

31 RESULTS OF THE SKELETAL ANALYSIS FOR THE 2011 ST. GEORGE'S CAYE ARCHAEOLOGICAL FIELD SEASON

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A total number of eighteen individuals were excavated during the 2011 St. George's Caye Archaeological Field School, which took place in July of 2011. The individuals were in single, unmarked graves and had few identifying artifacts associated with them. Both non-metric and metric data were collected for the individuals in an attempt to estimate age, sex, and stature. There were a high percentage of males in comparison to females represented in the cemetery at St. George's Caye and the age distributions indicate that the population was relatively young. Stature and long bone metrics were compared to ancestrally similar populations in an attempt to estimate relative health levels. Statistical analysis of long bone lengths does not support the hypothesis that the individuals differ significantly from their peers in the American colonies or Britain. The prevalence of common dental pathologies observed in the sample is also consistent with those observed contemporaneous groups. Further research is recommended to gain a better understanding of the colonial group.

Introduction

This paper reports on the analysis of the skeletal remains excavated from the cemetery at St. George's Caye during the 2011 field season. The burials were analyzed to provide demographic and baseline health data for the population. A total number of eighteen individuals were excavated from nine 2x2 meter units. The area excavated included fifteen burials, 12 of which were in single, unmarked graves. Two additional burials involved commingled remains. Only Burial 1, which included a partially legible coffin plate, contained an artifact that could be used to help identify the interred individual.

Burial Locations and Inventories

In total, eighteen individuals were excavated from fifteen burials. Two additional burials were located but not excavated. The burials were assigned numbers one through seventeen based on their relative positions within the operation. Burial 1 was located at the southwestern corner of the excavation area. The remaining burials were numbered sequentially from the southwest to northeast with Burial 17 located at the most eastern-most extension. Figure 1 is a close-up schematic of the 2011 excavation units.

Osteological analysis was performed for all but one of excavated individuals, who was represented by a single fibula in commingled Burial 15. Age, sex, stature, and health were estimated via skeletal analysis, and ancestry was inferred from historical texts. Morphological

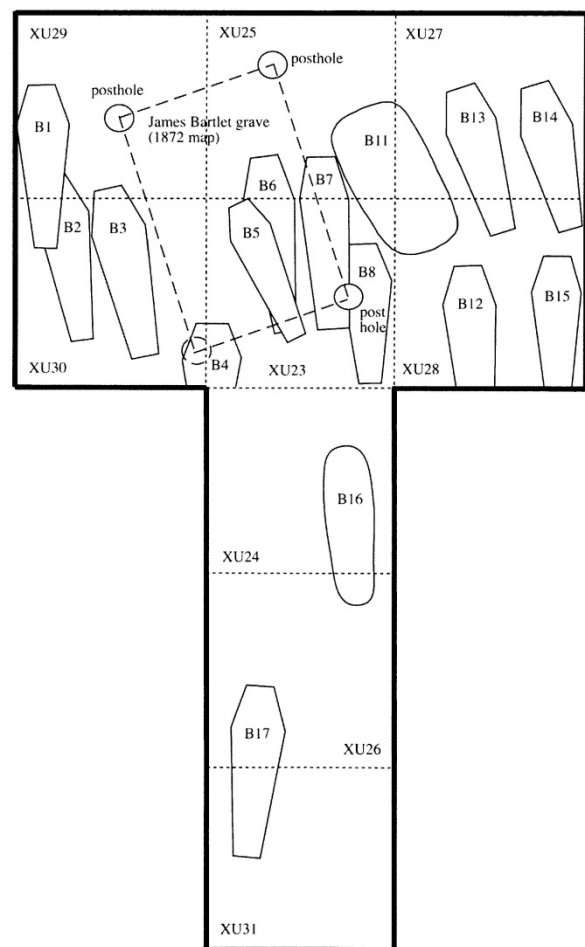


Figure 1. Schematic of the 2011 excavation.

and metric characteristics indicative of ancestral origin were recorded when available, but due to the poor preservation of the facial regions of the skeletons, they were very few in number. The

