Brimstone Hill Archaeological Project Report No. 25

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Human Skeletal Remains from Excavations at Brimstone Hill Fortress
National Park, St. Kitts, West Indies, July – August 2004

Introduction

Excavations sponsored by the Brimstone Hill Fortress National Park Society and the University of Tennessee, Knoxville at the Brimstone Hill Fortress National Park, St. Kitts, West Indies, during July and August of 2004 uncovered nine isolated human skeletal elements and teeth from separate excavation units at site BSH 2, located between the Orillon and Magazine Bastions. In addition, excavations at site BSH 4 at the uncovered one human burial. Digital images of the recovered skeletal elements are on file at the University of Tennessee, Knoxville, and at Brimstone Hill Fortress National Park.

The primary goal of excavations conducted at BSH 2 in 2004 was to locate the southern wall of a habitation structure/workshop utilized by enslaved Africans. Previous excavations conducted by the University of Tennessee located the eastern and northern edges of this building, in addition to locating a contemporary hospital building nearby (Schroedl 2000). During these excavations, isolated human remains as well as four burials were uncovered (McKeown 1997; 1998; 1999; 2000). The 2004 excavations identified an additional seven burials within the limits of the habitation/workshop structure. Therefore, it is reasonable to infer that BSH 2 was used as a burial ground at some point after the building was no longer in use; (Schroedl 2000) and that the recovery of isolated elements from the excavations are a result of the disturbance of primary burials from either construction or later burials at this site.

The excavation undertaken at BSH 4, located adjacent to the apex of the Orillon Bastion, was to investigate the site prior to the proposed building of a cellular phone tower. While excavating unit 95-06 N 102-103 W, the back of a human juvenile skull was uncovered in the northeast corner, at elevation 98.69 meters. In order to fully expose this burial, denoted Burial 1,
three more units were excavated: 96-97 N 101-102 W, 96-97 N 102-103 W, and 95-96 N 101-102 W. This burial is probably not an isolated feature, as there is a marked graveyard located to the south of the Orillon Bastion, and it is surmised that burials continue around the bastion to the south and west (Schroedl 1997). In addition, there are at least two other possible burials near where Burial 1 was found, based on the topography and two possible grave markers.

**Materials From BSH 2**

Ten isolated human elements were found at BSH 2. These include five phalange (finger bone) fragments, four of which came from two levels in the same square; a right maxilla containing the first and second molars; a complete right cuboid bone; a lower central incisor; a lower right lateral incisor; and two upper right lateral incisors (Table 1).

<table>
<thead>
<tr>
<th>Unit</th>
<th>Level</th>
<th>Elevation</th>
<th>Skeletal Element</th>
</tr>
</thead>
<tbody>
<tr>
<td>196-197 N 101-102 W</td>
<td>4</td>
<td>99.70-99.60</td>
<td>3 phalanges</td>
</tr>
<tr>
<td>196-197 N 101-102 W</td>
<td>5</td>
<td>99.60-99.50</td>
<td>1 fragmented phalange</td>
</tr>
<tr>
<td>195-196 N 101-102 W</td>
<td>9</td>
<td>99.20-99.10</td>
<td>right maxilla with 1st and 2nd molars</td>
</tr>
<tr>
<td>195-196 N 101-102 W</td>
<td>13</td>
<td>98.80-98.70</td>
<td>right cuboid</td>
</tr>
<tr>
<td>197-198 N 101-102 W</td>
<td>9</td>
<td>99.10-99.00</td>
<td>1 fragmented phalange</td>
</tr>
<tr>
<td>197-198 N 101-102 W</td>
<td>10</td>
<td>99.00-98.90</td>
<td>1 lower central incisor</td>
</tr>
<tr>
<td>197-198 N 102-103 W</td>
<td>4</td>
<td>99.40-99.30</td>
<td>1 lower right lateral incisor</td>
</tr>
<tr>
<td>198-199 N 102-103 W</td>
<td>2</td>
<td>99.60-99.50</td>
<td>1 upper right lateral incisor</td>
</tr>
<tr>
<td>203-204 N 105-106 W</td>
<td>2</td>
<td>98.60-98.50</td>
<td>1 upper right lateral incisor</td>
</tr>
</tbody>
</table>
As each of these remains were recovered and identified as human, they were carefully wrapped and labeled for transport to the United States for analysis. At the University of Tennessee, Knoxville, the remains were unpackaged and carefully examined.

