auricular surfaces exhibit uniform surface granularity with minor retroauricular activity and no apical development. Striae are absent from these surfaces. The anterior ramparts of the faces of the pubic symphysis are not fully defined. Trace intertrochanteric spicules are noted on the femora. Cortical striae are present on the middle thirds of the tibial diaphyses.

Ancestry

European ancestry is based on cranial and dental morphology. The nasal bones have high relief and are pinched, with a narrow nasal aperture and narrow interorbital distance. The inferior nasal chamber has a sharply defined border. The dental arcade is slightly V-shaped. Tooth cusp morphology is simple and consistent with European ancestry.

Dentition

Most of the teeth are present in the dental arcade (Figure 38). Exceptions are the mandibular first molars and maxillary second and third molars. The maxillary third molars and left second molar were lost

antemortem. The maxillary right second molar was abscessing and may have been lost postmortem or recently lost antemortem.

Several teeth show decay. The left maxillary first premolar has carious destruction of the occlusal and distal-interproximal surfaces, with pulp exposure and abscessing. The left second premolar and first molar show decay that has destroyed the lingual and interproximal surfaces, with only remnants of the occlusal/buccal surfaces present. Periapical abscessing is evident for both teeth. The maxillary right first molar has a carious lesion involving a significant portion of the distal interproximal, lingual, and occlusal surfaces. This tooth also has pulp exposure and a periapical abscess. The right mandibular second molar presents severe decay with destruction of half of the crown. The interproximal surface has been destroyed, with remnant occlusal, buccal, and lingual surfaces present. This carious lesion has exposed the pulp chamber, causing an abscess.

Mild to moderate calculus deposits are present throughout the dentition. On the maxillary left first premolar and right mandibular third molar these accumulations are present on the root, indicating alveolar resorption.

Tooth wear is mild to moderate in severity. Wear is most pronounced on the anterior dentition, specifically the incisors, partly due to posterior tooth loss. Pipe stem wear is an additional factor. Two pipe facet grooves are present. On the left, shallow facets are on the maxillary lateral incisor and canine, mandibular canine, and mandibular first premolar. On the right, the maxillary canine and first premolar, and the mandibular canine and first premolar are affected. The right pipe facet groove is slightly more defined than the left.

Linear enamel hypoplasia is recorded for the mandibular canines. Each tooth has one linear defect at about 3 mm from the cemento-enamel junction (CEJ).

Pathology

The occipital condyles have slight marginal lipping. Slight osteophyte formation and erosion is present on the capitulum of the right distal humerus. Minor erosion is present on the trochlea of the left proximal ulna (not scored), and mild marginal lipping is present on the distal left and right radii. The distal left tibia has slight marginal lipping of the joint. The calcanei also exhibit mild marginal lipping. Enthesophytes have begun to form on the posterior aspects of the calcanei, but are too slight to code on the pathology form.

The spine has minor degenerative changes. The first cervical vertebra has minor lipping of the facet margin. Thoracic vertebrae 1-9 exhibit lipping of the articular facets and slight degenerative changes to the centra. Compression of T3 through T5 has resulted in moderately severe gouging into the lamina and facet lipping. The inferior articular facets of T3 show mild to moderate marginal lipping related to compression into the underlying vertebra, T4. The condition is bilateral, but more severe on the right side. Thoracic vertebrae 10-12 present mild marginal lipping on both the facets and centra. The lumbar vertebrae have moderately severe degenerative changes to the centra and slight lipping of the articular facets.

Schmorl's depressions are present in T5-L3 vertebrae. The deepest depression is in the superior endplate of T11 and measures 21.6 mm transverse, 14.3 mm anterior-posterior, and 2.5 mm deep. This individual was engaged in strenuous physical labor, including mechanical labor that involved weight bearing on the spine.

Functional Morphology

The skeleton is heavy in weight, moderately large, and robust. A small cortical excavation is present on the right medial clavicle at the attachment site for the costo-clavicular ligament. The right humerus greater tuberosity has cystic pitting and the deltoid tuberosities for both humeri are large and robust. The lateral, supracondylar ridges of the humeri are raised. The ulnae have thick interosseous crests and developed

pronator quadratus ridges from strenuous forearm use. The palmar ridges of the hand phalanges are raised and defined.

The left femur has a third trochanter at the insertion site for the gluteus maximus muscle. The lineae aspera are strongly developed in the middle thirds of the diaphyses. The left has a midshaft width of 12 mm with a height of 4 mm. No squatting facets are present on the distal tibiae.

Further Analysis

The third right metacarpal was sampled for mtDNA testing.

Photography:

- Standard views of cranium
- Occlusal views of dentition
- Close-up view of right pipe facet set, with teeth in articulation
- T10-L2 articulated anterior view showing right side osteophytes
- View of superior endplates Schmorl's depressions, T10-L2
- Left humerus, anterior view, showing development of deltoid tuberosity
- Left humerus with 7SG57-AVERYSREST-04 left humerus (comparison to show development of deltoid)
- Close-up of green staining on cranium and left femur

7SG57-AVERYSREST-02

Present are the incomplete remains of an infant, aged approximately 5 months (assigned age code 01). Burial location suggests European ancestry, which was confirmed through mtDNA testing.

All cranial elements are complete, except for the temporal bones. The frontal bone is represented by two halves, separated by the metopic suture. The left and right clavicles, and both scapulae are present; only the left scapula is complete. The left and right humeral diaphyses are present; both distal and proximal epiphyses are missing. The radii and ulnae were not recovered. The vertebral column is missing the elements of some lower vertebrae (possibly T11, T12, L4, and L5). Fragments of the sacrum are present. The innominates are represented by left and right ilia. Both femoral diaphyses are present. The middle thirds of both tibiae are present; the fibulae are missing. Right ribs 1-10 are complete. Left ribs 1-11 are present; five are complete.

Five green copper oxide stains are present on the cranium. Two are located on the superior frontal bone, anterior to the coronial suture; one is on the left and one is on the right. The stain on the left is more prominent, linear in shape, and greenish-black in color. A pin was in contact with this surface when excavated. The stain on the right frontal is lighter in color and marks the presence of at least one additional pin. A third, faint stain is evident on the anterior left parietal, adjacent to the first stain described. A fourth, faint stain is located on the superior occipital squamous. A fifth green stain is on the anterior lower right parietal. It is elliptical in shape.

On the postcranial skeleton, a faint green copper oxide stain is present on the medial surface of the right tibia diaphysis.

Sex

Sex is indeterminate. The chin is square with a prominent mental eminence, obtuse gonial angle, robust mandibular ramus, and defined mandibular tubercles. The morphology of the chin and thickness of the mandibular ramus suggest sex is male.

Age

An age of approximately 5 months is based on bone and dental development (Figure 39). The deciduous mandibular central incisors are partially erupted through the alveolus, and would have just started to erupt through the gingiva. Radiographs of the dentition show the deciduous mandibular canines are Crown three-fourths formed, suggesting an age of 0.45 years. The deciduous right mandibular first molar has complete crown formation, suggesting an age of 0.4 years. The deciduous left mandibular second molar is Crown three-fourths formed, again indicating an age of 0.45 years. A reduced bregmatic fontanelle is present.

Ancestry

The mandible is slightly V-shaped. The nasal aperture width is narrow. Context within the group of adult burials with European ancestry suggest this infant also has European ancestry. This is confirmed through mtDNA analysis.

Dentition

The deciduous maxillary central incisors are just beginning to emerge from the alveolus. The mandibular incisors are partially erupted through the alveolus. The other deciduous dentition was unerupted.

Pathology

This individual exhibits no bone pathology.

Further Analysis

A left hand bone and right rib (6-10 range) were sampled for mtDNA analysis. Results indicate this individual has a maternal, genetic relationship with 7SG57-AVERYSREST-06 (female), 7SG57-AVERYSREST-07 (female), and 7SG57-AVERYSREST-08 (male).

Photography:

- No photographs requested

7SG57-AVERYSREST-03

Present are the nearly complete remains of a European male, aged 35 to 45 years (assigned age code 24). The bones are in good condition, especially the vertebral column, scapulae, and long bones. The cranium is complete; half of the right parietal, temporal, and basilar portion of the occipital are disarticulated and eroded. The mandible is also complete.