Burial No.	Age	Sex	Dental Pathologies	Other Pathologies	Coffins/ Burial Artifacts
	<i>Category</i>				
1	Young Adult	Male	Caries and hypoplasia	-	Coffin plate
2	Middle Adult	Male		-	Coffin
3	Middle to Older Adult	Male	Caries and hypoplasia	-	Coffin and Spanish Reale
5	Adult	Male	Caries	Pacchonian pits	-
6	Young to Middle Adult	Male	Caries and hypoplasia	Vertebral lipping and Schmorl's nodes	Coffin
7	Subadult	N/A	Caries	Cranial lesions	-
8	Adult	Indeterminate		-	Coffin
9	Adult	Ambiguous	Caries and hypoplasia	Abnormal suture closure, limb bowing, and periosteal infection	Faunal bone
10	Adult	Male	Caries and hypoplasia	Extensive hypoplasia	Faunal bone
11A	Adult	Male	Caries	-	Conch shells
11B	Adult	Female	Caries	-	Conch shells
13	Young to Middle Adult	Female	Caries and hypoplasia	-	Coffin
14	Subadult	N/A	Hypoplasia	-	-
15A	Middle Adult	Indeterminate	-	-	-
15B	Subadult	N/A	-	-	-
16	Young to Middle Adult	Ambiguous	Caries and hypoplasia	-	-
17	Young to Middle Adult	Male	Caries and hypoplasia	-	Coffin

Table 1. Results of osteological analysis for the 2011 St. George's Caye Archaeological Project.

results of the osteological analysis are presented in Table 1.

Preservation

Preservation of skeletal and burial materials varied widely in the cemetery with respect to the depth of burial. Sitting in the middle of a fluctuating water table, the cemetery has been subjected to periodic bouts of saturation by sea, fresh and brackish water since its inception. Excavations revealed a pattern of preservation that is reflective of the amount of time the burials remained submerged in water. The uppermost levels of the cemetery, where the water table was inconsistently present, produced poorly preserved skeletal fragments and a complete lack of organic coffin remnants. In contrast, skeletal elements were better preserved

at lower depths and those burials extending deepest in the units were found with organic coffin remnants. A clear soil change in the profiles of the units likely indicated the lowest height of the water table, and materials situated beneath that depth were among the most well preserved at the site. During 2011, only the bases and partial sidewalls of coffins were recovered. The lids and walls of the coffins extending above the water table were not preserved.

Specific classes of skeletal remains also displayed different degrees of preservation. The flat bones were particularly prone to poor preservation, and those most damaged included the bones of the face, scapulae, ribs, vertebrae, sterna, innominates, and sacra. The long bones maintained the highest degree of preservation,

although the articular surfaces were frequently damaged or destroyed. Removal of burials for analysis at the lab additionally impacted the integrity of the skeletal remains. Many elements were extremely friable and fragmented upon removal. Other common issues included root damage and unintentional fracturing during excavation. Figure 2 illustrates the various degrees of preservation encountered in the burials.

Dating the Cemetery

Mortuary Style

The mortuary style of the burials excavated during the 2011 field season was compared to styles popular among contemporary groups in Europe and North America. The only coffin type found in the cemetery at St. George's Caye is the generally unadorned "pinch toe" or "shoulder" coffin. These coffins are wooden and have a characteristic hexagonal in shape that tapers towards the toe. Pinch toe coffins were the primary means of burial in European and American populations until the Beautification of Death Movement of the nineteenth century (LeeDecker 2009).

During the early to mid-nineteenth century, mortuary behavior in North America and Europe change dramatically. The Beautification of Death Movement began in the late eighteenth and early nineteenth centuries and was marked by a cultural and material shift of attitudes toward the dead. Stylish grave markers, monuments and decorative coffins became commonplace, and elaborate epitaphs to decorate tombs rapidly gained in popularity. Only one burial from the 2011 excavations exhibited any such evidence of adornment. Burial 1 included an inscribed, heart-shaped, metal coffin plate found in association with the skeletal remains. This burial may be representative of the beginning of a shift in mortuary style among the settlers on the caye.

Additionally, the burial styles found during the 2011 field season contrast with the cemetery descriptions, photographs, and the epitaph inscriptions recorded by Usher in 1907. As opposed to documenting the use of the classic pinch toe coffins, the burials described by Usher were composed of concrete, above-ground



Figure 1. Burials 5 through 11 illustrating the range of preservation encountered.

tombs that were topped with marble lids. The lids were etched with epitaphs including the identity of the individuals and often poetry or biblical verses (Usher 1907). While a few of these burials dated to the end of the eighteenth century, the majority were dated within the nineteenth century. The descriptions provided by Usher demonstrate mortuary styles on the caye that align closely with those gaining popularity during the Beautification of Death Movement. Since the burials uncovered in 2011 are stylistically less advanced than those documented in the nineteenth century, it is likely that they originated sometime in the eighteenth century.

Specific Burials

The identified graves of the Reverend John C. Mongan and James Bartlet were also used to establish a tentative date of use for the cemetery. A brick grave previously excavated in 2010 was identified as belonging to Reverend John C. Mongan, who died in 1860. The grave was located at a higher elevation than that of the burials excavated during 2011, indicating that it may be from a later date. The grave enclosure was additionally constructed out of brick and more stylistically advanced than those seen during 2011.

