ST. GEORGE'S CAYE: A BIOARCHAEOLOGICAL

STUDY OF EIGHTEENTH CENTURY BELIZE

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ST. GEORGE’S CAYE: A BIOARCHAEOLOGICAL

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ABSTRACT

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While a majority of archaeological investigations in Belize are centered on prehistoric Maya sites, a research gap exists regarding historic site excavations in the archaeological records of Belize. This study aims to increase the amount of information available about the recent history of Belize by assessing the skeletal biological profiles of the individuals interred in the historic cemetery at St. George's Caye. The cemetery is dated to the mid to late eighteenth century and is the oldest historical, non-Maya cemetery in Belize (Garber 2010).

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 and coffin materials associated with them. Both non-metric and metric data were collected for the individuals analyzed. Maximum long bone lengths were used as a proxy for stature and compared against contemporaneous British and American populations via Analysis of Variance and Tukey's Studentized Range (HSD) tests to assess baseline health. There were a relatively high percentage of males in comparison to females represented in the excavated individuals from cemetery at St. George's Caye and the age distributions for the individuals were relatively young. Descriptive stature data seems to suggest a depressed level of health in the St. George's Caye settlement, but long bone metric analysis in ANOVA does not support the hypothesis that the individuals differ significantly from their peers in the American colonies or in Britain. The prevalence of common dental pathologies observed in the St. George's Caye sample is consistent with those observed in the British samples. The St. George's Caye sample is consistent with a population that was not significantly different from its contemporaries. In order to gain a clearer understanding of the relationships of health and nutrition in colonial Belize, further research and excavations need to be undertaken to increase the sample size and clarify any patterns among the data collected.

CHAPTER I

INTRODUCTION

The majority of archaeological investigations in Belize are centered on prehistoric Maya sites. With so much attention focused on prehistoric excavations, a research gap exists around historic site excavations in the archaeological records of Belize. This study ultimately aims to increase the amount of information available about the British colonial history of Belize by assessing the skeletal biological profile of the historic St. George's Caye population through excavations of the cemetery at St. George's Caye. The cemetery is dated from the mid to late eighteenth century and is the oldest historical, non-Maya cemetery in Belize (Garber 2010). This research project provides a descriptive analysis of the individuals interred in the cemetery and will provide a foundation on which further research regarding the historic population of Belize can be built.

Colonial Politics and Settlements

The first Europeans to arrive in the Caribbean and Central America were the Spanish, who kicked off the race to colonize the New World (Engerman 2000). The Spanish focused their efforts on the mainlands of South America and Mexico, as well as to a few of the larger islands in the Caribbean which acted as military and trading outposts. Shortly after Spanish arrival in the New World, competing European powers such as the English, French, and Dutch sent exploratory campaigns to the area to secure lands of their own for political and natural resource exploitation. Political disputes regarding territorial boundaries were constant in the New World and the political domination of any given area was regularly being challenged by opposing colonial forces as well as native populations.

The colonial history of Belize in particular is characterized by ongoing territorial disputes among the Spanish, British, indigenous Mayan, and other native groups (Bolland 1977; Waddell 1961). In 1502, Christopher Columbus and his crew were the first Europeans to view the coast of Belize (Setzekorn1981). The Spaniards, who in the 1520s began to invade Mayan lands in Belize, sought to expand their presence in the New World by maintaining a strict control on all trade and colonization in the Caribbean (United States Government Printing Office [USGPO] 1993). As the Spanish struggled to secure control over Mayan lands, they both displaced indigenous groups and attempted to convert them to Christianity. Tensions between indigenous peoples and the Spanish often resulted in indigenous revolts against Spanish rule.

Although Spain claimed all the lands of Belize, they left the area largely unoccupied and maintained only weak control over the area. British pirates arrived in Belize in the seventeenth century and used the coastal islands as bases from which to conduct their operations and hide out from Spanish authorities (Camille 1996). The fragility of the Spanish presence in Belize was attributed in part to the actions of the British pirates and buccaneers who constantly attacked Spain's settlements and fleets, thereby lessening their ability to effectively exert control over the settlements.

British officials frequently commissioned British piracy, in the form of looting and raids against the Spanish, and the trade routes of Spain were often monitored for ambush by the seafaring pirates (Setzekorn 1975). Government sanctions of such activities led to the re-evaluation of the pirate's status in colonial British society. Many buccaneers viewed themselves as soldiers fighting for the good of their country and some, such as the famous Sir Henry Morgan, were even honored and for their actions. Despite heightened self-perceptions of their own social status, the pirates maintained a wild lifestyle (Bolland 1977; Waddell 1961). They often retreated in times of low trade to the coastal islands to eat, drink, and celebrate the spoils they gained from looting Spanish ships in the nearby Caribbean area.

British piracy was a serious threat to Spanish vessels until the Treaty of Madrid forbade the practice in 1667, following which the British turned their efforts toward logwood harvesting in Belize (Swayne 1917; Waddell 1961). Early piracy and the desire for access to logwood in the Spanish territories were the main sources of European conflict in Belize during the seventeenth and eighteenth centuries. Clashes between the Spanish and the logwood-cutting British, or "Baymen", were constant. At times it seemed that the rival Spanish had permanently destroyed many British colonies. However, the Baymen were a resilient group and always managed to regain hold of the coastal settlements and access to the prized logwood resources.

Logwood and Mahogany Trades

Colonizing Europeans had quickly recognized the logwood and mahogany trades as profitable ventures. After the suppression of piracy in the late seventeenth century, the British buccaneers started to form permanent settlements on the Belizean coastline that enabled them to take up steady work as logwood cutters (Camille 1996; Swayne 1917).

At its height selling for £100, or approximately $485, per ton (Swayne 1917), logwood was the principal driving force for the permanent settlement of Belize (Leslie 1987). The logwood industry directly linked the Belizean settlements to Boston, Massachusetts, and Jamaica, where the shipments were then transferred for export to Europe (Camille 1996). Logwood was extremely important to the international market at the time. In Boston, for example, the Old North Church used funds collected by the sale of donated logwood to build its historic steeple, and erected a double pew as a dedication to the Baymen who supplied them with their lumber. The pew still exists in the church today as a living testament to the importance of logwood in the international market.

Even after occupational woodcutting became paramount to privateering, travel within the British settlement was dominated by water. After being cut, logwood and mahogany had to be drug to the nearest river system and floated to the coast on rafts for export (Leslie 1987). The ease with which early settlers could navigate to interior Belize via river systems to reach logwood and mahogany for export made the development of extensive rail or highway systems unnecessary. The mouth of the Belize River was the location of one of the most important ports to the wood-harvesting trades because it allowed merchants and travelers passage between the coastal islands and mainland (Camille 1996). Figure 1, which maps the main river and transportation routes in Belize, shows how clearly the landscape is dominated by water passages.

In the mid-eighteenth century, logwood sales declined and were surpassed by mahogany as a result of increased demands for mahogany-based furniture in Europe. The switch to mahogany cutting further drove the settlement of Belize because the work was substantially more difficult than logwood cutting and it required more workers (Camille

Figure 1: Map of Belize and major river systems

1996; Swayne 1917; USGPO 1993). To compensate for the increased workload, logwood and mahogany cutters began to import enslaved individuals into Belize.

The first documented reference to slavery in Belize was in a 1724 report of a Spanish missionary (Bolland 1977). The Europeans' main sources for enslaved individuals were the regions in Africa surrounding the Bight of Benin, the Congo, and Angola (USGPO 1993). Enslaved populations were composed mainly of individuals brought over from West Africa to work directly in the logwood industry. The enslaved peoples were chiefly adult men, but women and children also served as domestic slaves in the colonies.

The enslaved population grew rapidly and quickly outnumbered the free European Whites in Belize (Waddell 1961). In 1750, the population of Belize included 50 Whites, 114 enslaved, and 6 freed persons of color (Bolland 1977). Indigenous groups were excluded from the 1750 population count. These numbers continued to increase dramatically and in 1830 there were approximately 300 Whites, 1,900 enslaved and 2,000 freed persons of color (Engerman 2000). The treatment of enslaved individuals working in Belize has been characterized as less controlled and severe than that experienced by other enslaved groups in the Caribbean (Bolland 1977; Swayne 1917; Waddell 1961), particularly those working in the sugar plantations and engaged in more closely supervised work. However, slave revolts and the poor treatment of enslaved individuals were certainly present and have been clearly documented (Bolland 1977; Shoman 2000; USGPO 1993).

The increase in numbers of free persons of color in the population was due in part to the disbandment of the 5th West India Regiment, which granted 500 members of the all-Black regiment land grants and permission to settle Belize as free men (Setzekorn 1975). Manumission of enslaved individuals also increased the number of free persons of color in Belize. Between 1808 and 1830, over 500 Black enslaved individuals were manumitted, or granted freedom, by the individuals to whom they were enslaved (Shoman 2000). The majority of manumissions were granted to enslaved women and the children that resulted from the relations between the enslaved women and the White slave owners. Enslaved individuals travelling by boat to other colonies were additionally intercepted in Belize and granted freedom. In 1836, two slave vessels were captured and their passengers allowed to settle permanently in Belize (Setzekorn 1975). A third ship that docked for supplies that same year in Belize allowed their passengers to set up residence in the area. A total of 500 free Black individuals were introduced to Belize by the three ship arrivals. Although slavery was officially abolished in 1834, it wasn't until 1838 that full legal freedom was granted to previously enslaved peoples (Shoman 2000).

As the population continued to grow, the population in Belize became increasingly racially mixed. The Belizean population was recorded as 312,971 in 2010 by the national census. The largest two cultural groups in Belize were identified as the Mestizos and the Creoles (USGPO 1993). These groups make up 43.7% and 29.8% of the population, respectively. The Creoles have been described as people of mixed African and European ancestry while the Mestizos were described as a group of mixed Mayan and Spanish ancestry. Other Belizean populations include the Mayans, who comprise 11.0% of total population, and the Garifuna groups of Afro-Amerindian descent, who make up 6.6% of the population total. The remainder of the population is comprised of individuals from varying backgrounds and constitutes 8.9% of the total population. The most practiced religion is Roman Catholicism, but significant numbers of Protestant religions exist (USGPO 1993).

St. George's Caye

The initial seventeenth and eighteenth century colonial British settlements were concentrated on the coast and along the logwood-filled river valleys (Shoman 2000). One such British settlement was located at St. George's Caye. St. George's Caye is a small island located in the Caribbean Sea about eight miles northeast of Belize City, located at 17°33'N/ 88°4'W (Graphic Maps 2011). Figure 2 shows the location of the caye in relation to Belize City. The climate in Belize is tropical, and the mean annual temperature is about 80° F (Waddell 1961). Humidity in Belize City and the nearby cayes can be very high and there is considerable variation in the amount of rainfall among the seasons. During the rainy season, hurricanes threaten the coast and often inflict severe damage to the land and populations settled on the coast and the cayes (Setzekorn 1981; Waddell 1961).

The island sits in shallow waters adjacent to the second largest reef system in the world, the Barrier Reef. The landscape of the Barrier Reef is noted not only for its beauty but also for its danger. It has been described as a web of "concealed channels [that] penetrate into a labyrinth of lagoons" (Swayne 1917:161). Navigation through the area can be difficult to those unfamiliar with the reef system and the deep-water channels surrounding it (Garber 2011). Due in part to its strategic location, the island of St. George's Caye is noted through history as an important settlement whose inhabitants were responsible for both patrolling the traffic to and from Belize and guarding its main port at the mouth of the Belize River.