The manubrium and body of the sternum have eroded margins. The body has an unusually large sternal foramen, measuring 15 mm superior-inferior, and 12 mm transverse. Postmortem erosion has affected most of the ribs on both sides, with loss of the sternal thirds. The pubic portions of the innominates and anterior ilia have postmortem erosion. The lateral surfaces of both calcanei are eroded.

A green copper oxide stain marks the posterior left temporal squamous and adjacent inferior parietal, above the mastoid process. The green stain is oval-shaped and measures 37 mm anterior-posterior, and 9 mm superior-inferior.

Sex

Sex is based on features of the cranium and pelvis, as well as the overall size of the long bones. The superior, orbital margins are rounded. The mastoid processes are large and the nuchal ridge is developed. The supramastoid crests are slightly defined. The mandibular body is thick and the chin is square. The ascending ramus is wide.

On the pelvis, the greater sciatic notches are narrow. The auricular surfaces are flat. The long bones are moderately large in size, with defined muscle attachment areas. The femoral head diameter is 45 to 46 mm.

Age

Age is based on features of the cranium, teeth, and pelvis. The coronal and sagittal sutures show endocranial closure and obliteration. The sagittal suture has partial ectocranial bridging. Tooth wear is slight to moderate in severity. Pipe stem facets are noted on both sides of the dental arcade.

The joint surfaces of the long bones are smooth and lack degeneration. The auricular surfaces are generally smooth, with trace surface irregularity.

Ancestry

European ancestry is based on features of the skull. The interorbital breadth is narrow, and the nasal bones are steep with high relief. There is a well-defined inferior nasal border. The zygomaxillary sutures show recurvature. The palate is V-shaped, and the teeth exhibit simple cusp morphology. Some craniometric data were collected by Dr. Richard Jantz, but distortion and warping limits the number of measurements that could be taken.

Dentition

All teeth except the left maxillary second premolar, which was lost antemortem, are present. The beginning stages of alveolar resorption from periodontal disease are noted. The left and right maxillary second molars were scored for periodontal abscessing. The left lateral incisor, premolars, and first molar are scored for periapical abscessing. The right third molar has a small pit forming in the occlusal surface. In the left maxilla, the first premolar has a small carious lesion in the interproximal surface, and the first molar has a larger cavity affecting the occlusal and interproximal surfaces.

Calculus deposits range from slight to heavy in severity. Heavy calculus is found on the right maxillary canine, left maxillary lateral incisor and first and second molars, the right mandibular lateral incisor through first molar, and the anterior left mandibular dentition.

Dental wear is slight to moderate in severity with the presence of pipe stem grooves. Moderate pipe stem grooves are defined in three areas; one on the right and two on the left side of the mouth. On the right side the groove involves the maxillary lateral incisor and canine, and the mandibular lateral incisor, canine, and first premolar. On the left side two distinct facets are noted. The first affects the maxillary central and lateral incisors and the mandibular lateral incisor and canine. This pipe stem groove is the most defined, and wear resulted in exposure of the pulp chamber in the left maxillary lateral incisor. The second set on the left involves the maxillary lateral incisor and canine, and the mandibular canine, and first premolar.

Pathology

Slight cribra orbitalia is noted in the roof of the left eye orbit.

A blunt, oval-shaped, healed depression fracture is located in the right frontal bone, overlying the temporal line just above the orbital margin. Right temporal line involvement is characterized by a roughening and thickening of bone along the displaced ridge. The fracture depression measures 22 mm in maximum length (anterior-posterior) by 15 mm superior-inferior. The defect did not penetrate the inner table and is relatively shallow.

A smaller, shallow depression is more superiorly positioned on the right frontal bone. This small depression was originally identified as a possible second, healed depression fracture, but further inspection of the cranium altered this identification to a healed lytic lesion. The lesion measures roughly 8 mm in diameter. It is located approximately 20 mm anterior to the coronal suture. It resembles a stellate scar in the outer table.

Despite areas of post mortem erosion on the right side of the cranium, an area of probable lytic activity is identified on the lower left region of the frontal bone. This side of the face was directed downward in the grave. The lytic response begins 12 mm above the left supraorbital margin. It is characterized by a roughly oval-shaped opening with a superior-inferior height of 25 mm and a maximum width of 12 mm. The external

margins are irregular and were probably affected by some postmortem erosion. The interior frontal sinus is exposed and an eroded, somewhat irregular opening in the inner table shows penetration into the endocranium. The borders of the defect are marked with microporosity and thinning. This defect is indicative of some type of infection. Another smaller perforation with diameter of 4 mm is located 7 mm medial to the larger opening, just a few millimeters left of the midline in the frontal. The cranium was resting on its left side with the right side up, and consequently damaged.

The left scapula also has an area of lytic response on the superior, mid-lateral spine. This erosive lesion is surrounded by increased microporosity and its overall expression has been altered by postmortem erosion. The appearance suggests a lytic cavitation measuring at least 10 mm medial-lateral by 7 mm superior-inferior, with a depth of approximately 3 mm.

The lateral surface of the proximal right ulna, immediately distal to the radial notch, shows some irregularity and spicular bone formation. These minor changes are not evident on the left ulna. The abnormal bone is scored as slight periostitis. This is the insertion area for the supinator muscle.

Degenerative changes are minor but widespread in the vertebrae. Thoracic vertebrae 1-9 were scored for slight osteophyte development. The T6-T10 vertebrae have Schmorl's depressions in their inferior endplates, all are similar in size. The linear depressions extend from the posterior border of the endplate to the anterior margin. The depression in T6 measures 19 mm anterior-posterior by 4 mm transverse, and 2 mm deep. The largest depression is on the inferior endplate of T8, and measures 20 mm anterior-posterior by 5 mm transverse, and 2 mm deep.

The facets of L1-L3 were scored for slight lipping and porosity. The centra of L4-L5 were scored for slight osteophyte development. The sacral promontory has slight osteophytes.

Functional Morphology

The long bones have normal density. The deltoid tuberosities show slight to moderate development. Ridges for the insertion of pectoralis major and teres major are moderately developed. The left clavicle is scored for a small enthesophyte at the attachment for the costo-clavicular ligament. The femora show slight development of the lineae aspera. In conjunction with degenerative changes in the vertebral column, this individual likely engaged in routine physical work. A small squatting facet is on the distal right tibia.

Although this individual shows evidence of sustained, moderately heavy labor, the muscle attachments are less developed than that of 7SG57-AVERYSREST-09 and 7SG57-AVERSREST-10, two African adult males of similar age.

Further Analysis

The first right metacarpal was sampled for mtDNA testing.

Photography:

- Schmorl's depressions on the inferior endplates of T6-T10 (group of five vertebrae)
- Sternal perforation *if* another is present in the series
- Frontal and left lateral views of the skull
- Occlusal views of the dentition
- Close-up of the maxillary second premolar sinus and adjacent first molar microporosity
- Close up of the lytic lesions on the lower half of the left frontal bone
- Close up of the healed lytic depression on the upper-mid frontal bone

7SG57-AVERYSREST-04

Present are the remains of a male of European ancestry, aged 38 to 48 years (assigned age code 25). The bones are in good condition with some postmortem erosion and breakage. The outer table of the cranium has minor surface erosion. The anterior vertebral bodies of T5-T9 are eroded, and coffin erosion is evident on the posterior surfaces of the long bones, particularly near the epiphyses. The proximal left humerus has damage from postmortem cleaning on the anterior tubercle.

Four green copper oxide bone stains are present. They are located on the zygomatic arch of the left temporal, the facial surface of the left mandibular body below the first and second molar, the visceral surface of right rib 9, and on the dorsal aspect of the sacrum. Four areas of reddish-brown staining, likely iron oxide, are also present on the postero-lateral distal third of the right humerus, the left radius, the anterior surface of the styloid process, and the medial surface of the proximal third of the left ulna.

Sex

Sex is identified as male based on features of the cranium (Figure 40) and pelvis. The supraorbital ridges are moderately developed, and the mastoid processes are long. The nuchal ridge is rugose. The chin of the mandible is square and the gonial angle is slightly flared. The auricular surfaces of the innominates are flat and lack a pre-auricular sulcus. The sacrum exhibits pronounced curvature.