In 2011, another grave was located, identified, and matched to one of the epitaphs recorded by Usher in 1907. Three posts were identified in XUs 23, 25, and 29 that most likely represent the corners of a burial present on an 1872 cemetery map drawn by Rob Hume. Loose brick that is believed to be part of a tomb

was found in the sand between the posts at a depth superior to those of the 2011 burials. The placement of the three posts very closely corresponds to the two western and the northeastern corners of the burial of a man named James Bartlet. According to memorial epitaphs recorded by Usher (1907), James Bartlet was interred in 1800. His grave was also memorialized by an epitaph inscription that both identified the burial and celebrated his life's work.

The identified burials of John C. Mongan and James Bartlet both appear to postdate the 18 graves analyzed in this report. This is indicated in both their mortuary style and depth of burial. Because the grave depth and style of the 2011 burials seem to predate the previously located and described burials, the plots excavated during the 2011 season are estimated to be from the mid to late eighteenth century.

Sex and Age Distributions

Sex

More males than females were excavated from the cemetery at St George's Caye, with 47% (n=8) of the individuals in the cemetery estimated as male and 12% (n=2) estimated to be female. Of those remaining, 12% (n=2) displayed features that were not diagnostic of sex, 12% (n=2) had too few diagnostic features from which to estimate sex, and 17% (n=3) were subadults. Despite the scarcity of females in the sample, it is possible that the sex distribution observed in the cemetery at St. George's Caye is consistent with the sex distribution of the eighteenth century population living at the caye. Differential burial practices among men and women, and male-dominated migrations to colonial territories have been previously cited as mechanisms that can lead to unbalanced sex ratios in archaeological samples (Ashmore and Gellar 2005; Engerman 2000; LeeDecker 2009). Alternatively, given that the initial excavations of the cemetery grounds only covered a very small portion of the total area, it is possible that future excavations will expose more female internments and possibly even out the sex ratio of the sample.

Age

Age ratios indicate that the population was relatively young in comparison to contemporary groups. The most common age-at-death categories found in the sample are for early and middle adults, with very few older individuals present. Where able, individuals from St. George's Caye were grouped into one or more age classes of subadult (<20 years), young adult (20-34 years), middle adult (35-49 years), and older adult (>50 years). Of the individuals assigned to a specific age group, 27% (n=3) classified as subadults, 64% (n=7) as younger to middle aged adults, and only 9% (n=1) as middle to older aged adults. Six additional individuals were estimated as adults, but were unable to be assigned to a more specific age group due to poor preservation of the necessary skeletal elements. The ages for the individuals at St. George's Caye were relatively young in comparison to the British age-at-death distributions from contemporaneous samples interred in Chelsea Old Church and St. Bride's Lower churchyards in England. Thirty-six percent and 30% of the individuals were aged as older than 46 years at their time of death in the Chelsea Old Church and St. Brides's Lower samples, respectively (Centre for Human Bioarchaeology 2011). Again, the disparity in age among the samples may be due to a number of causes varying from unbalanced migrations or small sample size.

Ancestry

Because ancestry could not be estimated skeletally for the individuals interred at St. George's Caye, ancestry for the sample was inferred from available demographic and historic texts. Initial investigations into historic records suggest that the cemetery is mainly comprised of individuals of European ancestry (Bolland 1977; Garber 2011; Setzekorn 1975; Usher 1907; Waddell 1961). However, it is known that African enslaved groups did live on and near the caye at the same time as the European settlers. Additionally, indigenous Mayan and Carib groups were living near St. George's Caye during the colonial period (Shoman 2000). Admixture between the groups was documented both during and after the period of slavery in Belize, which suggests that the presence of

individuals of African, native, or mixed descent in the cemetery could be a very real possibility.

Despite the sparse amount of biological data available to aid in ancestry estimation, indications of a diverse population have presented in some of the skeletal remains. For example, some of the individuals excavated displayed shovel-shaped incisors and complex cranial suture patterns which, although found across populations, are considered more commonly associated with Asian and Native American groups (Ortner 2003; Pindborg 1970). Additionally, a single coin was found adhered to the cranium of the individual in Burial 3. Excavations of a historic African American cemetery in Pennsylvania included burials characterized by the placement of a single coin near the head (LeeDecker 2009). This practice is considered distinctively African in origin. While the placement of the coin could be completely coincidental, it may also represent the presence of an individual of African ancestry in the cemetery or the adoption of African customs into the colonists' mortuary practices. Lastly, in the 2010 field season two culturally modified teeth were found buried in an adjacent area of the cemetery. The teeth were both medial maxillary incisors and had been culturally modified by filing on the occlusal surfaces. While the cultural practice of dental modification is not common in individuals of European ancestry, it is frequently associated with both Native American and African groups (Finucane et al. 2008).