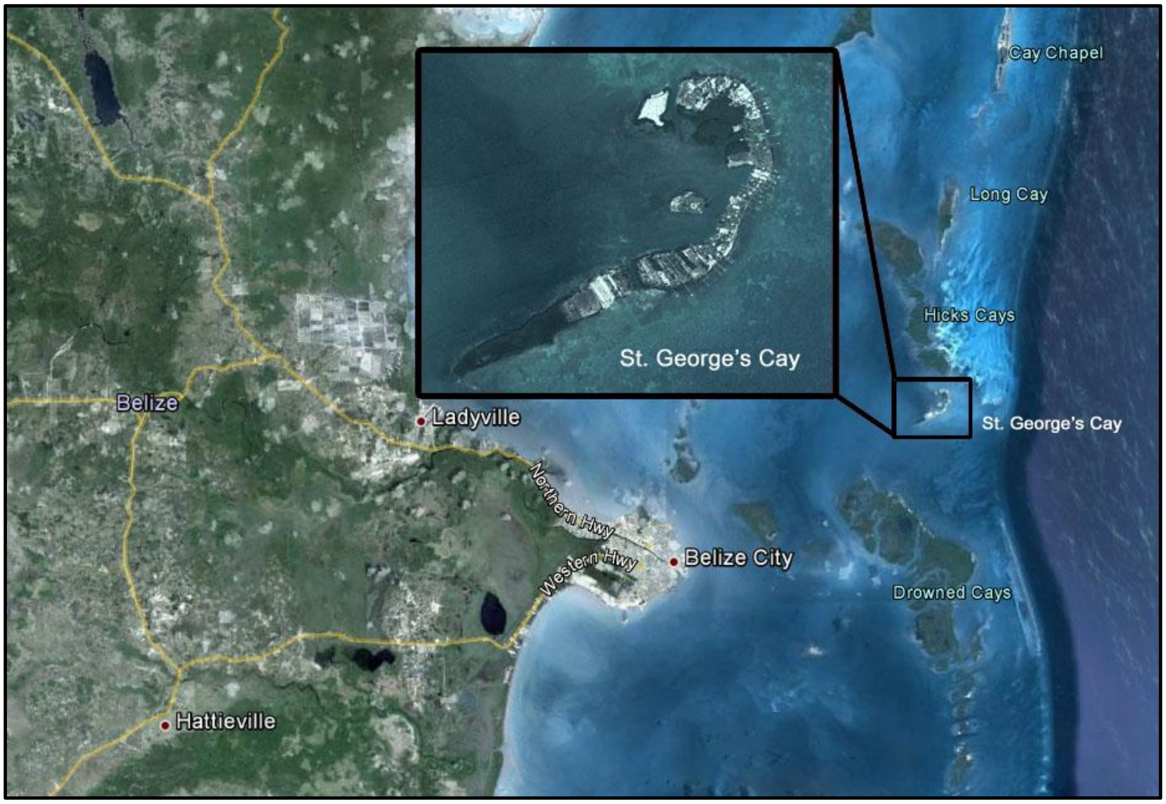


Figure 2: Map of the location of St. George's Caye

The island served as the first unofficial capital of the British settlement in 1764 and as the location of the signing of Burnaby’s Code, the first constitution of what was then Bay Settlement (Shoman 2000). The eighteenth century inhabitants of St. George’s Caye were believed to be mainly British pirates-turned-loggers and the individuals enslaved by them to work in the logwood and mahogany trades. They were remembered in part for their influential role in securing the independence of Belize by fighting and winning the Battle of St. George’s Caye in September 1798 (Camille 1996; Ramos 2009; Shoman 2000; Swayne 1917). The Battle of St. George’s Caye was the Baymens' final stand against Spanish rule. In this conflict the individuals fighting the Spanish were few in number and included British and African individuals, both enslaved and free

(Setzekorn 1981). This small crew was able to defeat a fleet of 500 Spanish sailors with 2000 auxiliaries, and thereby put an end to Spain's attempt to reclaim the settlement by force (Swayne 1917).

The Site

Today, St. George's Caye is sparsely populated but contains numerous summer homes, a previous British Army training establishment, and a small resort – the Lodge at St. George's Caye. Next door to the Lodge is the cemetery at St. George's Caye. It is the oldest historical, non-Maya cemetery in Belize (Garber 2010). As it exists today, the cemetery is surrounded by a white brick wall and encompasses an area of approximately 1000 square meters. The only marked grave is also the only modern burial. There are a number of memorial stones present at the site, but it is not known where all of the individuals they refer to are buried. Next to the memorial stones sits a modern monument that was resurrected in honor of those who fought in the Battle of St. George's Caye in 1798. Figure 3 shows a picture of the cemetery site prior to excavation.

A map drawn in 1872 by Rob Hume is one of few records that exist regarding the identities of individuals who were interred in the cemetery (Garber 2011). It shows the placements, names, and dates of death for the marked burials that were on the ground surface in 1872. Epitaphs recorded in 1907 and 1989 by James Purcell Usher and Mary Check-Pennel, respectively, document additional graves that were once visible, and some of them can be matched up to those illustrated on the 1872 map (Garber 2011). The context and interpretation of the cemetery is complicated by the damage it has sustained as a result of environmental conditions. When Hurricane Hattie crashed into the island in

Figure 3: Photo of the north end of the cemetery at St. George's Caye prior to excavation

1961 it damaged the southern edge of the cemetery, leaving the above-ground tomb of Thomas Potts, one of the island's most notable residents, buried beneath the disrupted sand (Garber 2010). Two additional hurricanes, one in 1931 and Hurricane Greta of 1978 also passed through the island, and both left damage in their paths.

CHAPTER II

MATERIALS AND METHODS

Sample

The skeletal remains of individuals excavated from the cemetery at St. George's Caye, Belize, were analyzed to estimate their biological profiles and provide preliminary baseline health and demographic data. 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 recovered comprised what appeared to be fifteen discrete burials, two of which were subsequently discovered to be commingled and containing elements belonging to more than one individual. The remaining individuals were in single, unmarked graves and had no identifying artifacts associated with them. The only exception was in Burial 1, which had a partially legible coffin plate found in association with the burial.

Excavation

Previous excavations during the 2009 and 2010 field schools revealed the presence of human skeletal remains in the cemetery grounds. Prior to the 2011 field season, a ground penetrating radar survey was performed to identify areas of possible subsurface disturbance in the cemetery. Results indicated the presence of a centrally located anomaly on the Northern side of the cemetery.

In 2011, excavation unit (XU) 23 was initiated to uncover the meaning behind the inconsistent reading. During excavation a wooden post and collapsed brick structure were found. These were determined to be a burial artifact and structure. Subsequently, additional excavation units were opened to uncover any adjacent burial remains. A total of nine 2x2 meter excavation units were established, encompassing an excavation area of 36 square meters. A total of seventeen burials were found. The burials were assigned numbers one through seventeen based on their relative positions in the operation. Burial 1 was located and the southwestern corner of the excavation area. The remaining burials were numbered sequentially from the southwest to northeast with Burial 17 at the most eastern-most extension. Figure 4 shows the layout of the cemetery and all excavation units to date. Figure 5 is a close-up schematic of the 2011 excavation units.

Due to the high level of the water table encountered during excavation, a dredging pump was needed to mechanically lower the water level each day so that excavations could proceed. To accommodate the dredging pump, a small unit was dug in a previously established, unproductive test pit that extended to a depth well beneath the water level. Water pumped from the test pit unit lowered the water level of the immediately surrounding areas in the cemetery. A large filter was placed around the mouth of the pump to prevent any particles or artifacts from being pulled into the device and destroyed. The pump was run during the day but turned off at night to conserve gas. As a result, the burials were submitted to soaking at night and drying during the course of the day. This cycle was repeated each working day until the pits were completely excavated and backfilled.