When examining skeletal remains, there are certain biological details such as sex, ancestry, stature, and age at death that can usually be ascertained from them. There are exceptions to this, however, as each criterion depends on which elements are present, how complete they are, and whether or not the remains represent a juvenile or adult. In addition, for bones that are paired (such as bones of the arms, legs, hands, etc.) it is possible to determine which side (right or left) a particular element represents. Isolated skeletal elements such as the ones recovered at BSH 2 make it difficult, if not impossible, to accurately determine sex, ancestry, stature, and age at death. In this case, the only biological aspects that can be determined about each isolated element is from which side it originated, and that they are each individually from an adult, defined as being past the point of puberty, or at least 18 (Gruell and Pyle 1959). In addition, there are systems that allow for the recording of tooth wear (Murphy 1959; Scott 1979; Molnar 1971). While wear has little or no correlation to age, it may reveal information about diet (Hillson 1996).

The three finger bones recovered in unit 196-197 N 101-102 W, Level 4, were: one 4th left side metacarpal with the distal end broken off, one fragmented metacarpal, with both ends broken off, making it difficult to assign side/number, and one distal phalange, a bone that is very difficult to assign side/number (White 2000). The phalange found one level lower (Level 5) in the same excavation unit, had both ends missing, making it impossible to determine side and number. However, the morphology of the shaft confirms it as an intermediate phalange from either the 2nd, 3rd, 4th, or 5th digit. According to Scheuer and Black (2000), finger phalanges and metacarpals are fully formed by the age of 14 for females and 16 for males. Once bones are fully fused and the fusion lines are obliterated, it is very difficult to age them. Therefore, a minimum
but not maximum age can be reached. In this case, the bones belonged to one or more individuals at least 14-16 years old. The fully fused nature of the bones, however, suggest an age range of at least 18-20 years (Gruelich and Pyle 1959). Because these finger bones came from the same excavation unit, they may have originated from the same burial.

The right half of the maxilla found in unit 195-196 N 101-102 W at Level 9 had its first and second molars still present in their sockets. The other teeth were missing postmortem — i.e. sockets were present for them. Additionally, there is a socket for the third molar, which indicates that it erupted before death. Therefore, this individual was at least 18-21 years of age at death (Hillson 1996). There was not much wear on the teeth, the 2nd molar having none and the 1st molar scoring relatively low on two systems: the 1st molar scored a 3 out of 6 on the Murphy (1959) system and a 6 out of 10 on the Scott (1979) system. However, wear patterns have little or no correlation to age, as wear is dependent partially on diet (how much abrasive materials are present in the diet) and on occlusion with other teeth (Hillson 1996). Both teeth had evidence of calculus (hardened plaque) buildup along their root-crown junction and the first molar had evidence of the beginning stage of a carious lesion (cavity). Other than that, the overall impression is of two healthy teeth.

The other human element found in the same unit as the maxilla, 195-196 N 101-102 W, at Level 13, was a complete right cuboid (ankle) bone. By age 8, it is completely ossified, having all of the landmarks of the adult bone (Scheuer and Black 2000). This cuboid is adult size, with all of the appropriate landmarks. There are no studies relating cuboid morphology to sex, age, stature, or ancestry. Therefore, all that can be said about this bone is that it is from the right ankle of an adult.