Age

Age is based on age-related changes to the cranium, dentition, and postcranial elements. The ectocranial sutures are partially closed with areas of obliteration. The coronal suture has bridging, while the sagittal suture is partially obliterated on the posterior aspect. The lambdoid suture is mostly closed and partially obliterated at lambda. Endocranial sutures are difficult to observe due to postmortem erosion and soil embedded in the suture lines. All molars are erupted and tooth wear is moderate.

The auricular surfaces retain some transverse organization and are coarse with areas of densification and slight porosity, particularly on the inferior demiface. Moderate spicule formation is noted on the superior margin of the auricular surface, particularly on the right side. Retroauricular activity is minimal, although the right side is damaged postmortem. The right side pubic symphysis has retained transverse ridging, and the rim has incomplete formation. The left pubic symphysis is damaged postmortem. The right femur has small intertrochanteric spicules.

Ancestry

European ancestry is based on cranial and dental morphology. The nasal bones show moderately high relief, and the interorbital breadth is narrow. The nasal chamber is narrow, and there is neither a pronounced sill nor guttering. The palate is deep and V-shaped, and tooth cusp morphology is simple. The forehead is long and low, consistent with 17th century English morphology. European ancestry is supported by the mtDNA analysis.

Dentition

All teeth, with the exception of the left maxillary third molar, are present (Figure 41). The maxillary and mandibular incisors exhibit anterior crowding. The left maxillary lateral incisor shows slight distal rotation. The mesial margin of the left central incisor is anterior to the right central incisor. The maxillary right lateral incisor is displaced anteriorly. In the mandibular, the right central incisor is displaced anterior to the left central and right lateral incisors.

Only slight decay is present. The left maxillary second molar has a cavity involving the distal interproximal surface and root. The left maxillary third molar was lost antemortem with resorption of the socket. Three teeth exhibit abscessing; the right maxillary second and third molars, and the left maxillary second molar.

The left mandibular third molar shows overeruption due to antemortem loss of the maxillary left third molar. No abscessing is noted for the mandibular dentition. However, resorption of the alveolus is evident for both the left and right sides; the molar sockets are particularly affected. This is attributed to moderate periodontal disease. Contributing factors include poor dental hygiene, dental calculus, and abscessing. Pipe use is also a possible contributing factor.

Extensive calculus is present. On the maxillary right dentition, deposits range from flecks to calculus encircling the crown. On the left side, calculus deposits range from moderate to coalesced, and are most prominent on the anterior teeth. Calculus on the mandibular dentition is more extensive. On both the left and right sides moderate to severe calculus deposits are present and three-dimensional calculus is noted for anterior teeth. It is so extensive that the lingual enamel cannot be observed.

This individual has two pipe facets (Figure 42). Both involve two maxillary and two mandibular teeth. On the right side, the maxillary canine and first premolar, and the mandibular canine and first premolar represent a pipe facet. On the left side the maxillary lateral incisor and canine, and mandibular canine and first premolar represent a pipe facet. Faint tobacco staining is evident on the lingual surfaces of the mandibular and maxillary first molars.

Pathology

Some degenerative changes are noted in the spine. The margins of the left occipital condyle are sharp. The right inferior articular facet of C5 has minor lipping. Minor lipping also is present on the margins of the articular facets of T1-T9 and T12. The vertebral body of T10 exhibits minor, marginal osteophytes. L1 is scored for mild degenerative changes to the articular facets. The left superior articular facet of L3 is malformed, but there was no associated degenerative change. Vertebrae L4 and L5 exhibit slight marginal lipping of the articular facets.

Schmorl's depressions are numerous in the vertebrae (Figure 12). T4-L4 have Schmorl's depressions in both the superior and inferior endplates. The depression in the inferior endplate of T6 is butterfly-shaped and measures 12 mm anterior-posterior by 17 mm transverse, with a depth of 1.6 mm. For T12, the Schmorl's depression in the superior endplate measures 10 mm anterior-posterior by 20 mm transverse, and has a depth of 3.7 mm. The L1 Schmorl's depression in the superior endplate measures 9 mm anterior-posterior by 12 mm transverse, with a depth of 1.6 mm. Depressions are more severe in the middle and lower thoracic vertebrae than in the lumbar vertebrae. This individual was engaged in physical labor that placed heavy loads on the spine.

Degenerative changes are also noted for the joints of the arms and legs. In the shoulders, the glenoids exhibit slight, marginal lipping but the severity is too slight to score as pathological. Minor lipping is noted on the distal femora and on the right proximal tibia at the intercondylar eminence.

Functional Morphology

The clavicles are robust. The muscle attachment areas are raised and roughened and cortical excavations are present at the attachment sites for the costoclavicular ligament. The excavation is much larger on the right clavicle, and measures 21 mm medial-lateral by 8.5 mm anterior-posterior, with a depth of 4 mm. The deltoid tuberosities of the humeri are only slightly developed. The left radial tuberosity is roughened.

The lineae aspera are well developed, and the attachment areas for gluteus maximus on the posterior aspect of the femora in the subtrochanteric region are roughed. The medial condyles of the tibiae are slightly cupped, especially on the right side.

Further Analysis

The left symphyseal face needs to be studied through x-ray and microscopy to confirm that the observed damage is postmortem.

The second left metacarpal was sampled for mtDNA testing.

X-Ray:

- Left pubic symphysis

Photography:

- Frontal and lateral views of skull
- Occlusal views of maxillary and mandibular dentition
- Close-up views of pipe facets, right and left sides, with teeth articulated
- Close-up views of selected Schmorl's depressions

7SG57-AVERYSREST-05

Present is the nearly complete skeleton of a male, aged 35 to 45 years (age code 24), with European ancestry. The bones are in good condition with minimal postmortem erosion and breakage. The skull is complete (Figure 43), with slight erosion on the frontal and posterior left parietal. The coracoid processes of the scapulae and the lateral-most end of the right acromion were broken postmortem. The transverse processes of the vertebrae are also damaged postmortem. The ilia have postmortem cracking. The sacrum has erosion and breakage of its inferior-posterior aspect. The right fibulae has flaking of the outer cortex.

Green copper oxide stains are present. Two stains are located on the posterior occipital squamous above and to the left of the protuberance. Green staining is also present on the left and right parietals and frontal bone at bregma (Figure 44). A small iron oxide stain is present on the posterior surface of the middle third of the right humerus diaphysis.

Sex

Sex is based on features of the cranium and pelvis, and the overall size and robusticity of the skeleton. The cranium has pronounced supraorbital ridges and bone development at glabella. The mastoid processes are long and wide, and the supramastoid crests are accentuated. The gonial angle of the mandible is fairly acute, with gonial flare and marked ridging. The mandibular body is moderately thick, and the chin is square. On the innominates, the greater sciatic notch is narrow and no preauricular sulcus present. The auricular surfaces are flat. The bones are heavy, fairly robust, and their size indicates medium stature.

Age

Age is based on features of the cranium and dentition, and morphological age-related changes of the pelvis. The coronal, sagittal, and lambdoidal sutures are still visible, with beginning obliteration (bridging) in some areas. Wear on the third molars is mild. The inferior demiface of the auricular surface has faint remnant striae. The surface shows uniform granularity along with minimal retro-auricular activity. Some striae are also visible on cortical long bone surfaces. There are no intertrochanteric spicules of the femora. Osteoarthritis and degenerative changes are minimal.

Dentition

All teeth are present, with the exception of the maxillary left third molar, which was lost antemortem with complete remodeling of the socket (Figure 45). The anterior mandibular dentition shows crowding. The right lateral incisor and left central incisor are slightly anterior to the right central incisor.

Severe decay is evident in some maxillary teeth. The second premolars and right first and second molars are represented by tooth roots only, with complete crown destruction due to caries. The maxillary left first molar has advanced destruction of the mesial-interproximal surface and the adjacent CEJ. All lesions resulted in pulp exposure and periapical abscessing.

Decay in the mandibular dentition is less severe. Minor occlusal pit caries are present in the right second and third molars. Minor decay is also present in the occlusal and mesial interproximal surfaces of the left first molar. A large cavity has damaged the buccal surface and adjacent root of the left third molar. This cavity has not resulted in pulp exposure, and there is no external evidence of a periapical abscess.