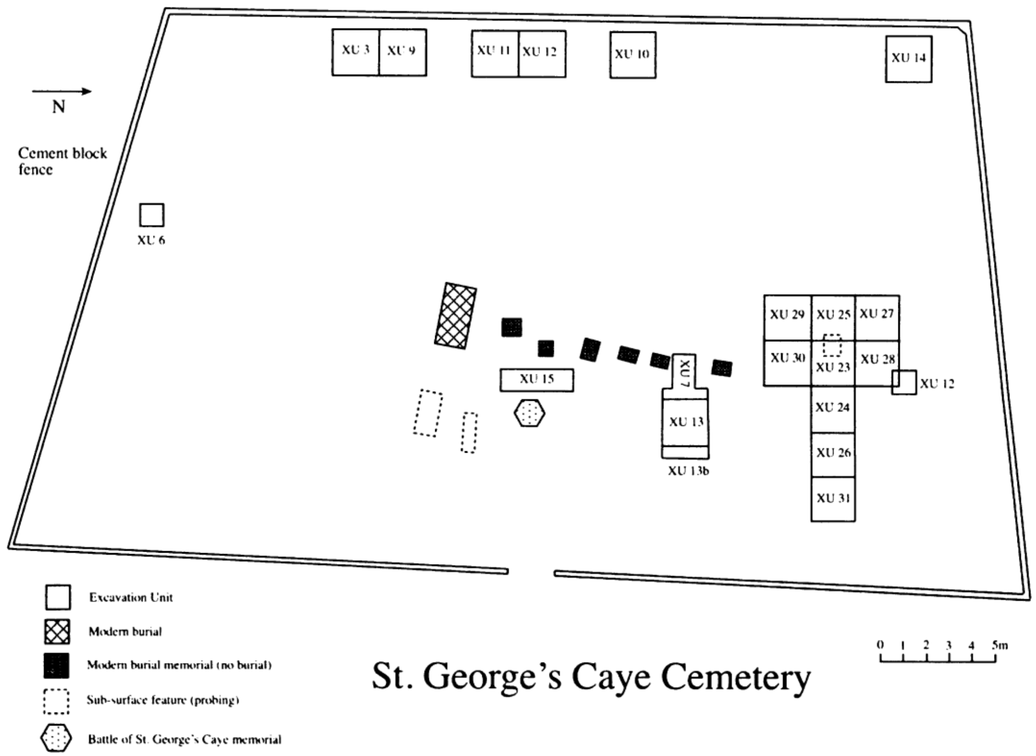


Figure 4: Map of all excavations to date at the cemetery at St. George's Caye

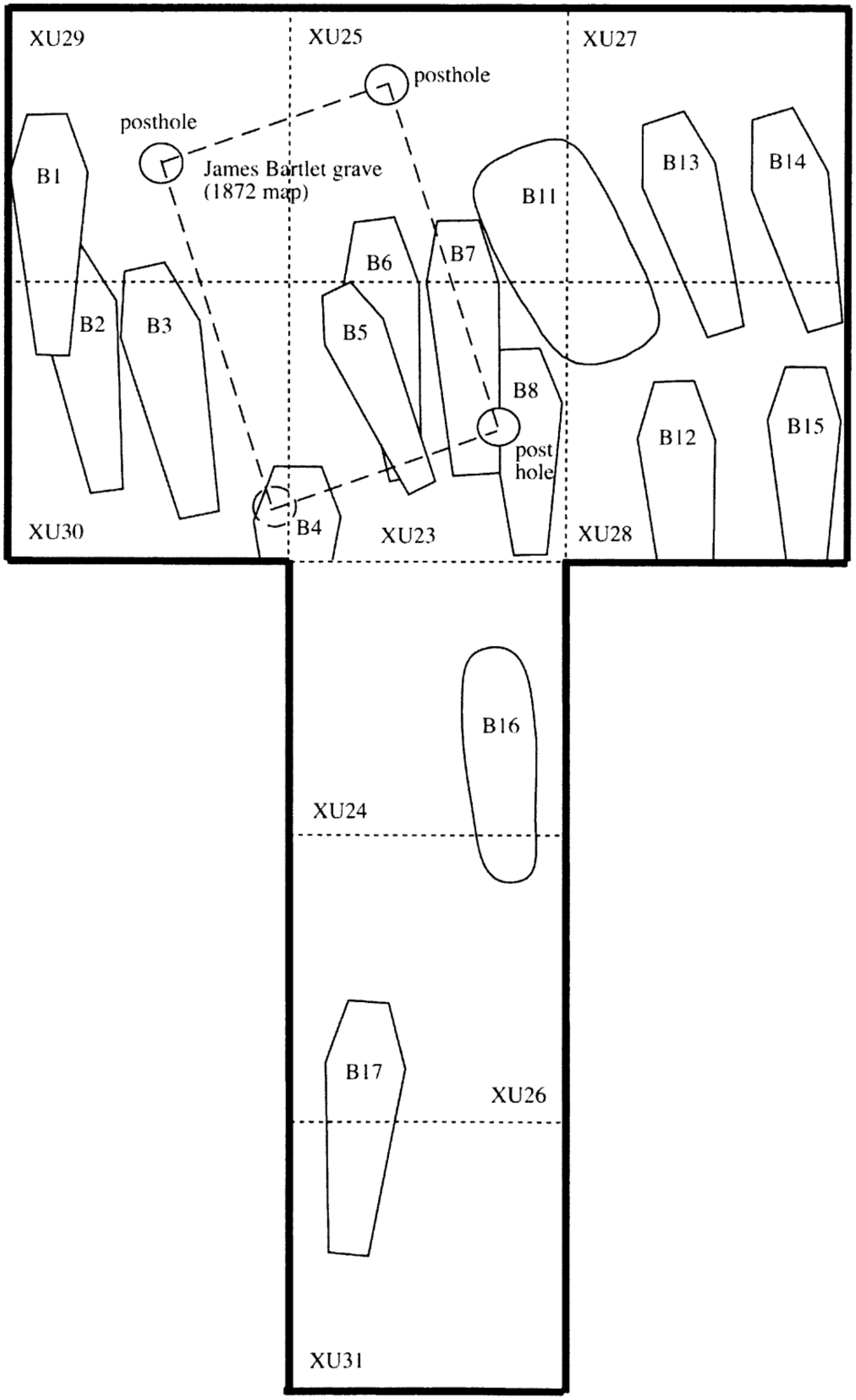


Figure 5: Schematic of 2011 excavation units

During excavation, the units were taken down to the level of the deepest skeletal remains found. The majority of the units extended to a maximum depth of approximately 70 centimeters (cm) below the ground surface, although XUs 26 and 31 extended to a depth of approximately 100 cm. The top layers of soil were removed from the units with shovels and trowels, while soft-bristled brushes and digging sticks were used to clear away soil from the skeletal remains. All of the remains were photographed in situ and after processing with a Canon D70 SLR camera. The skeletal elements were removed by teams of three to four students and were placed in labeled cloth bags, buckets, and plastic basins for transport to the lab. The elements were bagged and labeled according to provenience and material type or element. All non-skeletal material was bagged and recorded separately.

The skeletal remains were processed with soft-bristled toothbrushes in brackish and fresh rainwater pumped from a nearby well and cistern. No soaps or chemicals were used to clean the remains. The bones were dried in open air away from direct sunlight for a period of a few days. After analysis, the elements were placed into labeled paper bags and stored in a locked facility on St. George's Caye in labeled boxes.

The elements had to be excavated and processed with extreme care. The effect of intense hurricane interference and continual water saturation on the elements negatively impacted their structural integrity and made their removal a tedious and often destructive process. Long bones that were complete in situ fragmented easily upon removal and maintained their fragile nature during analysis. The flat bones were among the most friable of elements and were often damaged to the point of total disintegration during removal and processing. The delicate constitution of the remains adversely affected the excavation speed as well as the breadth of skeletal analysis performed by limiting the amount of data that could be recovered.

Skeletal Analysis

Data Collection

Both non-metric and metric data were collected for the excavated individuals at the field school laboratory on St. George's Caye. Metric data was collected in accordance with standards outlined by Buikstra and Ubelaker (1994) and Moore-Jansen (1994), and were taken using a Carolina Biological Supply Osteometric Board, Paleo-Tech Spreading Caliper, and SPI Digital Stainless Caliper-XL Display. When possible, metric data were used to estimate sex, stature, health, and ancestry for the elements recovered.

Non-metric analytical techniques were derived from a variety of sources, a concise summary of which can be found in "Standards for Data Collection from Human Skeletal Remains" (Buikstra and Ubelaker 1994). Particular areas of interest for non-metric analysis focused on the pelvic region, crania, and sternal ends of the ribs, as well as on overall taphonomic and pathologic appearance of the entire skeleton. When possible, non-metric data were used to estimate age, sex, ancestry, and health for the individuals recovered.

Inventory

Each discrete burial was inventoried to determine the minimum number of individuals (MNI) and relative completeness of the remains. The inventory was recorded on a modified version of the inventory form suggested by Buikstra and Ubelaker (1994) and can be referenced in Appendix A. Unidentifiable fragmentary remains were not included on the inventory form but were noted by the author in her field notes. Elements from individual burials were sorted and processed in groups according to their excavation labels. Fragmentary cranial, long bone, and pelvic remains were reconstructed when possible with craft glue. Completeness indications on the inventory forms reflect the values of the reconstructed elements as well as additional fragments that were unable to be fit into the reconstructions. Landmarks and features utilized in determining the presence of particular bones were referenced using standard human skeletal identification texts such as *The Human Bone Manual* (White and Folkens 2001) and *The Osteology of Infants and Children* (Baker et al. 2005).

Sex

Estimation of sex has traditionally focused on pelvic morphological analysis. The most widely accepted technique for sex estimation was proposed by Phenice and relies on the morphology of the ventral arc, ischiopubic ramus, and subpubic concavity for sex estimation (France 1998; Phenice 1969). Phenice (1969) characterized male pubes as lacking a ventral arc and subpubic concavity, but having a broad ischiopubic ramus. Conversely, he described female pubes as distinguishable by the presence of a ventral arc and subpubic concavity, as well as by their sharp ischiopubic ramus ridge.

The pelvic sciatic notch was also noted for its use in distinguishing sex. The greater sciatic notch was evaluated on a five point scale (1-5) where “1” is most indicative of a female, “3” is ambiguous, and “5” is the most male form of the expression, as per standards set forth by Buikstra and Ubelaker (1994) and Walker (2005). The presence of the preauricular sulcus and shape of the pubis bone were also noted for their usefulness in sex estimation. Standards for sciatic notch and preauricular sulcus sex estimation methods were found in *Standards for Data Collection from Human Skeletal Remains* (Buikstra and Ubelaker 1994). Bass (1995) provided descriptions of male and female pubis shapes used in the study.

According to standard operating procedures for sex estimation used at the Joint Prisoner of War, Missing in Action Accounting Command Central Identification Laboratory, postcranial measures of the humeral and femoral heads can be used to aid in estimating sex (JPAC 2008). They characterized females as having measurements that do not exceed 43 millimeters (mm) and 43.5 mm for maximum humeral and maximum femoral head diameter, respectively. The corresponding male values were noted as greater than 47 mm and 46.5 mm, respectively (JPAC 2008). Measures that fell between the male and female ranges were considered to be ambiguous.

Sex estimation via cranial morphology can be difficult to assess because its accuracy depends on the familiarity of the researcher with the skeletal norms of the population in question and the highly variable degrees of sexual dimorphism found among population groups (Walker 2008). These difficulties have been compounded in bioarchaeological settings where exemplars of known sex individuals are scarce or unavailable. Additionally, Spradley and Jantz (2011) found that sex estimation via postcranial elements can be more accurate than estimation using the crania alone. However, this study used cranial morphological analyses in instances when only the skull was recovered from an individual or where the data could be used as supporting evidence for additional sex estimation methods. Cranial characteristics analyzed included the nuchal crest, mastoid process, supraorbital ridge, supraorbital margin, and mental eminence and were scored on a five-point scale as per standards proposed by Buikstra and Ubelaker (1994). Scores of "1" represented the female, more gracile, expressions of a trait while scores of "5" indicated a robust, male expression.

Sex estimation techniques utilized in this study varied depending on the preservation of the individual burials. Sex estimation was only established after all data had been collected and all applicable methods could be analyzed together. If the results of the individual analyses were in disagreement, more weight was given to the pelvic methods because the os coxa is the most sexually dimorphic area due to female skeletal preparation for childbirth (France 1998). Individuals were assigned a final sex estimation based on the following scale:

Indeterminate: There was little or no available data to estimate sex.

Female: The available features indicate that the individual is likely female.

Ambiguous: The available features are not strongly characteristic of either sex.

Male: The available features indicate that the individual is likely male.

Age-at-death

The estimation of age at death has been extensively studied by a variety of researchers on different areas of the human skeleton (e.g. Brooks and Suchey 1990; Iscan et al. 1984; Lovejoy et al. 1985; Meindl and Lovejoy 1985; etc.). The analysis of the pubic symphysis has been considered one of the most reliable estimation methods of human age at death (Buikstra and Ubelaker 1994; Katz and Suchey 1986). Established originally by Todd (1920) and later revised by Brooks and Suchey, the method has been widely used by biological anthropologists both singularly and in conjunction with other age at death estimation techniques (Brooks and Suchey 1990; Katz and Suchey 1986). The Brooks and Suchey data for pubic symphyseal aging used in this study assigned individuals into one of six phases based on the presence and characterization of traits such as transverse organization, face delimination, bone texture or granularity, and lipping and osteophyte growth (Brooks and Suchey 1990).

A secondary indicator that was used in this study was age-at-death estimation by the auricular surface. Increased preservation of the area relative to the pubic symphysis has heightened the utility of age determination based on auricular features (Buckberry and Chamberlain 2002). Using the Lovejoy et al. (1985) method, individuals were placed into eight age categories based on the expression of varying traits on the auricular surface and retroauricular area. These traits included, but were not limited to, bone texture and density, presence and degree of porosity, transverse architecture, and retroauricular activity. However, validation studies of the auricular surface techniques have shown that they tend to underage individuals (Murray and Murray 1991), and this was taken into account when the final age at death ranges were estimated for each burial.

Estimation of age from the morphology of the sternal ends of the ribs was based on the representation of the shape, depth, and margins of the pit that forms on the sternal end of the fourth ribs as age increases as per Iscan et al. (1984). This method broke the age estimates into nine fairly broad age categories with corresponding features outlined in Iscan et al. (1984). In this study, the age-at-death based on the sternal rib ends was often estimated in the absence of a clear fourth rib. In such cases, the general characteristics of the ribs available were utilized and scored. Their age ranges were used in conjunction with other methods as a secondary estimation to confirm other estimates.