General Health

Stature

Stature was analyzed for the sample at St. George's Caye because significant differences among the statures of biologically similar groups can indicate that health disparities exist between the populations. The total number of individuals from St. George's Caye for which stature could be estimated was twelve. Average stature for male adults (n=7) was calculated and compared to contemporaneous British and American samples. The lowest and highest values obtained for a male stature interval were 144.1 and 181.3 cm, respectively. The average stature for the male group was 165.3 cm. To analyze

the height statistics of the sample, Analysis of Variance was used to test for significant differences among the British, American, and St. George's Caye samples. There were no significant differences found in the statures of the St. George's Caye group when compared to British or American samples of the same time period. Consequently, stature analyses fails to indicate that the population residing at St. George's Caye was experiencing different levels of health than those observed in contemporaneous populations.

Dental Health

The prevalence of the common dental pathologies observed in the St. George's Caye sample is also consistent with those that were observed in contemporaneous British samples. However, it should be noted that the dental statistics described for this sample report on the occurrences of particular pathologies per individual analyzed, not per tooth. As the pathologies are not reported based on their occurrence per tooth and most individuals were missing data due to postmortem loss of dentition, the results presented are more likely to underrepresent the total occurrence of the pathologies.

Of the individuals with dentition present, 64% exhibited parallel grooved striations or pits on their anterior dentition consistent with enamel hypoplasias. Another 86% of the individuals had visible caries, with the lesions ranging in size from small (<1 mm wide) to large (covering an entire side of the crown). Eighty-six percent had calculus deposits on their enamel or root surfaces. Alveolar resorption was present in 75% of the individuals and another 69% displayed visible antemortem tooth loss.

Pathological Lesions

Burial 5

The individual in Burial 5 had seven endocranial lesions on the left and right parietals. The lesions ranged from 1 to 4 mm in diameter and were roughly circular in shape. They were all located along the sagittal and coronal sutures. The defects were smooth-edged and did not extend through the exterior surface of the crania. Their morphology is consistent

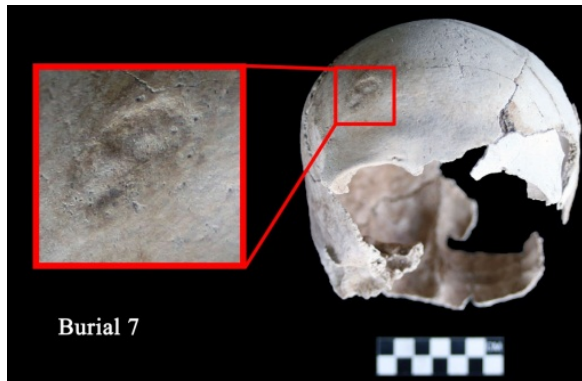


Figure 3. Frontal lesion of Burial 7.



Figure 4. Lambdoidal lesion of Burial 7.

with pacchionian pits, which are generally located on the parietals and are very common across populations (Mann and Hunt 2005). While the pits have not been significantly linked to any adverse health conditions, they have been characterized as more prevalent and pronounced in older individuals.

Burial 6

Schmorl's nodes and slight vertebral lipping were visible on four of the vertebrae recovered from Burial 6. Schmorl's nodes are identified as variously shaped and sized depressions on the surfaces of vertebral bodies that are fairly common and often related to increasing age or the application of stress to the lower spine due to heavy lifting or strenuous and habitual activities (Mann and Hunt 2005; Waldron 2009). They are fairly common and are most likely to be found in the lower thoracic and lumbar vertebrae.

The presence of vertebral lipping, which is commonly associated with osteoarthritis, also

occurs in the spine with advancing age or the presence of applied physical stress (Ortner 2003). Because the age of the individual in Burial 6 is estimated as a younger to middle adult, the presence of the previously described pathologies is consistent with that of defects resulting from physical stress to the lower spine.

Burial 7

There was a slight, smooth-edged depression superior to the right eye orbit on the frontal bone of the individual in Burial 7. The defect was not penetrating but was visible both endo- and ectocranially. On the ectocranial aspect, the defect was roughly circular and had an uneven, undulating surface. The endocranial view of the defect was crescent-shaped and also slightly uneven.