Moderate to heavy calculus deposits are noted throughout the dentition (see Figure 45). These accumulations are particularly heavy on the labial and lingual surfaces of the anterior mandibular teeth, but are also evident on the roots of the maxillary left premolars and molars, and mandibular left molars. Alveolar resorption from periodontal disease was moderately severe.

Tooth wear ranges from mild to heavy. Heavy wear is associated with pipe use and is localized on the anterior dentition (Figure 11). There are two pipe stem grooves. On the right, the affected teeth include the maxillary incisors and canine, and the mandibular lateral incisor and canine. On the left, the affected teeth include the maxillary incisors and canine, and the mandibular lateral incisor and canine. Tobacco staining was also noted.

Pathology

The right TMJ has moderate erosion and porosity (Figure 46), and the left has slight porosity. The radii have trace marginal lipping on the distal joints (too slight to score on pathology form). The right calcaneus has a small enthesophyte.

Slight degenerative changes are present in the spine. The C1 shows mild, marginal lipping on the facet for the dens. L4-L5 display trace, marginal lipping on the articular facets. Schmorl's depressions are present in the inferior endplate of T11, but the extent of the depression cannot be assessed due to postmortem breakage. T12 also exhibits small, depressions in the inferior endplate. In the lumbar vertebrae, L2 has a Schmorl's depression in the inferior and superior endplates. Schmorl's depressions are also noted in the

endplates of L3 and L4. The presence of these depressions suggests physical labor involving mechanical loading on the spine. Muscular development is not as pronounced as observed in some Chesapeake males, and degenerative changes are very minor.

Functional Morphology

The right clavicle has a distal-medial bony protuberance scored as an enthesophyte. The right humerus is slightly larger than the left, suggesting preferential use of the right arm. The ridges for the insertion for pectoralis major on the humerus are somewhat raised and the deltoid tuberosities are slightly developed.

The lineae aspera of the femora are raised and moderately developed. A long, linear trough is present lateral to the linea aspera in the subtrochanteric region at the insertion for gluteus maximus. Only the right distal tibia has a small squatting facet.

Further Analysis

An x-ray is required to determine whether or not the cavity in the mandibular left third molar has resulted in a periapical abscess. There is no pulp exposure or external evidence of an abscess.

The second right metatarsal was sampled for mtDNA testing.

Photography:

- Standard views of skull, including the superior and posterior views
- Views of the green copper oxide pin stains (on skull)
- Close-up of right TMJ erosion
- Occlusal views of dentition
- Close-up of left and right pipe stem groove sets with teeth articulated
- Close up view of 3-D calculus deposits on the labial and lingual surfaces of the anterior dentition

- Tobacco staining on lingual left maxillary M1 and M2 roots

7SG57-AVERYSREST-06

Present is the nearly complete skeleton of a female with European ancestry, aged 50 to 60 years (assigned age code 27). This skeleton is in good condition, but the facial bones of the cranium have separated postmortem and exhibit some damage. The zygomatics, maxillae, and nasals are fragmented and minimally represented. Age-related thinning of the facial bones contributed to the observed breakage. The mandible is nearly complete with damage to the ascending rami. Both condyles are missing. The long bones are complete, with erosion affecting their proximal and distal ends. Eleven left and right ribs are present with most broken postmortem into multiple pieces. All cervical, thoracic and lumbar vertebrae are present; twelve are scored as complete.

Rootlet staining is widespread on the skeleton. Green copper oxide discoloration is present and includes an oval-shaped stain on the upper mid-frontal bone anterior to bregma. The squamosal portions of both temporal bones are discolored green. The stain on the left temporal covers most of the squamous and extends onto the mastoid process. Right squamous discoloration is more subtle and extends onto the adjacent posterior-inferior parietal. Faint green staining is also evident on the left mandibular body at the base of the ascending ramus. The anterior bodies of cervical vertebrae two and three have faint green discoloration. Right rib ten and another rib body from the lower right side have green stains.

Dentition

Five loose maxillary teeth are present: a right canine, and the right and left second and third molars. The right canine has marked lingual-mesial and distal wear. The maxillary left second molar and right third

molar have calculus deposits on their roots indicating advanced alveolar resorption of these sockets. The right second molar has moderate hypercementosis on the root's apical half and the third molar has pronounced hypercementosis on the root's apical third. On the left side, the second molar has moderate hypercementosis on the apical third. A small carious lesion is present in the lingual-distal aspect of the right second molar crown. A resorbed fragment of the posterior left alveolus shows antemortem loss of the third molar. The fact that additional maxillary teeth were not recovered likely indicates that they were lost in life.

Advanced alveolar resorption of the mandible indicates advanced age and poor dental health. Only the left and right first premolars are present in their sockets. All other mandibular teeth were lost antemortem. The sockets posterior to the first premolars have complete resorption. The sockets anterior to the first premolars are almost fully remodeled. The left premolar has slight mesial drift, with lateral rotation of the tooth crown such that the mesial aspect is facing outward. The right first premolar has distal drift and marked mesial wear of the crown. The maxillary canine and mandibular first premolar likely provided some functional occlusion in life that caused this marked attrition.

Age

Age is based on features of the cranium, dentition, and postcranial remains. The cranium has complete suture closure and endocranially the suture are obliterated. Ectocranially, the sutures are nearly obliterated. The mandible shows extensive antemortem tooth loss and alveolar resorption. Tooth wear ranges from slight to extreme.

The auricular surfaces exhibit linear striations, islands of densification, and macroporosity. Post-auricular activity is present. The symphysis shows complete rim formation and surface breakdown. Osteoarthritis is present in the cervical, thoracic and lumbar vertebrae and the sacrum. Inter-trochanteric spicules are present on the femora. Internal cancellous bone shows wide spacing.

Sex

Sex determination is based on cranial morphology and features of the pelvis. The cranial vault is small with sharp supraorbital margins and minimal brow ridge development. The mastoid processes are small and the supramastoid crests are flat. The nuchal ridge of the occipital bone is smooth and undeveloped. The mandible is small with thin rami and a slighted pointed chin. The sciatic notches are wide and two deep parturition pits are present on the pubic bones. Overall, the skeleton is small.

Ancestry

The cranial vault is long and relatively narrow, with a low forehead and low cranial vault height. The nasal bones show low relief. The cranial shape is consistent with 17th century English crania.

Pathology

Cystic erosions are present in the greater and lesser tubercles of the humeri. These were not scored on the pathology form and generally are related to advanced age.

The left radial tuberosity has a small enthesophyte. The right calcaneus also has a small enthesophyte on the plantar surface.

The right distal ulna has slight porosity on the joint surface. Slight lipping is also present on the joint margins of the patellae.

The cervical, thoracic and lumbar vertebrae are all scored for osteophyte formation and porosity. The thoracic and lumbar vertebrae have the most lipping, particularly in the L4-S1 range. Osteophyte formation is most pronounced along the left side endplate margins. The fifth lumbar has slight wedging of the centrum on the left side.

Three thoracic vertebrae have small Schmorl's depressions. The best defined depression is located on the inferior endplate of T9 and measures 4.5 mm anterior-posterior by 2 mm transverse, with a shallow depth of about 1 mm.

The femora have slight lipping of the distal joint margins.

Functional Morphology

The humeri are small but show moderate development of the deltoid tuberosities and ridges for pectoralis major. The insertion for the deltoid muscle is pronounced on the clavicles. The right arm bones are slightly larger than the left, suggesting right handedness.

The lineae aspera are moderately developed in the middle third of the femoral diaphyses. The right femur linea aspera has a width of 8.6 mm with a height of 3.5 mm. The postcranial skeleton bears evidence of a moderately strenuous lifestyle and history of childbirth.

Further Analysis

The first right metatarsal was sampled for mtDNA analysis. The results show a genetic, maternal, relationship with 7SG57-AVERYSREST-07, a younger adult female from this site, 7SG57-AVERYSREST-08, a male from this site, and 7SG57-AVERYSREST-02, the only infant from the site.

The third and fourth right metacarpal were pulled for isotope and metals testing.