The degree of cranial suture closure as described by Meindl and Lovejoy (1985) was used as an indicator of age-at-death in the absence of more reliable markers. The large degree of variability in suture closure rates can be interpreted as negative with regards to its usefulness when compared to the previously detailed methods. As such, it was used when no other age-at-death indicators were present in an individual or to corroborate estimations made by other methods. Scores of “0” to “3” were recorded for ten separate ectocranial landmarks according to their degree of closure as outlined by Meindl and Lovejoy (1985). Composite scores were then calculated for the vault and lateral-anterior sites, each with their own corresponding age estimates.

Dental eruption patterns, epiphyseal union, and bone fusion rates were used to estimate age-at-death in younger individuals. Dental estimates were based on sequenced eruption charts published in *Standards for Data Collection from Human Skeletal Remains* (Buikstra and Ubelaker 1994). Estimates for rates of epiphyseal union were found in *The Juvenile Skeleton* (Scheuer and Black 2004) and *The Osteology of Infants and Children* (Baker et al. 2005).

The final age-at-death estimations for this study were made based on the morphological characteristics of the elements available for analysis per burial. Estimates from each possible aging method were recorded and composite age-at-death intervals were assessed based on the individual estimates provided by each method of analysis. Age-at-death estimations were only assessed after sex estimation had been completed because some methods of age-at-death estimation are sex specific (e.g. Brooks and Suchey 1990). To provide the most conservative estimation of age-at-death possible, individuals who were not clearly estimated as male or female were analyzed and assessed for both possible age-at-death intervals. In such cases, the maximum ranges of the male and female estimates were combined in an effort to minimize the exclusion of any possible ages based on sex categories. This can result in wider ranges for age-at-death for individuals of unknown sex.

Ancestry

Ancestry estimations in this study utilized both metric and non-metric skeletal analysis (See Appendix F). Historically, ancestry estimation has been based on cranial morphology and metrics. Classic morphological studies delineated common characteristics that were usually ascribed to specific groups as a means of helping to estimate ancestry (e.g., Rhine 1990). However, the estimation of ancestry has been confounded in many studies because of population fluidity and migration (Ousley and Jantz 1998), which can lead to misinterpretation of ancestral affinity. In this study, morphological 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.

FORDISC 3.0, a discriminant function analysis program, was developed as an analytical tool to help anthropologists estimate ancestral affinity based on cranial and postcranial metric analysis of skeletons. The database uses metric data from known reference groups to classify unknown individuals into group membership based on similarities to the reference samples (Jantz and Ousley 2005). The program calculates the probabilities of group membership based on the relative distances of the unknown individual to each comparison group's centroid. Typicality probabilities are additionally computed by FORDISC 3.0 and reflect how likely an individual is to be typical of each comparison group in relation to the amount of variance observed in the reference sample.

In this study, cranial and postcranial measurements were taken as outlined by Buikstra and Ubelaker (1994) and Moore-Jansen (1994). These measurements were compared against a custom dataset using FORDISC 3.0 to estimate ancestral affiliation. The most likely ancestral groups represented in the cemetery, as indicated by migration and colonial records, include European, African, and Mayan or Native American groups. Accordingly, four parental groups were used for comparison against the Belizean sample in the analysis: one was European, one African, one Guatemalan and one Mexican in origin. The Guatemalan and Mexican samples represent known collections of modern Mayan and archaeological Native American groups. The data for the parental groups were comprised of metrics available in Howell's and Goldman's osteological data sets, as well as data from Mexican and Guatemalan groups provided by Dr. Kate Spradley, Texas State University-San Marcos.

Although initial ancestry estimations based on non-metric and metric analyses were attempted, they were ultimately disregarded due to the limited amount of data available both in the parental and Belizean sample groups. For this project, the ancestry of all exhumed individuals is based on ethnohistoric, demographic data found in written historical records that suggests the majority of individuals interred in the cemetery are European in origin. Multiple texts (Bolland 1977; Setzekorn 1975; Waddell 1961) note that the island was principally a British settlement, a map of the caye dating to 1764 indicated that a separate area of the island was designated for the “negro quarters” (Garber 2011:Figure 2.2), and all but one of the eighteenth to nineteenth cemetery epitaphs recorded by John Purcell Usher indicated European origins for the interred individuals (Usher 1907). One individual was identified as a native African by their epitaph, and they are not included in the study sample.

Stature

Stature, estimated from metric data, has been calculated using a variety of skeletal elements, but the most commonly used, with a demonstrated high rate of accuracy, are the long bones of the lower limbs (Raxter et al. 2006; Wright and Vasquez 2008). Measurements of maximum long bone length can be input into sex and ancestry specific regression equations to predict a range for the individual’s living height (Galloway 1988; Jantz and Ousley 2005; Steele and Bramblett 2003; White and Folkens 2005).

Stature was estimated by regressing maximum length measurements of the postcranial bones in FORDISC 3.0 against the closest populations available, nineteenth century United States Whites. Metric data was collected when possible and stature estimates were determined for each individual after their sex and age estimations were completed so that they would take into account the specific biological background of each individual. For the individuals for which sex could not be determined or was ambiguous, stature was estimated for both sexes and the ranges combined to provide the most conservative estimates of stature.

Health Indicators

Stature estimation was used in this study as an indicator of the basic health of the individuals. The average stature for the male cohort at St. George's Caye was computed and compared to contemporaneous populations of the eighteenth and nineteenth centuries for which stature estimates were available. Average stature data for seven American groups (Angel 1976; Sokoloff and Villaflor 1982; Steegman 1985, 1991; Steegman and Haseley 1988) and five British groups (Centre for Human Bioarchaeology [CHB] 2011; Sokoloff and Villaflor 1982) were compared to the average stature data for St. George's Caye. Four of the American and three of the British average statures were collected from living individuals, while the remainders were taken from skeletal populations. All of the samples used are contemporaneous with the cemetery at St. George's Caye. The breakdown for each group is listed in Table 1.

In addition, maximum long bone lengths from comparative populations were input into Statistical Analysis Software (SAS 9.1) and analyzed for significant differences between populations using Analysis of Variance (ANOVA) and Tukey's Studentized Range (HSD) tests. Significance was determined at a 0.05 degree level. Because each of the groups is estimated as European and they are temporally related, significant differences in long bone lengths were used as proxies for health status. The seven groups analyzed were the current study sample from Belize, samples from Britain (n=3 groups), and samples from North America (n=3 groups). The British data were taken from the

Museum of London archives and includes the skeletal collections of Chelsea Old Church, St. Bride's Lower, and Cross Bones cemeteries, which date to the eighteenth and

Table 1: Average Stature in Belize, America, and Britain by sample groups

Sample Location	Number in Sample	Sample Description	Average Stature (cm)	Living or Skeletal
Belize	7	St. George's Caye Cemetery[1]	165.3	Skeletal
USA	25	Nagel Cemetery New Yorkers[2]	173.0	Skeletal
USA	84	Rochester, New York Poorhouse[3]	172.7	Skeletal
USA	5	Pre 1800 White Males[2]	172.0	Skeletal
USA	1945	American born French and Indian War Soldiers[4]	171.2	Living
USA	301	New England Revolutionary War Soldiers[4]	172.2	Living
USA	275	Middle Atlantic Revolutionary War Soldiers[4]	172.7	Living
USA	392	Southern Revolutionary War Soldiers[4]	162.1	Living
Britain	37	Chelsea Old Church [5]	168.4	Skeletal
Britain	76	St Brides Lower[5]	168.9	Skeletal
Britain	985	British Royal Marines - Chatham Division[4]	164.3	Living
Britain	1669	Foreign born French and Indian War Soldiers[6]	167.4	Living
Britain	668	British 54th Infantry Regiment[7]	167.6	Living

1. Study Sample; 2. Angel 1976; 3. Steegman 1991; 4. Sokolff and Villaflor 1982; 5. CHB 2011; 6. Steegman and Haseley 1988; 7. Steegman 1985

nineteenth centuries and include individuals of known and varying socioeconomic status (CHB 2011). American data includes the skeletal collections of war dead from Snake Hill, a Catholic cemetery in Missouri, and various historic cemeteries from across the United States (Wescott 2001). Each of these groups was estimated as dating to the early nineteenth century, but their socioeconomic status is unknown.

Dental pathologies were used as a secondary source for health indicators in this study. In particular, the presence and prevalence of caries, dental calculus, enamel hypoplasia, antemortem tooth loss, and degrees of alveolar resorption were recorded. Each pathology was recorded with reference to its size and location in the dental arcade. The rates for the occurrence of caries, calculus, and hypoplasia were calculated for the number of individuals affected by the pathology, not by the total number of teeth affected. These pathologies were used as overall health indicators for the population and were not intended to reflect particular diseases of individuals.

Pathology and Trauma

Elements displaying obvious pathologies and trauma were examined for their gross morphology. Traumatic elements that were due to taphonomic processes were not described because they are less likely to contain information relevant to the identification of the biological profile of the individual. Individualizing pathologies were recorded and described on a per case basis. Differential diagnoses were offered where applicable but in many cases the analyses were essentially descriptive owing to the fragmentary nature and incomplete observation of pathological elements.

CHAPTER III

RESULTS

Preservation and Taphonomy

The degree of in situ skeletal preservation found in the cemetery was greater than expected at the outset of the 2011 field season. Most of the burials were clearly articulated and major areas of the skeletons were visible during excavation. However, the extremely water-logged nature of the elements made it difficult to remove the bones from the ground and transport them to the lab. As a result, many of the elements that were intact in the ground fragmented upon removal. The elements most affected included the bones of the face, scapulae, ribs, vertebrae, sterna, innominates, and sacra (i.e. the flat bones). The long bones maintained the highest degree of integrity, although the articular surfaces were frequently damaged or destroyed during removal and subsequent transport to the lab. Figure 6 of Burials 5 and 6 shows typical preservation of the burials in situ. Figure 7 shows Burial 5 after removal and processing at the lab. The laboratory photograph does not include elements that had become fragmented to the point of being unidentifiable.