The finger bone found in unit 197-198 N 101-102 W, at Level 9, had its distal end broken off. Based on morphology, it is a left first proximal phalanx. As it is fully formed, this is an adult bone. As discussed earlier, phalanges are fused by the age of 14 - 16 (Scheuer and Black
Since this bone has no lines of fusion evident, it definitely belongs to an individual older than 14 to 16 years (Greenish and Pyle 1959). As with the cuboid, no more can be said about this bone other than that it belongs to an adult. The other human element found in this unit, at Level 10 (99.00-98.90) is a single permanent central incisor. These teeth usually erupt by age 7 (Hillson 1996), but as there are no mammelons present (bumps on the occlusal surface which marks a newly erupted tooth), it is probably from a much older person. Determining side with mandibular central incisors is challenging due to the similar morphology of these teeth, and therefore not usually attempted (Marks, personal communication 2004). This tooth was slightly worn, scoring a 3 of 8 on the Murphy (1959) system and a 2 of 8 on the Moynart (1971) system.

The tooth also had a buildup of calculus on the crown – root margin, which would indicate a person probably older than 18 years (Hillson 1996).

The rest of the human materials recovered at BSH 2 were all teeth. In Unit 197-198 N 102-103 W, at Level 4 was a permanent lower right lateral incisor. Part of the root was broken off the tooth postmortem. This tooth erupts by age 8. It is probably an older individual, however, due to the lack of mammelons and the slight buildup of calculus on the crown – root margin. There was not enough wear on this tooth to score it using either the Moynart (1971) or Murphy (1959) systems. Interestingly, this tooth has two clear lines across the enamel, representing enamel hypoplasia. Enamel hypoplasia is a defect in the thickness of the tooth enamel, which results in a disturbance in the form or outline of the tooth crown (Hillson 1996). Hypoplasias are essentially the result of the brief disruption of enamel secretion when teeth are being formed, and are caused by a variety of disturbances in the biological system, including malnutrition and chronic illness (Hillson 1996). It is not unusual to see enamel hypoplasia in archaeological human remains, because poor nutrition generally was widespread.

The tooth found in Unit 198-199 N 102-103 W, at Level 7, was a permanent upper right lateral incisor. Permanent upper lateral incisors erupt by age 9, and similar to the other teeth
found, this tooth is also probably from an older individual since it lacks mammelons. The wear on this tooth scored a 3 out of 8 on the Murphy (1959) scale and a 3 out of 8 on the Molnar (1971) scale. The tooth also has some postmortem damage to the enamel at the occlusal surface. Interestingly, this tooth has a distal indentation on the labial distal side of the enamel – which is one of the variant types of permanent upper incisors (Hillson 1996). This tooth also displays three lines of enamel hypoplasia.

Lastly, the tooth found in 203–204 N 105–106 W at Level 2 is a permanent upper right lateral incisor. This type of tooth erupts by age 9, and there are no mammelons present, indicating a tooth from an older person. This tooth’s morphology is interesting, as it has a groove running from its crown to the root on the lingual surface known as a crown-root groove (Hillson 1996). In addition, the wear facet on the tooth is minimal, scoring a 2 out of 8 on the Murphy (1959) system and a 2 of 8 on the Molnar (1971) system. Like the other two incisors discussed above, this tooth has two clear lines of enamel hypoplasia. The root on the tooth was fractured postmortem.

Summary

The nine human elements found at BSH 2 during July of 2004 were all isolated finds, and therefore possibly represent nine different primary burials. However, as some elements were found close to one another, it cannot be ruled out that fewer burials are involved. As these remains were isolated finds, the only biological criterion that can be stated with certainty is that they all belong to adults; and that the presence of enamel hypoplasias on the incisors indicate that the individuals from which the teeth came suffered some sort of nutritional or serious illness during childhood. Circumstantial evidence, such as the occurrence of 19th century burials of British soldiers in the vicinity of BSH 2 (Schreriel 2000), and that disturbed human remains have been recovered at BSH 2 in the past (McKeown 1997, 1998, 1999, 2000) suggests that the
remains from BSH 2 belong to men of European ancestry - British soldiers who served and died at Brimstone Hill Fortress in the late 1700s and early 1800's.