Photography

- Cranial vault (left and right lateral, superior, frontal)
- Parturition pits on the pubic bones
- Mandible (occlusal view and frontal)

7SG57-AVERYSREST-07

Present is a mostly complete skeleton of a female with European ancestry, aged 35 to 45 years (age code 25). The cranium is complete, but the facial bones have separated from the vault postmortem (Figure 47). Sandy soil was removed from foramina, the cranial vault cavity, orbits, and maxillae as part of the conservation process. Coffin erosion is evident on the posterior epiphyses of the long bones. The anterior bodies of the vertebrae show slight postmortem erosion. All ribs are represented but fragmentary due to postmortem breakage.

Six green copper oxide pin stains are present on the cranium. Two green-black, oval-shaped stains are located at pterion. These two stains align with two oval-shaped stains on the superior frontal bone. Together, the four stains form a coronal arc across the anterior cranium. The best-defined stain measures 29 mm transverse by 16 mm anterior-posterior. Two additional stains are located at bregma, and on the anterior-medial right parietal.

Sex

A sex of female is based on features of the skull and pelvis. Supraorbital brow ridge development is minimal, and the mastoid processes are moderately small. The supramastoid crests have subtle definition. The nuchal region of the occipital is mostly smooth with a small protuberance. The chin is pointed and the mandibular body is thin. The ascending ramus is gracile.

The greater sciatic notches of the pelvis are wide, as is the subpubic angle. Preauricular sulci are absent, however, and the auricular surface is not raised on the left side. The bones are unusually heavy, with well-developed muscle attachment sites. The weight of the bones may be due to postmortem infiltration of sand into internal cavities at points of erosion.

Age

Age determination is based on features of the skull and postcranial bones. The coronal suture is obliterated except at pterion. The sagittal suture is partially obliterated. The lambdoid suture is obliterated except at the lateral portions. Tooth decay, antemortem loss and abscessing are moderate in severity.

The auricular surfaces of the innominates have a granular appearance, residual striae, apical rim sharpening, and beginning postauricular spicule formation. Small intertrochanteric spicules are present on the right femur only. Trace degenerative changes are evident on the joint surfaces and spine.

Ancestry

European ancestry is based on features of the skull. The forehead is relatively low and interorbital width is moderately broad. The maxillae lack prognathism, and the inferior nasal cavity has a sharp border. Tooth cusp morphology is simple and the palate is V-shaped. Craniometric data collected by Dr. Richard Jantz classify the individual as having European ancestry.

Dentition

Some antemortem tooth loss is noted (Figure 48). The left maxillary lateral incisor was lost postmortem. The mandibular left first and second molars and right first molar were lost antemortem, and the sockets are remodeled. The maxillary and mandibular third molars have congenital absence. A moderate diastema separates the mandibular central incisors.

Several teeth show decay. The crowns of the right maxillary premolars and first molar were almost completely destroyed by carious lesions and also exhibit periapical abscessing. The right second molar has less severe decay, but also displays a periapical abscess. The left maxillary lateral incisor has a periapical abscess. Carious lesions are present in the occlusal and interproximal surfaces of the left maxillary canine. The crown of the left maxillary second premolar was completely destroyed by decay with abscessing from pulp exposure.

The left maxillary first molar has a cavity involving the occlusal and interproximal surfaces of the tooth. The pulp chamber is exposed and abscessing has occurred.

In the mandible, the right first premolar is represented by the root only. There is complete destruction of the crown with pulp exposure from decay and abscessing. The right second premolar has a cavity involving the occlusal and mesial interproximal surfaces. Mild decay is present in the left dentition. The distal interproximal surfaces of the premolars each have small cavities.

Calculus deposits range from slight to heavy, with significant build-up on the anterior mandibular dentition. Wear is slight to moderate in severity, with a beginning pipe facet involving the left upper and lower canines and first premolars.

Three deep enamel hypoplasias are present on the maxillary central incisors. On the right, they are located 1.2, 2.6, and 4.8 mm from the CEJ. On the left, they are located 1.4, 3.1, 5.1, and 6.7 mm from the CEJ.

Pathology

Degenerative changes are slight. The dens of the C2 vertebra exhibits mild marginal lipping. T1-T9 vertebral bodies and facets have trace marginal lipping. T10-T12 vertebrae also show slight lipping of the endplate margins. Gouging of the lamina is evident on the right superior articular facets of T5 and T6. Laminal spurs are beginning to develop in the mid to lower thoracic vertebrae and both rib facets of T12 (especially the right) exhibit moderate lipping and porosity. A shallow, linear Schmorl's depression is present in the inferior endplate of T8. It extends from the neural canal margin anteriorly for 9 mm with a width of 1.7 mm. On the lumbar vertebrae, L1-L3 centra are scored for slight osteophyte formation and L4-L5 facets and bodies are scored for marginal lipping, with slight porosity also noted on the endplate surfaces and margins.

The left tibia has a small enthesophyte on the medial surface of the distal third of the diaphysis. Beginning enthesophytes are present on the posterior surfaces of the calcanei. These are too small to score on the pathology form. The right distal femur and patella exhibit mild lipping.

Functional Morphology

The deltoid tuberosities of the humeri are robust, and the ridge for the insertion of the pectoralis major muscle is roughened and developed. The clavicles are robust, and the attachment site for the costo-clavicular ligament is roughened.

The femora have lineae aspera that are well developed for a female. The left linea aspera has a midshaft width of nearly 11.0 mm with a height of 3.6 mm. The subtrochanteric region of the posterior femora are roughened. The tibiae have raised soleal lines and small squatting facets. Palmar ridging is defined on the hand phalanges. This woman was routinely engaged in heavy physical labor.

Further Analysis

The third right metatarsal was sampled for mtDNA analysis. The results show a genetic, maternal, relationship with 7SG57-AVERYSREST-06, an older adult female from this site, 7SG57-AVERYSREST-08, a male from this site, and 7SG57-AVERYSREST-02, the only infant from the site.

Photography:

- Frontal, left and right lateral, and superior views of cranium
- Occlusal views of dentition
- Close-up views of enamel hypoplasias on central maxillary incisors
- Close-up views of pipe facets on left canines, if possible
- View of lingual surface of anterior mandibular dentition to show calculus deposits

- View of left humerus with left humeri of Burial #1 and Burial 4 to show deltoid development
- Overview of left and right humeri together

7SG57-AVERYSREST-08

Present is the skeleton of a male with European ancestry, aged 30 to 40 years (assigned age code 23). The bones are in good condition with some postmortem erosion and breakage. The outer table of the cranium has surface exfoliation on the frontal. Part of the right zygomatic arch is absent due to postmortem breakage. Erosion of the left mastoid process exposes the lacunae of the sinus cavity. Erosion is present on the left mandible, and the condyle is broken or eroded away. Minor erosion is present along the anterior vertebral bodies. Possible coffin erosion is present on the posterior aspects of the long bones, particularly near the epiphyses. The posterior proximal left humerus and the distal right fibula show damage from cleaning. Several ribs on both sides exhibit postmortem breakage.

Five areas of green copper oxide staining are present. These are located on the right parietal and temporal (near pterion), the right mastoid process, the left frontal superior to the zygomaticofrontal suture, the left second rib on the inferior surface of the costal end, and on the left ninth rib near the head.

Sex

A male sex is based on features of the skull (Figure 49) and pelvis. The supraorbital ridges of the cranium are moderately developed. The nuchal ridge is rugose, with development of a nuchal hook, or occipital protuberance. The mastoids are long and wide, and the chin is square. The innominates exhibit narrow greater sciatic notches. The auricular surfaces are not raised, and a preauricular sulcus is absent. Overall, the skeleton is large and robust.

Age

Age is based on age-related changes to the skull, dentition, and pelvis. The ectocranial sutures are open. Endocranial sutures are unobservable due to soil adhering to the inner table. Tooth wear is moderate. The auricular surfaces exhibit minor transverse organization, and show mostly uniform granularity. Postauricular activity is absent. The pubic symphysis lacks a sharp dorsal rim. Joint surfaces are smooth.

Ancestry

European ancestry is based on skull morphology. The nasal bones have high relief, and interorbital breadth is intermediate. The nasal chamber is narrow with a sharp inferior nasal border. The palate is deep and V-shaped. Tooth cusp morphology is simple. The forehead is long and low, and consistent with 17th century English cranial morphology. Craniometric data were collected by Dr. Richard Jantz and classify this individual as having European ancestry.