The water table at the cemetery was high and had to be mechanically lowered each day in preparation for excavations. It was allowed to rise again each night at the end of the workday to conserve gas. As a result, the burials were subjected to soaking at night and drying over the course of the day, which had a negative effect on the

Figure 6: Burials 5 (Left) and 6 (Right) in situ

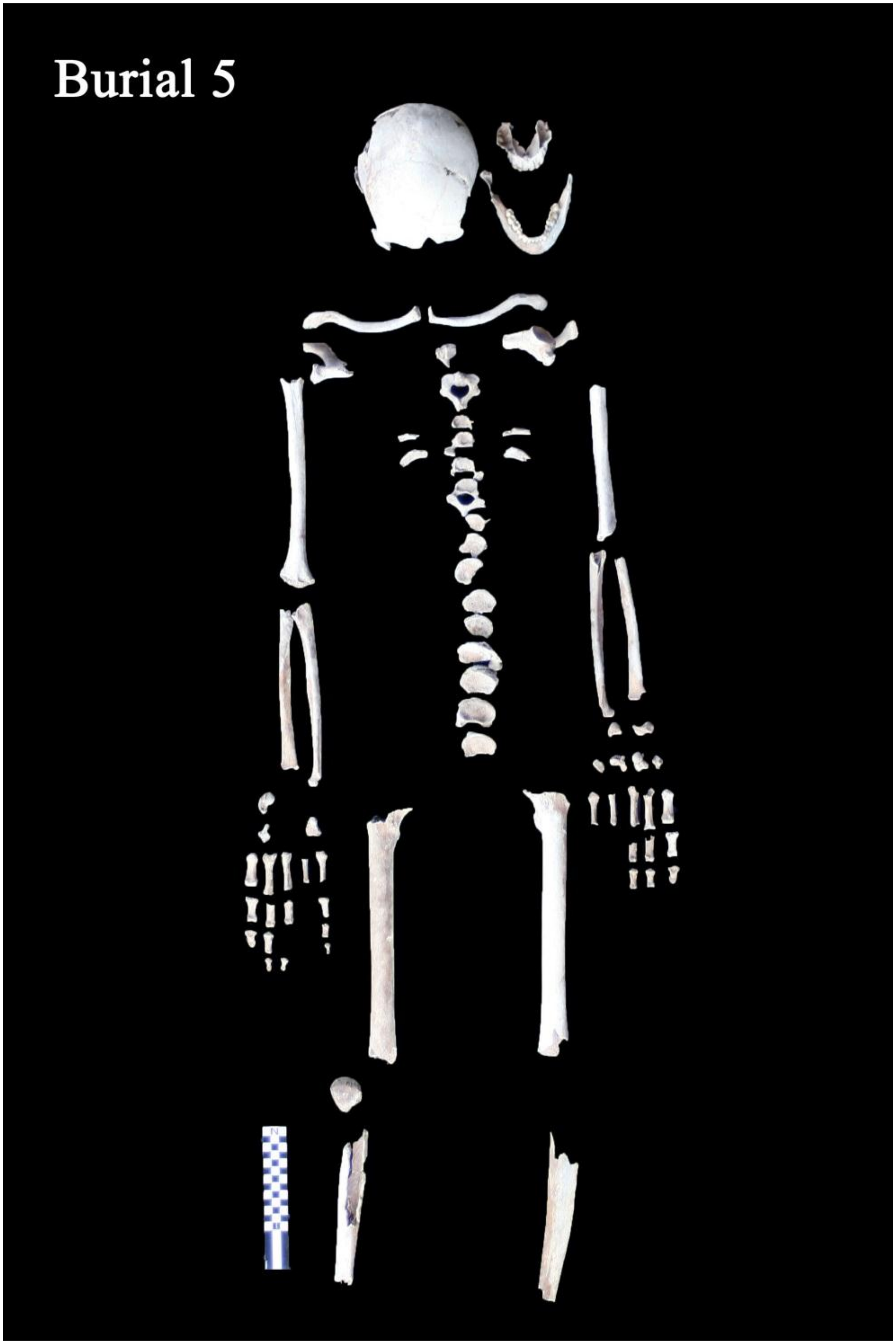


Figure 7: Burial 5 preservation after excavation and processing

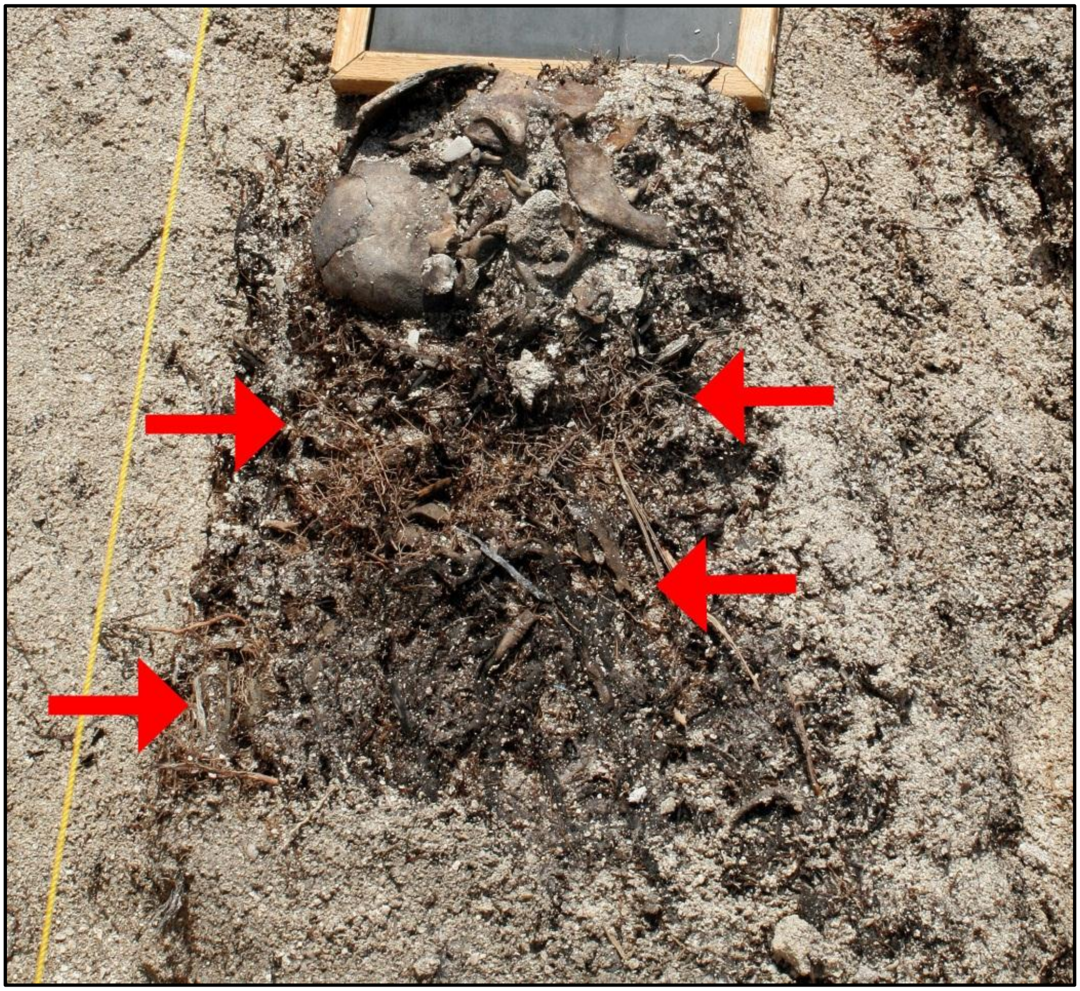


Figure 8: Root damage and soil staining in Burial 4 (burial not removed or analyzed)

preservation of the bone, which was constantly being soaked and dried. Other common taphonomic changes encountered included sunbleaching, root damage and soil staining, as well as unintentional fracturing via excavation. Figure 8 shows extreme root damage sustained by Burial 4, which was not removed during excavation.

The effect of constant water submersion on the burials functioned in part as a preservative of organic matter such as wooden coffin remains. Of all burials excavated, only those reaching the lowest depth were found with organic coffin remnants. In each case, only the bases and portions of the sidewalls of the coffins remained. It is likely that the organic materials situated above the absolute lowest height of the water table were subjected to accelerated decay rates resulting from constant wetting and drying over an extended period of time. Those that remained completely submerged appear to have been afforded additional protection from the decay process.

Age of the Cemetery

No historic records have been found that date the first use of the cemetery on St. George's Caye. However, a grave excavated in the 2010 field season was identified as belonging to Reverend John C. Mongan, who died in 1860. The depth at the base of the grave was at a higher elevation than that of the burials excavated during 2011, which indicates that the 2011 burials are most likely older in age. During the 2011 field season, three posts were identified in XUs 23, 25, and 29 and are believed to represent the corners of a burial present on the 1872 map drawn by Rob Hume. Loose brick was found in the sand between the posts at a depth just superior to the level of the 2011 burials. The placement of the three posts closely correspond to the two western corners and the northeastern corner of the previously above ground burial of James Bartlet, which is dated to 1800 by the memorial epitaph on his grave (Usher 1907). The 2011 excavated burials located inferiorly to that of James Bartlet's grave were accordingly estimated as being interred prior to 1800.

The mortuary style of the burials excavated during the 2011 field season also indicated a pre-1800s age of the cemetery. The type of coffin that was used in the cemetery at St. George's Caye was wooden, hexagonal in shape, and showed very little evidence of adornments. This style of coffin is referred to as a "pinch toe" or "shoulder" coffin and remained popular until the Beautification of Death Movement of the nineteenth century (LeeDeeker 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 to early nineteenth centuries and was marked by a cultural and material shift of attitudes towards the dead. Stylish grave markers, monuments, and coffins were popularized, as were elaborate epitaphs for individuals who had passed away (LeeDeeker 2009). With the exception of Burial 1, the only hardware found in the graves excavated in 2011 included the plain, wooden coffins held together by nails. Burial 1 had a heart-shaped metal coffin plate associated with it and may be representative of the beginning of a shift towards the Beautification of Death Movement.

In stark contrast to the burials found in 2011 are the cemetery descriptions, photographs, and the epitaph inscriptions recorded by Usher in 1907. These clearly demonstrated mortuary attitudes on the caye that correspond to a significant transition resulting from the Beautification of Death Movement. As opposed to being buried in wooden, hexagonal coffins, burial plots were composed of concrete, above-ground tombs that were topped with marble lids. The tops of the lids were etched with epitaphs including identifying information and often poetry or biblical verses (Usher 1907). The majority of these burials were dated to the nineteenth century and a few were dated to the last decade and a half of the eighteenth century. 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.

Burial Analyses

Burial position and orientations were described following the standards outlined in Sprague's *Burial Terminology: A Guide for Researchers* (2005). Burial orientation was specified for articulated to mostly articulated burials and referred to the cardinal direction of the crania in relation to the rest of the body. Position referred to the relationships of the individual areas of the body to each other (e.g. flexed or extended). When a burial was described as "facing" a particular direction, it was in reference to the orientation of the face.

Analyses of the eighteen individuals excavated during the 2011 field season have provided basic information regarding the age, sex, ancestry, and stature of a subset of the historic population. In total, eighteen individuals were excavated from fifteen burials. Only one individual, represented by a single fibula in Burial 15, was too incomplete to be analyzed. Although age, sex, stature, and health were estimated skeletally, ancestry was inferred from multiple historical texts and it is believed that the cemetery contains mostly individuals of European descent. A summary of the data gathered from the burials can be found in Table 2.