There was a second antemortem defect just lateral to the intersection of the sagittal and lambdoidal sutures. The lesion was circular in shape and its base was slightly pitted. The edges and base were smooth, and while it was not penetrating, the depth of the pit nearly reached the endocranial surface. The two lesions are pictured in Figures 3 and 4.

It is not clear whether or not the two defects are related to one another. The defect on the frontal has the overall appearance of a healed compression fracture while the morphology of the second defect is consistent with that of a lytic lesion. Mann and Hunt (2005) note that characteristic "pond"-like compression fractures that are often found on the skull are commonly indistinguishable from healed infectious lesions. While the frontal defect appeared to be consistent in morphology with a healed compression fracture, it could also represent a lytic lesion similar to the one found on the right parietal but at a more progressive state of healing.

Burial 9

The individual in Burial 9 displayed an unusual suture closure pattern. The sagittal suture was completely obliterated antemortem and the lambdoidal sutures were near obliteration. The areas along the previously mentioned suture lines were depressed, resulting in a pronounced bulbous appearance of the cranial vault. In contrast to the sagittal and

lambdoidal sutures, the coronal and metopic sutures remained completely open.

Normally, the cranial sutures first begin to close around bregma and their degree of closure increases with age (Aufderheide and Rodriguez-Martin 1998). The fusion of the metopic suture typically occurs in childhood, but its presence has been found in adult skeletons as well as juveniles. While it is possible that the abnormal pattern of suture closure for this individual is pathological in nature, it could simply be a result of normal human variation.

Additionally, the bones of the lower limbs were all bowed and the tibiae exhibited a classic saber-shin appearance, as shown in Figure 5. There was significant woven bone formation at the anterior sites of bowing. The femora were also thicker and heavier at the sites of bowing than the remaining areas of the shaft. The right fibula exhibited two sites of possible periosteal infection where woven and porous bone growth and remodeling was marked.

The postcranial traits were all consistent with changes seen to adult skeletons of individuals that had residual rickets as children (Brickley and Ives 2008). Additional differential diagnoses for the individual include osteomalacia, Paget's disease, Blount's disease, trauma, infection, and childhood stress.

Burial 10

The central incisors of the maxillary teeth from Burial 10 each had antemortem circular defects with what look like radiating, postmortem fractures. The edges of the defects were smooth, completely penetrated the enamel, and extended into the core of the tooth, as shown in Figure 6. The anterior and inferior halves of the incisors were thicker and whiter in color, and the lingual surfaces were covered with pitted hypoplasias. While not as common as linear or pitted variants, hypoplasias can also be expressed as "poorly-defined, chalky white of hypomineralization or honeycombed beds of cup-shaped enamel voids" (Aufderheide and Rodriguez-Martin 1998:406), similar to what is seen in Burial 10. Enamel defects like hypoplasia have been linked to various conditions like hemolytic disease of the newborn, dietary deficiency, and congenital syphilis (Aufderheide and Rodriguez-Martin



Figure 5. Bowed tibiae of Burial 9.



Figure 6. Dental defects of Burial 10.

1998). However, the most commonly acknowledged condition resulting in hypoplasia is malnutrition.

Conclusions

Dated to approximately the mid to late eighteenth century, the 2011 excavated cemetery burials represent the remains of men, women, and children. The cemetery appears to include a larger number of men than women, which could be indicative of differential burial practices, dominantly male colonial migrations, or could be a relic of a small sample size. The most common age-at-death categories found in the sample are for early and middle adults, with very few older individuals represented. Because only sparse demographic data is available for the sample, it is unclear whether or not the age and sex distributions accurately represent the individuals living on the caye during the eighteenth century.

The metric, dental, and pathological data available for the sample do not support the hypothesis that the population at St. George's Caye was experiencing different health levels than their British and American counterparts. While specific pathological indicators were highlighted, it appears that the St. George's Caye group was very similar to their contemporaries in terms of their overall health indications.

While ancestry was unable to be estimated skeletally, it is recommended that future efforts be made to understand the biological background of this colonial group. If future analyses reveal that the settlers are more racially mixed than is presently indicated, the cemetery would be an invaluable source of information as one of the few skeletal collections able to document admixture between diverse groups. Alternatively, if it is confirmed that the sample is comprised of individuals of European ancestry, the cemetery could be studied as a representative of the slave-holding upper class of the society. In either situation, the information gained from the skeletal and archaeological analysis would provide valuable insights into the division of class structure and racial dynamics in the British colonies in Belize.

Future excavation and skeletal analysis of the cemetery at St. George's will be able to

increase the body of data available to researchers who wish to understand the biological and cultural histories of colonial settlers at St. George's Caye. It is recommended that this study be used to highlight possible research avenues of future projects.

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