Dentition

All teeth are present with the exception of the right mandibular first molar and left mandibular first and second molars (Figure 50). These three teeth were lost antemortem with resorption of their sockets. Carious lesions ranging in severity from stage 1 to stage 3 are present in the maxillary incisors through second premolars, maxillary right first molar, mandibular first premolars, left second premolar, right second molar and both mandibular third molars.

No abscesses are present. However, advanced resorption of the alveolus has occurred on both sides, particularly the molar sockets. This is attributed to periodontal disease. Calculus on the dentition ranges from moderate to coalesced.

A pipe facet is present and involves the maxillary left canine and first premolar.

Pathology

The right and left tibiae have mild periostitis on the middle thirds of the shafts.

Minor lipping of the facets is present in several cervical and thoracic vertebrae. Gouging of the lamina is present between the right side facets of T3 and T4. Schmorl's depressions are present in the inferior end plates of T5 – L1, and superior end plates of T7 – L1. Depressions in T11 and T12 are not large, but are moderately deep. T11 measures 5.5 mm anterior-posterior, 6.2 mm transverse, and 4.9 mm deep. T12 measures 11.9 mm anterior-poster, 5 mm transverse, and 4.4 mm in depth. The sacrum exhibits a bifurcated S1 spinous process, and a cleft neural arch from S3 to S5.

Minor marginal lipping is present for the right distal femur. A healed minor compression fracture is present in the posterior/lateral quadrant of the distal articular surface of the left tibia. This distal joint was also scored for slight lipping. The left calcaneus is missing the anterior talar articular surface, possibly due to calcaneus secondaris.

Functional Morphology

The clavicles exhibit cortical excavations at the insertion of the deltoid muscle. The left humerus has a cortical excavation at the insertion for pectoralis major. The left humerus is shorter in length and smaller in girth than the right humerus, suggesting preferential use of the right arm.

Further Analysis

A right fourth metatarsal was sampled for mtDNA analysis. The results show a genetic, maternal, relationship with 7SG57-AVERYSREST-06, an older adult female from this site, 7SG57-AVERYSREST-07, another female from this site, and 7SG57-AVERYSREST-02, the only infant from the site.

Photography:

- Frontal and lateral views of the skull
- Occlusal views of maxillary and mandibular dentition
- Close-up view of green stain on right parietal

- Close-up view of select Schmorl's nodes (superior endplate of T11 and T12)
- Close-up view of left tibia distal articular surface

7SG57-AVERYSREST-09

Present is the nearly complete skeleton of a male with African ancestry, aged 32-42 years (assigned age code 23). The cranium and mandible are complete and in good condition (Figure 51). The long bones are well preserved and the joint surfaces are mostly complete. The sternum and the coccyx are absent. Left and right ribs 1-10 are broken postmortem.

The bones are light brown to yellow in color with trace amounts of adhering brown, sandy soil. Conservation has been performed and the bone and tooth surfaces are cleaned. Postmortem erosion is evident on the joint surfaces, distal aspects of the diaphyses, and the anterior vertebrae. Dark reddish-pink stains are present on many bones along with black mottling (posterior cranium and right ulna).

Four green copper oxide stains are present. A faint green stain is noted on the left postero-lateral frontal, likely from a straight pin that once secured a burial cloth or head covering. A second green quarter-sized stain is present on the left innominate, lateral and inferior to the acetabulum. A third green stain is visible on the right auricular surface, and a fourth are of discoloration is on the sacrum. It is located on the infero-posterior portion of the right sacroiliac joint. The stains to the pelvis are due to the presence of copper alloy buttons found associated with these bones.

Age

Age is based on features of the cranium, dentition, and age-related changes to the postcranial bones. Ectocranial obliteration is complete for the lambdoid suture, and partial for the sagittal suture. The endocranial sutures are mostly obliterated. The third molars are erupted and exhibit slight tooth wear.

All epiphyses are fully united, including the medial clavicle. The auricular surface has limited striae on the inferior demiface, uniform granularity (fine grained), no post-auricular activity, and minimal apical rim activity. Surface stria are limited on the long bone cortices.

Sex

A male sex is based on features of the skull and pelvis. The cranium has pronounced supraorbital ridges, rounded supraorbital margins, and a rugose nuchal ridge with a nuchal hook. The mastoid processes are very wide and short, and the supramastoid crests are well defined. The gonial angle is slightly obtuse, gonial flare is slight, and the ascending ramus is broad. On the pelvis, the greater sciatic notch is narrow and the auricular surfaces are flat. The pre-auricular sulcus is absent.

Ancestry

African ancestry is based on cranial morphology. The cranial vault shape is long and narrow. The interorbital breadth is wide, and the nasals show low relief. A nasal gutter is present, and the nasal chamber is wide. The dental arcade is U-shaped. The maxillary central incisors show a diastema. There is alveolar prognathism. Craniometric data were collected by Dr. Richard Jantz and classify this individual as African or African American.

Dentition

All teeth are present in the dental arcade and exhibit minimal decay overall with the exception of the right maxillary first molar (Figure 52). In the maxilla, the right lateral incisor has a minor pit cavity in the interproximal surface. The right second premolar has a slightly larger cavity in the interproximal surface. The

right first molar exhibits extensive decay; the lingual and interproximal surfaces were destroyed by caries, and over half of the occlusal surface is missing. The tooth root is involved and pulp exposure resulted in a periapical abscess. In the mandible, only the right third molar exhibits decay. This cavity is present in the buccal crevice and is relatively mild in severity.

Calculus deposits are mild to heavy. The heaviest deposits are on the right second and third molars and the left lateral incisor through the second premolar.

The teeth exhibit minor occlusal wear. The most extensive wear is moderate in severity and affects the anterior maxillary dentition and left molars. Beginning pipe facet grooves are present on the left maxillary dentition, involving the central and lateral incisors and the canine. The two matching facet sets in the left mandibular dentition include the lateral incisor and canine, and the canine and first premolar. Dark brown (tobacco) staining is present on the left mandibular third molar.

Pathology

The lesser tubercles of the humeri have minor pitting. The left ulna exhibits trace lipping on the proximal joint surface.

The vertebrae exhibit slight to moderate degenerative changes. The facets of the second cervical exhibit lipping and minor surface porosity. Compression of the inferior articular facets of the first thoracic vertebrae into the articular facets of the second thoracic vertebra (T2) is present, and resultant gouging is evident in the lamina of T2. The fourth thoracic vertebra has minimal erosion on the right, superior articular facet. The fifth thoracic exhibits a small Schmorl's depression in the inferior endplate. One through nine thoracic articular facets were scored for mild surface porosity. The 10-12th thoracic articular facets present slight lipping and porosity. Ligamentum flava are developed, particularly on the lower thoracic vertebrae. A malformation involving the left facet articulation of T11 and T12 is present in which the inferior superior facets

of T11 and superior articular facets of T12 deviate slightly to the left. The left inferior articular facet of the eleventh thoracic (T11) wraps around the left superior articular facet of T12. The first and second lumbar vertebral facets were scored for moderate marginal lipping and slight surface porosity. Distortion is on the right inferior articular facet of the first lumbar and the right superior facet of the second lumbar. Both exhibit lipping with spicules, surface erosion, and surface margin irregularities. The second lumbar shows gouging from compression of the L1 inferior articular facets into the underlying lamina; this condition is more pronounced on the right side. Similar gouging is present on the left side of the third lumbar. On the fourth lumbar, bilateral gouging is present in the lamina and the centrum exhibits a Schmorl's depression on the superior endplate, measuring 13 mm anterior-posterior, 7 mm wide, and 2.5 mm in depth. Lumbar vertebrae 4 and 5 show mild marginal lipping of the articular facets, and mild porosity on the surfaces and margins of the centra. The spinous processes of the third and fourth sacral units are flattened.

The left fibula has slight, integrated striations and corresponding porosity on the midshaft with very slight subperiosteal bone apposition in the shaft's inferior middle third. This area was coded for periostitis.

Functional Morphology

The left scapula has an os acromiale; the right scapula is damaged and cannot be evaluated. The clavicles have cortical excavations at the attachment site for the costo-clavicular ligaments.