Burial 1

Burial 1 was represented by 468 complete, fragmentary, and reconstructed skeletal elements and remained very well preserved during excavation (See Appendix B, Burial 1). Burial 1 was located on the southern edges of XUs 29 and 30. The base of the burial sat at a depth of approximately 70 cm below the ground surface. There were no

Table 2: Biological profiles by burial at St. George's Caye

Burial Number	Age		Sex	Stature (cm)
	Category	*Range*		
1	Young Adult	18-30	Male	166.5-181.3
2	Middle Adult	35-44	Male	151.0-171.2
3	Middle to Older Adult	40-59	Male	158.9-173.7
5	Adult	24-75	Male	159.8-179.6
6	Young to Middle Adult	25-39	Male	157.6-177.6
7	Subadult	11-18	N/A	151.5-167.9
8	Adult	28-71	Indeterminate	N/A
9	Adult	20+	Ambiguous	N/A
10	Adult	24-75	Male	149.7-165.1
11-Crania 1	Adult	24-75	Male	N/A
11-Crania 2	Adult		Female	N/A
11-Innominate	Adult		Indeterminate	N/A
13	Young to Middle Adult	28-49	Female	157.7-175.2
14	Subadult	11-18	N/A	144.1-164.5
15-Innominate 1	Middle Adult	40-44	Indeterminate	N/A
15-Crania & Innominate 2	Subadult	16-23	N/A	154.9-181.3
16	Young to Middle Adult	30-39	Ambiguous	164.5-181.1
17	Young to Middle Adult	30-46	Male	162.3-177.0

wooden coffin remains associated with the burial. However, a heart-shaped metal coffin plate, pictured in Figure 9, was found resting on the chest and crossed arms of the individual. The plate contains identifying information about the individual interred, including name, age, and dates of birth and death. However, the plate was heavily corroded and most of the etching on it was illegible. The only identifying information

Figure 9: Burial 1 with coffin plate in situ

that was readable at the time of analysis was the probable age of the individual at their time of death. The inscription "Aged (?)1" was legible, but it only provided the last digit of the age for the individual. The individual was extended on their back in the burial with their right arm crossed over their stomach and left arm at their side. The burial was oriented to the west and was facing the right. Skeletal analysis indicates that the individual was a young adult male, aged approximately 18-30 years of age, and estimated to have been between 166.5 and 181.3 cm tall during his life (See Appendices C-E, Burial 1). The sex of the individual was estimated using the morphological characteristics of the pubic bone, sciatic notch, and crania, and metric estimation of sex was based on the humeral and femoral heads. The pelvic and postcranial analyses indicate that the individual was male, while the cranial analysis resulted in an ambiguous sexual classification.

Age-at-death for Burial 1 was estimated using the pubic symphysis, auricular surface, sternal rib ends, degree of union in the clavicles and sternum, and cranial suture closure. All of the methods placed the age range within that for a young adult. Based on the biological data available and the historic record provided by the coffin plate, it is likely that the individual was 21 years of age at the time of their death. Stature was estimated using measures of the femur and tibia.

Burial 2

There are 274 fragmentary, complete, and reconstructed skeletal remains associated with Burial 2 (See Appendix B, Burial 2). The base of Burial 2 was lying at approximately 75 cm below ground surface in XUs 29 and 30. The remains of a wooden coffin base were present underneath the skeletal remains. The upper right half of the individual was buried beneath the individual in Burial 1, which had to be completely cleared before full excavation of Burial 2 could be completed. The individual was oriented west and was extended on their back with their arms at their sides. It is impossible to determine which side the individual was facing at the time of their interment because the cranium was not recovered in the grave.

Burial 2 most likely belonged to a middle aged male, estimated as between 35 and 45 years of age at the time of death, with an estimated stature of between 151.0 and 171.2 cm tall (See Appendices C-E, Burial 2). Sex estimation was based on the postcranial metrics and sciatic notch morphology. The diameter of the left femoral head classified the individual as male, and the morphology of the sciatic notch was sexually ambiguous. Therefore, the only characteristic useful in estimating the sex of the individual in Burial 2 was the diameter of the left femoral head. Age was estimated using the right auricular surface. Stature estimates were derived from the maximum length of the radius.

Burial 3

Burial 3 is made up of 386 complete, fragmentary, and reconstructed elements (See Appendix B, Burial 3). Burial 3 was situated in the center of XU 30, just north of and at a slightly higher elevation than Burial 2. The partial remains of a wooden coffin were recovered underneath the skeleton, which was oriented west. The individual was in extended position with their arms at the sides and their head tilted back. A silver coin was found adhering to the cranium of the individual. It was located on the right frontal, about six mm lateral of the anterior sagittal landmark used in cranial suture age estimation. The coin was removed and visually inspected. It is believed to be a Spanish Reale. Upon the removal of the coin, a thin layer a woven fabric was identified and is still adhering to the bone. The fabric has not been identified.

Burial 3 included the remains of a male, aged 40-59 years old at time of death, with a stature of between 158.9 and 173.7 cm tall (See Appendices C-E, Burial 3). Sex estimation for Burial 3 utilized the pubis, sciatic notch, crania, and postcranial metric analysis. While the crania scored as a possible female, all remaining analyses scored the individual strongly as male. Age estimation took into account ranges provided from independent analyses of the left pubic symphysis, both auricular surfaces, and the sternal rib ends. Stature estimation was based on femoral and fibular measurements.

Burial 5

Burial 5 consists of 596 skeletal elements ranging from fragmentary to complete (See Appendix B, Burial 5). Burial 5 was primarily located in XU 23, with the upper edges of the burial extending slightly into XUs 29, 30, and 25. It was overlaying the southeastern portion of Burial 6. Burial 5 sat at a maximum depth of approximately 60 cm. The skeleton was oriented west and in extended position on their back with their hands positioned over the pelvis. The individual was facing the right and there were no coffin remains found in association with the burial.

The individual in Burial 5 was most likely an adult male between 24 and 75 years old, and between 159.8 and 179.6 cm tall (See Appendices C-E, Burial 5). Sex was estimated using cranial morphology and scored strongly as male. Age-at-death estimates were very broad for Burial 5 because the only technique able to be utilized was for cranial suture closure. However, the presence of multiple and deep pacchionian pits found endocranially could indicate that the individual was advancing in age (Mann and Hunt 2005). The stature interval was calculated based on the maximum length of the clavicle.

Burial 6

Burial 6 is made up of the partial to complete and reconstructed bones of 425 skeletal elements (See Appendix B, Burial 6). The base of Burial 6 was at a depth of approximately 70 cm below the ground surface. The majority of the burial was in XU 23, with only the easternmost portion extending into XU25. The skeleton was situated on top of a wooden coffin base in extended position and on their back. The individual was oriented to the west with their head tilted back and arms resting on the pelvis. The bottom right portion of the burial was overlaid by Burial 5.

This individual was estimated as a male, aged 25 to 39 years old, and standing 157.6 to 177.6 cm (See Appendices C-E, Burial 6). Sex estimation for the individual utilized the pelvis, right femoral head, and cranium. While the cranium displayed characteristically female markers, the pubis and postcrania scored the individual as clearly male. Age-at-death, as estimated using the left pubic symphysis, both auricular surfaces, and cranial suture closures, all suggest that the individual was a young to middle adult. The stature estimate was computed using metrics from the radius.

Burial 7

Represented in Burial 7 are the whole, reconstructed, and fragmentary remains of 460 skeletal elements (See Appendix B, Burial 7). Burial 7 was situated parallel to Burial 6, in the center of XUs 23 and 25. The maximum depth of the burial was approximately 52 cm and there were no coffin remains associated with the burial. A wooden post had been driven into the burial at the position of the left lower leg, which was not recovered. The extended burial was oriented to the west, facing right, and with the arms at the sides.

Burial 7 was estimated to contain the remains of a subadult, aged 11-18, with a stature of 151.5 to 167.9 cm (See Appendices C-E, Burial 7). Sex was indeterminate due to the relatively young age of the individual. Age was estimated using the rates of dental eruption and epiphyseal union, the right pubic symphysis, and the sternal rib ends. All of the estimates indicated the individual was a subadult. The stature regression for Burial 7 was based on the metric data of the femur and humerus.

Burial 8

Burial 8 is comprised of 234 skeletal elements ranging from fragmented to complete (See Appendix B, Burial 8). Burial 8 was situated along the northern border of XU 23, slightly east of but parallel to Burial 7. The burial was overlaid on its north and south borders by Burials 7 and 9, at sat at a maximum depth of approximately 62 cm. The skeletal remains were enclosed by the base of a wooden coffin, laid out on their back in extended position, and oriented to the west. Burial 8 was missing the cranium and therefore the direction the individual was facing could not be determined.

The individual contained in Burial 8 was estimated to be an adult aged 24 to 75 years at their time of death (See Appendix E, Burial 8). Sex and stature were unable to be estimated due to the poor preservation of the elements recovered in the grave. The age range of the individual was based on the intact remains of one sternal rib end and the degree of resorption of the mandibular dentition.

Burial 9

There are 577 fragmented to complete skeletal elements associated with Burial 9 and Burial 10 (See Appendix B, Burials 9 and 10). Their commingled nature made it impossible to determine with certainty which fragmentary remains were associated with each burial and they were therefore counted together. The lower limb bones for Burials 9 and 10 were partially overlapping and upturned, also making a definite determination of which bone belonged to which individual impossible. All following analysis pairs limb bones with individuals based on the relative positioning and articulation of the elements. Lying along the northern edges of XUs 23 and 25 at a depth of 55 cm is Burial 9. Burial 9 was part of a group of three burials (9, 10, and 11), two of which were commingled with each other (Burials 9 and 10), and all of which were commingled with faunal assemblages. The faunal bones present included the long bones and pelves of what is believed to be a bovid. The faunal elements were clustered near the cranial remains on the western borders of the burials. There were no coffin remains associated with the assemblage. The burials were oriented to the west, partially articulated, and had elements of the skeletons upturned in the graves. Burial 9 was in extended position but resting in the grave on their stomach.

Burial 9 was estimated to be a younger adult of at least 20 years of age at the time of death with clear pathology of the postcrania and possible pathology of the cranium (See Appendix H). Sex estimation based on the cranium and sciatic notch yielded ambiguous results (See Appendices C and D, Burial 9). The age-at-death estimates for the individual were based on the eruption rates and wear patterns to the dentition, as well as the morphology of the left auricular surface. Cranial suture closure scores were recorded but determined to be an inappropriate aging method for the individual because of the abnormal and possibly pathological nature of the crania. Stature was unable to be estimated for the individual.

Burial 10

There are 577 fragmented to complete skeletal elements associated with Burial 9 and Burial 10 (See Appendix B, Burials 9 and 10). Their commingled nature made it impossible to determine with certainty which fragmentary remains were associated with each burial and they were therefore counted together. Burial 10 was lying at the intersection of XUs 23, 25, 27 and 28. It was parallel to and commingled with Burial 9. The maximum depth of the burial was 59 cm and there were no wooden coffin remains found in association with it.

The individual in Burial 10 was estimated as an adult male between 24 and 75 years old and had an estimated stature of 149.7 to 165.1 cm (See Appendices C-E, Burial 10). Sex and age-at-death estimates were based on the non-metric traits of the crania. Stature estimation was based on measurements of the femur and ulna.

Burial 11 – Multiple Interments

Burial 11 contained the remains of two individuals and was situated in the southeast corner of XU 27. The individuals present in Burial 11 are represented by 98 skeletal elements, all of which are fragmentary and have been partially reconstructed (See Appendix B, Burial 11). The grave had a maximum depth of approximately 55 cm below the ground surface. While there was no evidence of a coffin in Burial 11, five whole conch shells were found placed in a straight line, extending east from the location of the cranial remains. One of the conch shells that appeared to be associated with the burial was found in the southwest corner of XU 28.

Cranium 1 from Burial 11 was estimated as a male between 24 and 75 years old (See Appendices B and C, Burial 11). All estimates for Crania 1 were based on the morphology and metric data of the crania. Cranium 2 most likely belonged to an adult female (See Appendices C and D, Burial 11). Sex and age estimates were based on the morphology and rates of suture closure of the cranial remains, respectively. While it is clear that the innominate found in Burial 11 belonged to an adult, the fragmentary nature of the pelvic remains made it impossible to confidently estimate sex (See Appendices C and D, Burial 11). No estimates for stature were possible for any of the individual remains found. The age status estimated for the innominate was based on the complete fusion of the ilium, ischium, and pubis.