**Materials From BSH 4**

Burial 1 at BSH 4 was found in four units: 95-96 N 102-103 W, 96-97 N 101-102 W, 96-97 N 102-103 W, and 95-96 N 101-102 W at elevation 98.69 meters. The grave was unmarked and was oriented east-west, with the head to the west. The position of the skeleton was with the legs straight and the arms to the side. The grave was located 90 degrees to the Orillon Bastion. Its dimensions north/south were 67 cm, and east/west were 90 cm. The depth from the datum was 1.27 meters, with the elevation of the burial being 98.73 meters, and the depth from the surface was 82 centimeters. The burial was clearly interred after the construction of the Orillon Bastion, and could date anytime after the 1750's. The recovery of iron nails and wood fragments indicates burial in a wood coffin.

In addition, a single rodent skull was recovered with the burial. It was located on the right upper thorax, along with several other small rodent bones. The rodent is *Rattus norvegicus*, or brown Norway rat, which is known to burrow and favors meat consumption. Therefore, it is probable that this particular rat dug its way into the burial for a meal, and met its demise there.

Burial 1 was carefully mapped, photographed in situ, and then excavated and packaged for transport to the University of Tennessee, Knoxville for further analysis. An inventory of the elements was done in the field and because the skeletal elements were in fragmentary condition, the bones were carefully packaged in aluminum foil and plastic for transport. At the University of Tennessee, Knoxville, the remains were carefully unpacked, sorted, and another inventory was completed. Each element was carefully examined, but no evidence of trauma was detected. However, there is some evidence of a condition known as cribra orbitalia, discussed in the succeeding section.
As discussed with BSH 2, there are certain biological characteristics that usually can be determined from examining human remains: sex, ancestry, stature, and age at death. A number of factors, including elements present and whether or not the remains are juvenile or adult will determine whether or not each characteristic can be accurately assessed. In the case of Burial 1, since the remains represent a juvenile (as will be discussed below) the only biological aspect ascertainable is age at death. The eruption and formation of the teeth occurs at a predictable rate, and this sequence and timing of dental growth and development is known, making it relatively simple to age skeletal remains from children when teeth are present (Hillson 1996). However, determining sex and ancestry from juveniles is not possible, as the features on the bones that would reveal these biological measures do not develop until puberty (Byers 2001). In addition, stature can be ascertained from children, but not from infants.

Burial Description

The remains from BSH 4, Burial 1 represent a single individual. The person was buried in a coffin, as evidenced by coffin nails and wood fragments found with the skeleton. Much of the recovered skeleton was in fragmentary condition, although most bones were still identifiable. A list of the bones recovered and their condition is as follows:

Skull:

- Frontal – right and left halves
- Occipital – pars squama, right and left pars lateralis, pars basilaris
- Parietal – just fragments
- Temporal – right and left halves
- Ear ossicles – left stapes
- Nasals – 2 left fragments, also 1 nasal concha
- Zygomatic – right and left halves
- Sphenoid – fragmentary
- Ethmoid – fragmentary
- Maxilla – fragment of left side
- Maxillary teeth – all deciduous tooth buds
- Mandible – right and left halves
- Mandibular teeth – all deciduous tooth buds
Postcranial:

Cervical vertebrae – all 7 present in halves
Thoracic vertebrae – 11 processes and centra
Lumbar vertebrae – 4 halved processes, 5 centra
Sacrum – fragmentary
Ribs – 10 right, 16 fragments of left
Humerus – left almost complete; right shaft fragment
Radius – left small fragment; no right
Ulna – left distal end and shaft; right distal end present
Scapula – left and right fragments only
Clavicle – left lateral end only; right complete
Ulna – left and right fragments
Femur – left almost complete; right mostly shaft
Tibia – left fragments of shaft; right mostly shaft
Fibula – left mostly shaft; right fragments of shaft
Phalanges – 9 side unknown; 2 left; 2 right