The insertion sites for the deltoideus muscles of the deltoid tuberosities are moderately developed. The right side is slightly more pronounced. The maximum diameter at midshaft is 26 mm for the right side and 24 mm for the left. The minimum diameter at the midshaft was 20 mm for both. The right humerus is longer than the left, measuring 333 mm in length (HML) vs. 324 mm. This bilateral asymmetry is attributable to preferential use of the right arm. The insertion sites for the pectoralis major and teres major are rough. The distal, lateral supracondylar ridges are well developed, thickened, and raised. This is the site of origin for the

brachioradialis, which flexes the forearm, and the extensor carpi radialis longus and extensor carpi radialis brevis muscles, which extend the hand (Stone and Stone 2003; White 2012). The pronator quadratus ridges of the ulnae are defined. There is slight development of the marginal palmar ridges on the hand phalanges.

The linea aspera of the femora are moderately defined. The left linea aspera width at the midshaft is 9 mm and the height is 2 mm. The right linea aspera at midshaft measures 10 mm in width and 4 mm in height. Intertrochanteric spicules are present on the right side only. The posterior femora exhibit roughening and shallow linear troughs in the subtrochanteric region at the insertion site for the gluteus maximus muscle, which abducts the femur at the hip joint, and the origin of the vastus medialis, which extends the leg at the knee joint (Stone and Stone 2003; White et al. 2012). Roughening and build-up of bone is present on the posterior distal diaphyses of the femora superior to the medial condyle at the origin site of the plantaris muscle, which flexes the foot and leg. These were not coded as enthesophytes. The distal tibiae have no squatting facets.

Vastus notches are present on the patellae. Mann and Hunt (2005) and White et al. (2012) note this is a non-metric trait.

Small cavitations and trace spicule development are observed on the posterior surface of the calcanei at the attachment site for the Achilles' tendon from the soleus and gastrocnemius muscles, which flex the foot and leg at the knee (Stone and Stone 2003).

This individual was engaged in frequent heavy labor, evidenced by defined muscle attachment, insertion, and origin sites, as well as degenerative changes of the spine. The damage in the inferior spine reflects heavy strain on the lower back from load-bearing labor. The degenerative change is less than the other individual of African ancestry (7SG57-AVERYSREST-10). Apart from the severe abscess in the right maxillary first molar, this individual displays much better dental health than 7SG57-AVERYSREST-10.

Further Analysis

A right fourth metatarsal was sampled for mtDNA analysis.

Photography:

- Standard views (frontal, left lateral, posterior) of skull
- Occlusal views of dentition
- Inferior, lingual oblique view of right maxillary M1 cavity and abscess
- Right, lateral close-up of right maxillary M1 abscess.
- Pipe facets

7SG57-AVERYSREST-10

Present is the complete skeleton of a male with African ancestry, aged 27-37 years (assigned age code 22). The bones are well preserved. All elements except the xyphoid are present. The cranium is complete, but separation of the right malar has occurred. The long bone diaphysis are complete, as are the joint surfaces. The ribs are all represented and complete, apart from the first ribs and right second rib. Some postmortem fracturing has occurred. All vertebrae are represented and mostly complete.

Small striations from rodent-gnawing are observed on the right sphenoid, along the suture line at pterion. The bones are yellow to light brown in color. Postmortem damage, in the form of erosion, is present on some bone margins. Cortical surfaces are well preserved. No staining is noted.

Age

Age is based on features of the cranium, dentition, innominates, and degenerative changes to the joint surfaces. The coronal suture exhibits areas of bridging on the left side and at bregma. The sagittal suture also has areas of initial bridging. The lambdoid and squamosal sutures are open and unbridged.

The maxillary third molars show minimal wear, but the right is partially destroyed by decay. In the mandible, the left third molar has been lost antemortem and the socket is almost completely remodeled. The right third molar has slight wear, a large carious lesion, and periodontal abscessing. Advanced decay is noted on five other teeth. The left first mandibular molar was also lost antemortem.

All epiphyses are united, including the medial clavicles. The auricular surfaces are fine-grained, with retention of striae at the apex and on the inferior demiface. Initial development of post-auricular irregularity is present, particularly on the right side. The pubic symphysis retains billowing on the face. The dorsal rampart is developed, but the ventral rampart development is incomplete. Some surface stria are visible on the cortical bone of the femora.

Sex

Sex is based on features of the skull (Figure 53) and pelvis. Glabella is pronounced, and the supraorbital brow ridges are moderately developed. The supramastoid crests are defined, with more definition on the right side. A moderate occipital protuberance defines a rugose nuchal ridge. The mandible has a high mental eminence with marked gonial flaring and ridging. The innominates have narrow greater sciatic notches and wide ischiopubic rami. The long bones are robust.

Ancestry

African ancestry is based on features of the cranium and mandible. The cranial vault is moderately long and narrow. The face displays a wide interorbital distance and a wide nasal aperture. Nasal bone relief is low,

with slight nasal guttering. The palate is deep and U-shaped with slight prognathism of the midface. Craniometric data collected by Dr. Richard Jantz classifies this individual as African or African American.

Dentition

The left mandibular first and third molars were lost antemortem, and their sockets are mostly remodeled. Several teeth have carious lesions, with some resulting in complete crown destruction (Figure 54).

In the maxillae, the right first and second premolars have small to moderate distal interproximal cavities. The second premolar has beginning periodontal abscessing due to severe decay and abscessing of the adjacent first molar. The right first molar exhibits complete destruction of the occlusal, lingual, and interproximal surfaces; more than half of the buccal surface is destroyed. This decay involves the root and the pulp chamber is exposed. Periapical abscessing has occurred. Large carious lesions are also present on the right second and third molars, and both exhibit partial destruction of the occlusal and interproximal surfaces. The decay involves the root and pulp chamber, and both sockets have periapical abscesses.

On the left maxilla, the canine exhibits an interproximal lesion involving the root. The first premolar has a more extensive cavity that destroyed more than half of the occlusal surface and all of the mesial-interproximal surface. This lesion involved the root and exposed the pulp chamber, resulting in a periapical abscess. The second premolar has slight over-eruption, and a small carious lesion on the mesial-interproximal surface. The first and second molars both have small areas of decay on their interproximal surfaces involving the root. The third molar is slightly over-erupted due to the loss of the left mandibular third molar.

The right mandibular dentition has advanced decay. The right second premolar and first molar have complete crown destruction. These lesions also involve the root, and exposed the pulp chambers. Periapical abscesses have occurred for both tooth sockets. The right second molar has a large cavity affecting its mesial-interproximal and occlusal surfaces. The pulp chamber is exposed and a periapical abscess is present. The right

third molar has decay on the occlusal-buccal aspect with a small carious lesion on the lingual surface. A periodontal abscess is present and is characterized by pocketing and destruction of the lingual alveolar ridge.

On the left mandible, only the second premolar and second molar exhibit decay. The premolar has a small carious lesion on the distal-interproximal crown surface. The second molar has small areas of decay in the occlusal and buccal aspects of the crown, and a slightly larger area of decay on the mesial-interproximal surface. The first and third molars were lost antemortem, and resorption is nearly complete.

The right maxillary teeth have moderate calculus deposits (score 3). Slightly heavier calculus is noted on the molars. Calculus on the left maxillary dentition was less severe, ranging from flecks to moderate deposits and is more pronounced on the posterior dentition. Calculus on the right mandible ranges from moderate to coalesced, with heavier deposits on the molars. Calculus on the left mandibular dentition ranges from flecks to coalesced deposits, with the anterior dentition most affected.

Tooth wear is fairly mild; the most wear is noted for the maxillary and mandibular incisors. There are four sets of pipe wear facets (incipient pipe stem grooves), two on each side of the mouth. On the right side, the first set involves the maxillary lateral incisor and canine, and the mandibular canine and first premolar. The second set involves the maxillary canine and first premolar, and the mandibular first premolar. On the left side, one pipe set involves the maxillary central and lateral incisors and mandibular lateral incisor and canine. The second set involves the maxillary lateral incisor and canine, and the mandibular first and second premolars. Black staining from tobacco is present on some dentition and is most prominent on the left mandibular second molar.