Burial 13

Burial 13 is made up of 385 skeletal elements ranging in completeness and partially reconstructed (See Appendix B, Burial 13). Burial 13 was located near the center of XU 27 and extended slightly into the western margins of XU 28. The skeletal remains were in extended position inside the base of a wooden coffin at a maximum depth of approximately 62 cm below the ground surface. The individual was oriented to the west, facing left, and lying on their back with their right arm at their side and left arm resting on their pelvis.

The individual in this burial was estimated to be a female, between the ages of 28 and 49 years old, with an estimated stature ranging between 157.7 and 175.2 cm (See Appendices C-E, Burial 13). The sciatic notch and cranial characteristics were used to estimate sex for the individual in Burial 13. Age-at-death estimations were based on the morphology of the right auricular surface, two intact sternal rib ends, and the degree of cranial suture closure. Stature was based on the maximum length of the radius.

Burial 14

Parallel to Burial 13 and at a maximum depth of 60 cm was Burial 14. The fragmentary and whole skeletal elements associated with Burial 14 number 650 and include reconstructed elements made up of numerous fragments (See Appendix B, Burial 14). It extended from the eastern half of XU 27 into the western half of XU 28. The skeletal remains were in extended position on their back and there were no remnants of a coffin found in the grave. The burial was oriented to the west and facing left. The individual's right arm was crossed over their pelvis and the left arm was at their side.

The remains of Burial 14 were estimated to be those of a subadult, aged 11 to 18 years old at time of death (See Appendix D, Burial 14). Although sex was unable to be estimated, the individual's stature was estimated as ranging between 144.1 and 164.5 cm

(See Appendices C and E, Burial 14). Age-at-death was estimated using the morphology of the auricular surfaces, five sternal rib ends, the rate of dental eruption, and degree of epiphyseal union of numerous postcranial bones. Stature estimates were based on the maximum lengths of the clavicle, humerus, and radius.

Burial 15 – Multiple Interments

The individuals contained in Burial 15 were represented by 335 complete to fragmentary skeletal elements (See Appendix B, Burial 15). Burial 15 was located at a maximum depth of 60 cm along the northern wall of XU 28. The burial remains were not enclosed in a coffin and represent three separate individuals. The individuals were all commingled and the bones were slightly scattered. At least two of the burials were oriented to the west and the third burial, which is represented by a single bone, was in an undetermined orientation and was likely displaced from its original context.

The first individual identified in Burial 15 was estimated as that of an adult, aged 40 to 44 years at their time of death (See Appendix D, Burial 15). Sex and stature were unable to be estimated for Individual 1. Age-at-death estimates for Individual 1 were based on the left auricular surface of the pelvis. Sex and stature were unable to be assessed due to poor skeletal preservation.

Individual 2 consists of the remains of a subadult with an estimated age and stature of 16 to 23 years old and 154.9 and 1801.3 cm tall, respectively (See Appendices D and E, Burial 15). Sex was unable to be estimated for Individual 2. The auricular surfaces and degrees of union in the pelves and left clavicle were utilized in estimating age-at-death. The stature regression was calculated with the maximum length measure of the left clavicle.

No skeletal analysis could be performed for Individual 3, who was represented solely by a fragmentary fibular shaft.

Burial 16

The individual in Burial 16 is represented by 603 skeletal elements ranging from complete to fragmentary (See Appendix B, Burial 16). Burial 16 was found outside of the main burial concentration in XUs 24 and 26 at a maximum depth of 55 cm. The remains were located on the north edges of the unit and consist of an individual in extended position on their back, oriented to the west. The individual was facing left and had their right arm resting over their pelvis and left arm at their side. There were no coffin remnants or associated grave goods found in the burial.

The individual in Burial 16 was estimated as an adult, aged 30 to 39 years old at time of death, with a stature of 164.5 to 181.1 cm (See Appendices C-E, Burial 16). Sex estimation yielded ambiguous results. Sex estimation was performed utilizing the traits of the cranium, innominate, and postcranial metrics. All sex analyses had ambiguous results. Age-at-death was estimated via degree of cranial suture closure and the morphology of the right auricular surface. Stature regression was based on the lengths of the femur, tibia, and humerus.

Burial 17

Burial 17 is comprised of 332 skeletal elements that are either whole, fragmentary, or are partial reconstructions (See Appendix B, Burial 17). Burial 17 was also located away from the central mass of burials. It extended through XUs 26 and 31 at a maximum depth of 99 cm below the ground surface. The remains were oriented to the west and appear to have been in extended position but have been moderately disturbed. The base of a wooden coffin was found underneath the individual.

Burial 17 was estimated to belong to a male adult aged 30 to 46 years at the time of death, with an estimated stature of 162.3 to 177.0 cm tall (See Appendices C-E, Burial 17). Cranial, pubic, and postcranial data were used to estimate sex for the individual in Burial 17. Estimation of age-at-death utilized the degree of cranial suture closure as well as the morphology of the left pubic symphysis and auricular surface. Stature regression formulae were based on lengths of the femur and fibula.

Stature

The total number of individuals from St. George's Caye for which stature could be estimated was twelve. Of those, three were estimated as subadults, seven as adult males, one as an adult female, and one as an adult of ambiguous sex. Average stature for male adults was calculated for comparison with contemporaneous male populations. The three subadults, one female, and one ambiguously sexed adult were excluded from this analysis.

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 (n=7) is 165.3 cm, with a prediction interval of 8.7 cm. An average for the female sample could not be estimated due to the small sample size (n=1). However, it is noted that the single female stature estimate is 166.4 cm with a prediction interval of 8.8 cm, and is very similar to the male average. A breakdown of the estimated and average stature for the St. George's Caye sample is shown in Figure 10.

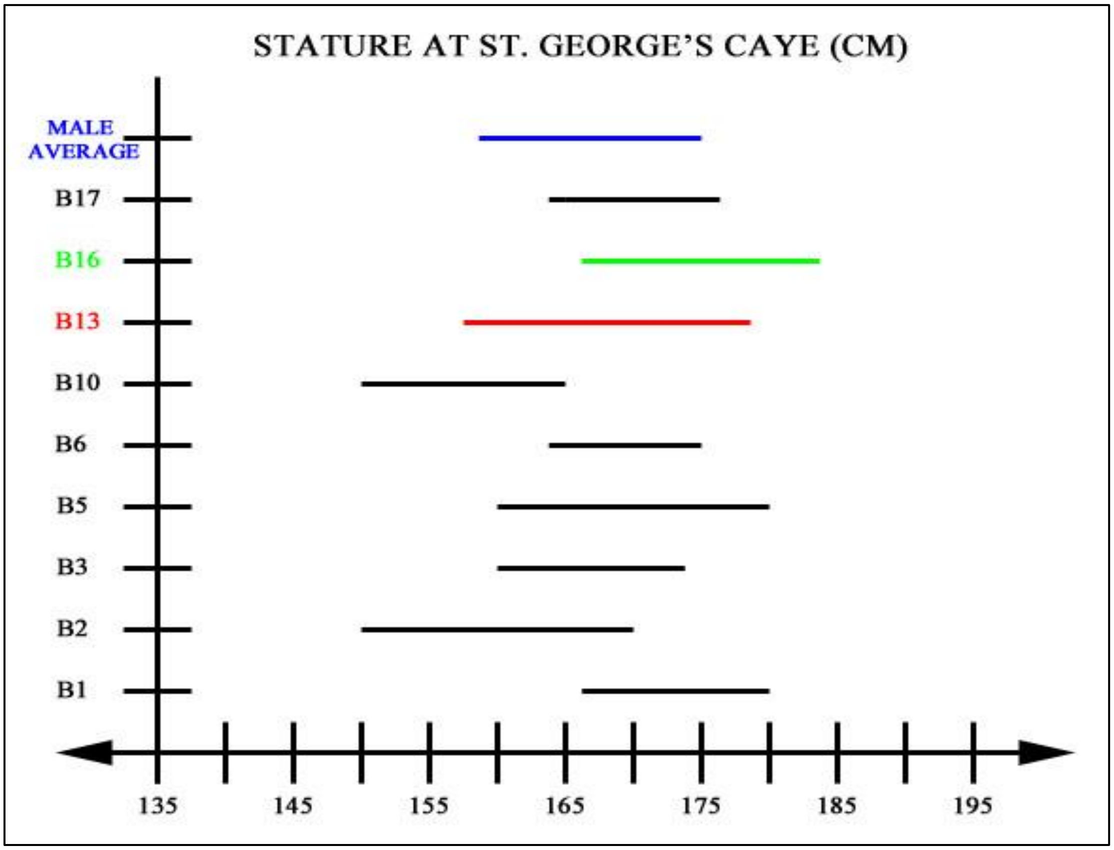


Figure 10: Stature estimates from St. George's Caye. B16 (in green) represents the individual of ambiguous sex. B13 (in red) represents the individual sexed as female

The individuals represented at St. George's Caye had a shorter average height than any of the contemporaneous American populations to which they were compared. They were also shorter than four of the British groups, but taller than one. Overall, the

Belizean group was more closely aligned with the British sample than the American, as shown in Figure 11.

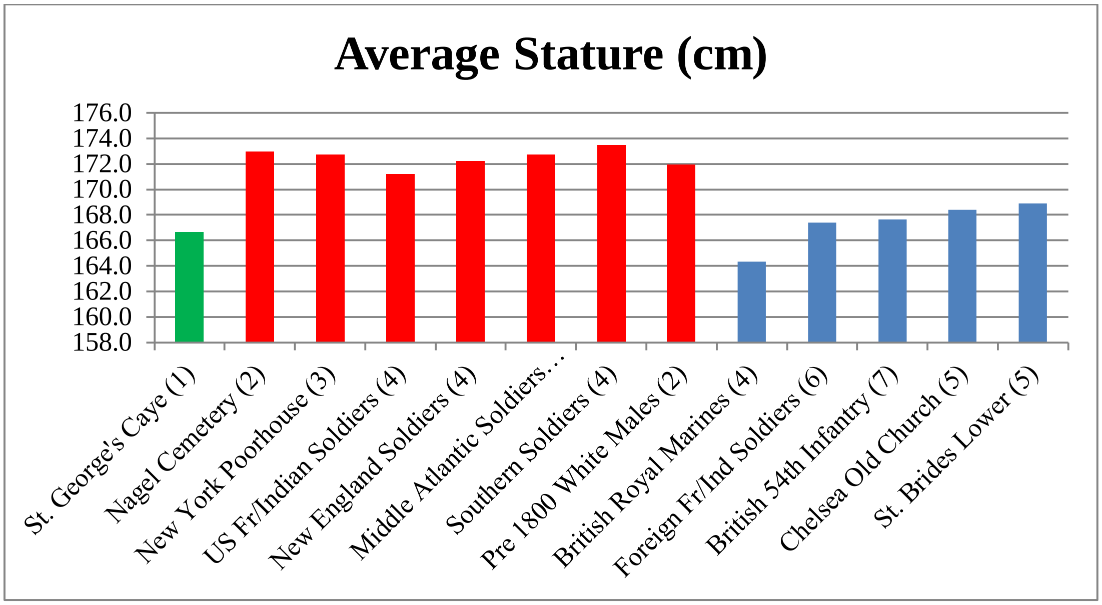


Figure 11: Average stature by sample groups. The Belizean sample is represented in green, American samples in red, and British samples in blue. References: 1. Study Sample; 2. Angel 1976; 3. Steegman 1991; 4. Sokolff and Villaflor 1982; 5. CHB 2011; 6. Steegman and Haseley 1988; 7. Steegman 1985

Significant Population Differences in Long Bone Lengths

Average lengths for the clavicle, humerus, radius, ulna, femur, and tibia were compared against three British (CHB 2011) and three American (Wescott 2001) samples using Analysis of Variance to test for significant differences (See Appendices H and I for St. George's Caye metric data and SAS statistical output, respectively). No differences were found between the three groups at a 0.05 level of significance for the femora (p=0.1799), humeri (p=0.2440), ulnae (p=0.0718), and clavicles (p=0.8806). The tibiae and radii of the three groups were significantly different at the 0.05 level, with p-values of 0.0098 and 0.0450, respectively. Tukey's Studentized Range (HSD) tests were performed for the tibiae and radii to determine which groups had significantly different average maximum lengths. The results show that the only significant differences found were between select British and American groups, as illustrated in Table 3. The sample at St. George's Caye was not significantly different from any of the British or American groups it was compared against.