Juvenile skeletons have more individual bones than adults, as these extra elements will come together and fuse eventually, allowing for growth in the bones. Since a good number of the bones recovered from Burial 1 were not yet fused (e.g. vertebrae, mandible, frontal, occipital, pelvis), observation in the field suggested that Burial 1 was a juvenile. In the University of Tennessee, Knoxville osteology laboratory, the elements that best reveal age at death for a juvenile were closely examined.

The occipital bone is a very good indicator of age at death for juveniles, as it fuses at predictable ages. One of the pieces of the bone, the pars basilaris, can be measured and these measurements compared to a chart of measurements of infants of known age at death (Scheuer and Black 2000). The width of Burial 1’s pars basilaris is 19 millimeters and the length is 17 millimeters. According to Scheuer and Black (2000), when the width measurement is greater than the length measurement, the bone belongs to an individual at least 5 months old. The comparison of these measurements to a chart of known age at death infants places Burial 1 at an age between 5 and 8 months (Scheuer and Black 2000). This chart is an estimate, however, as the
sample size of known age of death infants is very small, and thus the range may actually be higher.

In addition, it is possible to measure other bones, when complete, and compare the measurements to similar charts constructed for infants of known age. The only other complete bone that was subject to this method was the right clavicle. It measured 56.34 millimeters, which when compared to measurements from known age at death infants, placed Burial 1 at an age between 7 and 12 months (Scheuer and Black 2000). When compared to measurement ranges as opposed to mean measurements, the age range was wider: between 7 and 18 months. However, based on the evidence from the pars basilaris, the age is probably closer to 7 to 12 months.

One of the best methods of estimating age at death from juvenile remains is through the analysis of teeth. Teeth form and erupt at predictable rates and ages. In addition, all deciduous (baby) teeth are already formed at birth, just waiting to erupt (Scheuer and Black 2000). In the case of Burial 1, although several teeth had fallen loose of the bone, teeth in the left side of the mandible were still intact. The analysis of this side of the maxilla revealed that the central deciduous incisor had fully erupted, with the lateral incisor beginning its eruption. The average age of eruption of the central maxillary deciduous incisor is 8 months, with a range of 6 to 10 months (Scheuer and Black 2000). The average age of eruption of the lateral mandibular deciduous incisor is 13 months, with a range of 10 to 16 months (Scheuer and Black 2000).

Based on the age ranges given for the pars basilaris and clavicle measurements and the full eruption of the central incisor, Burial 1 represents the remains of an infant who died at age 8 to 10 months. Sex and ancestry cannot be determined for infants, so it is not possible to say whether this infant was male or female, of African or European ancestry.

As far as pathology is concerned, there was some evidence of a condition known as cribra orbitalia, which manifests itself as a lesion of bone in the eye orbit, usually causing pitting and
porosity of the bone (Ornner 2003). This condition is a result of a metabolic disturbance, usually iron deficiency or some other vital nutrient deficiency (Ornner 2003). The evidence seen on the right side of the frontal bone is slight, and perhaps may just be a result of the wearing of the bone.

Summary

Burial 1 at site BSH 4 represents an 8 to 10 month old infant. The child was buried in a wooden coffin, orient east – west, both of which would suggest a child of European ancestry. The child’s age at death is the only aspect that could be determined for certain. There was no way to determine ancestry or sex. It was not surprising to locate a burial in the vicinity of BSH 4, as there is a marked graveyard located to the south of Orillon Bastion and several areas of sunken soil and large rocks along the south bastion wall may represent graves. There are in addition numerous graves located between the Orillon and Magazine Bastions (Schroedl 2000).

Acknowledgements

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