Pathology

A probable perimortem fracture of the right supraorbital margin is present, such that the right zygomatic process of the frontal bone is fractured off and is loose (Figure 13). A related perimortem fracture is

present in the right maxilla. This fracture is superior to the alveolar process and exposes the floor of the maxillary sinus. A hairline fracture runs transversely from the margin of this fracture medially to the nasal aperture. The right zygomatic arch is also broken. These breaks are characteristic of a "tripod" fracture of the right zygomatic bone and usually occur from an impact during a fall or an assault (Galloway and Wedel 2013:148).

The right fibula has mild, well-healed periostitis on the middle third of the diaphysis. The left and right tibiae exhibit slight bowing of their shafts.

Degenerative changes are present in the spine, particularly the lower vertebrae. C5 and C6 articular facets have mild surface porosity. The centra of C3-C7 are also scored for slight lipping and porosity. T1-T9 have slight porosity on the surface of the facets, while the centra of T10-T12 have some mild marginal osteophytes. T12 has a shallow, elliptical Schmorl's depression in the middle of the endplate measuring 8 mm anterior-posterior by 3.6 mm transverse, with a depth of 1 mm. The first through third lumbar vertebrae have porosity on the articular facet surfaces and slight lipping is noted on the endplate margins. The fourth and fifth lumbar vertebrae have severe degenerative changes. Severe lipping is noted for the articular facets with moderate porosity and eburnation present on both the facet margin and surface on the right side. The sacral promontory and facets had corresponding osteophyte formation, porosity, and eburnation (Figure 55).

Slight lipping is present on the left and right acetabular margins.

Small enthesophytes are present on the left and right ischia.

Functional Morphology:

In the cranium, the temporal lines are roughened.

Muscle attachment sites of the arm bones are well developed. The humeri exhibit strong bilateral development. The deltoid tuberosities are moderately developed at the insertion site for the deltoideus

muscles. A raised attachment ridge for the insertion of the pectoralis major muscles is present, inferior to the greater tubercle. Shallow linear troughs for the insertion of the latissimus dorsi muscles are observed. On the right humerus, the supracondylar ridges are rough and developed at the origin for the brachioradialis which flexes the forearm, as well as the extensor carpi radialis longus and extensor carpi radialis brevis which extend the hand (Stone and Stone 2003; White 2012). The right humerus is larger and longer than the left, with the right measuring 337 mm in length (HML) and the left measuring 332 mm. This bilateral asymmetry is attributable to preferential use of the right arm. The phalanges of the hand have slight palmar marginal ridge development.

The femora have moderately large third trochanters. The insertions for the gluteus maximus muscles at the posterior-proximal subtrochanteric region are raised and roughened. The lineae aspera are moderately developed, particularly in the middle third of the diaphysis. At the midshaft, the left linea aspera is 6.8 mm in width and 3 mm in height; the right is 7.9 mm in width and measures 3.1 mm in height.

The soleal lines of the tibiae are deep and ridged, terminating in a trough on the medial posterior surface at the origin of flexor digitorum longus. On the proximal lateral diaphysis, the attachment sites for the interosseous membrane are roughened. No squatting facets are present on the distal tibiae.

This individual was engaged in routine heavy physical labor, as evidence by the development of the limbs and muscle attachment sites and the degenerative change in the spine. This was similar to 7SG57-AVERYSREST-09, which also evidenced strenuous activity. This individual exhibited more degenerative changes than 7SG57-AVERYSREST-09, and had much poorer dental health.

Sampling

The left fourth metatarsal was sampled for mtDNA analysis.

The femurs are candidates for DXA scanning.

Photography:

- Standard views of skull
- Occlusal views of dentition
- Pipe facets
- Sacrum articular facet abnormality
- Left inferior facet of L5 and sacrum eburnation
- Left T11 and T12 rib head facets
- Old fracture described on the right zygomatic, right supraorbital margin, and right maxilla superior to the alveolar process (**See Doug before photographing this)

7SG57-AVERYSREST-11

Present is the partial skeleton of a child of undetermined sex, approximately 4.5 to 5.5 years old (age code 06). The represented bones are in good condition with minimal postmortem erosion and breakage. The cranium has flaking from exfoliation on the anterior-superior frontal bone. There is a retained portion of the metopic suture at nasion.

The mandible is missing from the skull. Missing from the postcranial skeleton are the cervical vertebrae, sternal body, several ribs, the right scapula and clavicle, both patellae, the right ulna and radius, likely due to postmortem disturbance by a rodent burrow. The burrow disturbed the skeleton's chest and right hip area. A piece of a modern, blue tarp and plastic bottle were brought into the hole and were recovered

with the bones in the grave. Bone fragments associated with this child were recovered outside of the burial in the plow zone as well. These were re-associated in the lab.

The sternum is represented by a poorly preserved partial manubrium; the body is missing. The left clavicle and scapula are present. The scapula is discolored grey. Ten ribs (two left and eight right) are represented; nine are fragmentary from postmortem breakage. Both humeri, the left proximal epiphysis (humeral head), and proximal left radius and ulna represent the arm bones. The outer cortex of these elements is in fair to poor condition, exhibiting flaking and minor postmortem deterioration. Eleven vertebrae are represented, some are partial. The sacrum and coccyx are absent. Both femora are in good condition, and the distal and proximal epiphyses are unfused. The distal epiphyses and the superior epiphysis of the right side are present. The shafts of the tibiae are represented and exhibit some postmortem damage, most notably on the anterior proximal and distal ends. Both proximal epiphyses have not yet fused and are present as separate elements. The left fibula is fragmentary and the right fibula exhibits flaking of the cortical bone surface. The tali and calcanei were recovered, but are partial.

A green shroud pin stain is present above the left superior orbital rim. A plant root interrupts the stain, and a faint green discoloration is present on the anterior surface of the root as well.

Age

An age of 4.5 to 5.5 (age code 06) was assigned based on the development of the dentition, epiphyseal union, and long bone lengths. The deciduous maxillary first and second molar roots show apex complete formation suggesting the individual is older than 3 years (Figure 56). The permanent maxillary first incisor is stage $R_{1/4,}$ which is consistent with an approximate age of 6 years. The maxillary second incisor was assessed radiographically as having R_i formation, also consistent with approximately 6 years of age. The permanent maxillary canine has crown-complete formation, which lowers the age to 3.9 years. The right maxillary first

premolar has crown three-fourths development suggesting an approximate age of 4.5 years, and the right maxillary second premolar is crown three-fourths formed, reflecting an age of about 5 years. The first molar has apex ½ formation of the root (6.7 years), and the maxillary second molar crown complete formation (6.2 years). The child is in the period of mixed dentition with both deciduous and permanent teeth recovered. All features suggest an age of about 5 years since tooth development is generally precocious in children with African ancestry in relation to Caucasian standards.

The length of the right humerus is estimated at 199 mm, suggesting an age of 6.5-7.5 years. The length of the right femur is estimated at 267 mm, suggesting an age of approximately 7 years. The innominate has not yet fused. The vertebral centra are mostly fused to the neural arch, but at least one mid-thoracic arch is unfused. Fusion lines are visible on T1. One unfused cervical centrum is present.

Sex

Sex for this individual is indeterminate. The cranium has wide mastoid processes and large dentition. A slight nuchal ridge is present. The ilia exhibit sunken auricular surfaces, and the sciatic notch is moderately wide.

Ancestry

This individual has African ancestry. The first and second permanent maxillary molars exhibit crenulation and are large in size. There is a tendency towards shovel-shaping of the incisors. The interorbital distance is wide, and there is low relief of the nasal bones. The cranial vault shape is consistent with African ancestry.

Dentition

The dentition of this child is incomplete due to postmortem damage and missing mandible. The maxillary permanent incisors, canines, the first premolars, and the first and second molars are present. Both

deciduous first molars are present, as well as the left deciduous second molar. The first deciduous molars have absorption of approximately a third of the apices. The deciduous second molars are just beginning to resorb. A small distal interproximal cavity is present on the deciduous right maxillary second molar.

X-rays of the dentition were taken to visualize the unerupted dentition in addition to root formation. There is slight peg-shaped morphology of the left maxillary second incisor.

Pathology

No pathological conditions are noted for this individual. Bossing of the right parietal is attributed to normal cranial asymmetry. The femora and left tibia were x-rayed, and no transverse lines of arrested growth are present (Figure 57).

Sampling

A right rib (6-10 range) was sampled for mtDNA testing.

Photography

- No photographs requested