Table 3: Significant differences in long bone length by sample. Differences in the tibia, radius, and ulna were observed

	St. George's Caye[1]	**Cross Bones[2]**	**Chelsea Old Church[2]**	**St. Bride's Lower[2]**	**Snake Hill[3]**	**Missouri[3]**	**Misc. American[3]**
St. George's Caye[1]							
Cross Bones[2]							
Chelsea Old Church[2]					TIB		
St. Bride's Lower[2]					TIB/RAD		
Snake Hill[3]			TIB	TIB/ RAD			
Missouri[3]							
Misc. American[3]							

1. This study sample; 2. CHB 2011; 3. Wescott 2001

Dental Health

Dental health indicators noted during the study are summarized in Table 4. Of the individuals with dentition present, 64% exhibited parallel grooved striations or pits on their anterior dentition consistent with enamel hypoplasia. Enamel hypoplasias are

Table 4: Occurrence of dental pathologies by burial. An "X" indicates the presence of the pathology

Burial/ Individual #	Caries	Enamel Hypoplasia	Calculus	Incisal/ Canine wear	Premolar/ Molar wear	Abscess	Alveolar Resorption	Antemortem Tooth Loss
1	X	X		X			X	
2					X			
3	X	X	X	X		X	X	X
5	X		X	X	X		X	X
6	X	X	X	X	X		X	X
7	X		X					
8								X
9	X	X	X	X			X	
10	X	X	X	X	X		X	X
11-Cranium 1	X		X					
11-Cranium 2	X		X	X	X		X	
13	X	X	X	X	X		X	X
14		X	X					X
16	X	X	X	X	X		X	X
17	X	X	X	X				X

disruptions in the formation of dental enamel resulting from an insult or stressor sufficient enough to arrest ameloblastic processes (Aufderheide and Rodriguez-Martin 1998). 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 built up on their enamel or root surfaces. Alveolar resorption was present in 75% of the individuals and another 69% displayed visible antemortem tooth loss. Dental statistics reported in this study report the occurrences of particular pathologies per individual analyzed, not per tooth analyzed. Because 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 most likely an underrepresentation of the total occurrence of the pathologies.

One individual (Burial 3) had a buccal abscess in the socket of the mandibular right first molar. Localized alveolar porosity was evident on the maxilla of Burial 10, and calculus build up was noted on the root of the maxillary right third premolar of Burial 16. Almost 80% of the individuals represented exhibited varying degrees of wear to the occlusal surfaces of their teeth. Across the population, wear was significantly more marked on the anterior than on the posterior dentition. Individual descriptions of the dentition can be found in Appendix G.

Dental data collected from the cemetery burials also informed on the level of health among the settlers. In comparison to three British cemeteries of varying socioeconomic status (CHB 2011), the rates and prevalence of dental caries and calculus were the most similar to those found in the very poor socioeconomic group interred in the

Cross Bones cemetery, as shown in Table 5. The burial grounds were originally a prostitute's cemetery that later doubled as a pauper cemetery until it was closed in 1853 (CHB 2011). The rate of hypoplasia found in the cemetery at St. George's Caye was most similar to the sample from Chelsea Old Church, the most affluent of the three British groups analyzed.

Table 5: Frequency of dental pathologies in one Belizean and three British samples

	Percentage of Sample with Caries	Percentage of Sample with Calculus	Percentage of Sample with Hypoplasia
St. George's Caye[1]	86	86	64
Chelsea Old Church[2]	62	94	59
Cross Bones[2]	87	92	80
St. Bride's Lower[2]	50	63	37

1. This study sample; 2. CHB 2011

Individualizing Pathologies

Field descriptions of burial anomalies, pathologies, and notes can be found in Appendix H.

Burial 5

The individual in Burial 5 had seven antemortem endocranial lesions on the left and right parietals. The smaller lesions were approximately 1 mm in diameter and cluster around the interior sagittal suture. Four of the larger lesions were approximately 3-4 mm in diameter and were roughly circular in shape. One was located on the right parietal approximately 2 mm lateral of the midpoint on the sagittal suture. Two were on the left parietal approximately 4 mm lateral to the anterior sagittal landmark. There was a final large lesion located on the left half of the frontal bone, about 30 mm superior to the most medial aspect of the left eye orbit. Three of the larger lesions are pictured in Figure 12.

The defects were smooth-edged and did not extend through the exterior surface of the crania. Their morphology is consistent with that of pacchionian pits. Pacchionian pits are most widely found in the parietals and are very common in all populations (Mann and Hunt 2005). They become more prevalent and deep with increased age. The pits are formed by the erosion of the endocranial vault by arachnoid granulations, and have not been significantly linked to any adverse health conditions.

Figure 12: Large (3-4 mm wide) Pacchionian pits on the left and right parietals of Burial 5

Burial 6

Schmorl's nodes and slight vertebral lipping was seen on four of the vertebrae recovered from Burial 6. These defects are antemortem in nature and three of the affected vertebrae are pictured in Figure 13. Schmorl's nodes are identified as variously shaped and sized depressions on the surfaces of vertebral bodies (Waldron 2009). They are fairly common and are most likely to be found in the lower thoracic and lumbar vertebrae. Various studies have suggested that the presence of Schmorl's nodes increases with age and that they may also be linked to the application of stress to the lower spine as a result of heavy lifting or strenuous and habitual activities (Mann and Hunt 2005; Waldron 2009).

Figure 13: Schmorl's nodes and vertebral lipping of Burial 6

Vertebral lipping is commonly associated with osteoarthritis, which occurs commonly 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 physical stress to the lower spine and not advancing age.

Burial 7

There was a slight, smooth-edged and antemortem depression superior to the right eye orbit on the frontal bone of the individual in Burial 7. The defect is picture in Figure 14. It was not penetrating but could be viewed 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 had a slightly uneven surface.

There was a second antemortem defect just lateral to lambda along the lambdoidal suture on the right parietal which is pictured in Figure 15. The lesion was circular in shape and the base of it was slightly pitted. The edges and base were smooth, and while it was not penetrating, the depth of the pit at its base nearly reached the endocranial surface.

Currently, it is impossible to tell whether or not the two defects are related to one another. The frontal defect had the overall appearance of a healed compression fracture and the morphology of the parietal lesion was consistent with that of a lytic lesion. Mann and Hunt (2005) note that characteristic “pond”-like compression fractures that are often

Figure 14: Frontal lesion of Burial 7

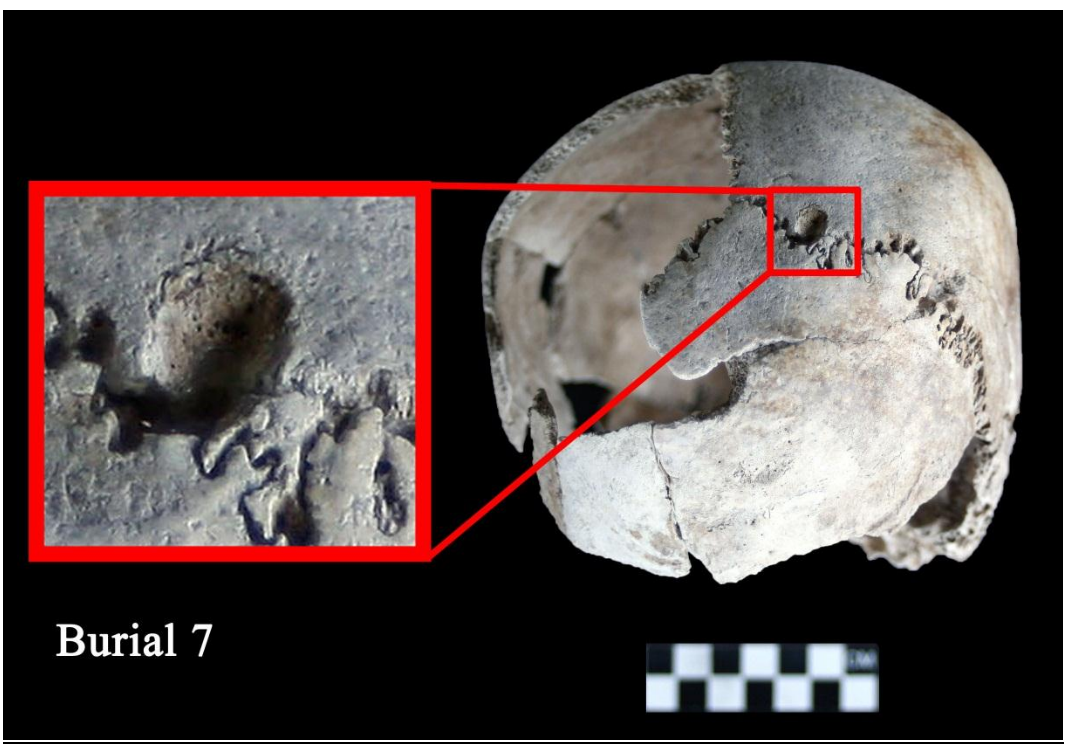


Figure 15: Lambdoidal lesion of Burial 7

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 8

Seven of the nine vertebral bodies recovered from Burial 8 displayed Schmorl's nodes and/or vertebral lipping, all of which are pictured in Figure 16. These defects are antemortem and could be due to pathological or habitual influences, or may be attributable to the degenerative effects of advancing age. When viewed in conjunction

Figure 16: Schmorl's nodes and vertebral lipping of Burial 8

with the degree of mandibular resorption observed, the vertebral pathology likely indicates that the individual in Burial 8 had reached middle to older adult age status.

There was a mid-shaft defect observed on the lateral side of the right radius, which is pictured in Figure 17. The area was characterized by a large groove running approximately 13 mm down the side of the shaft. The groove ran a maximum of 7 mm wide and reached a depth of 1.5 mm. The bone along the surface of the defect was striated and compact. The striations ran perpendicular to the length of the groove. This defect has not been linked to any known health or pathological processes.

Figure 17: Radial defect of Burial 8

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. Figure 18 shows the superior view of the cranium and degree of closure attained in the sutures visible.

Figure 18: Superior view of Burial 9 cranium

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.

The bones of the lower limbs were all bowed antemortem both medio-laterally and anterior-posteriorly, with the tibiae exhibiting a classic saber-shin appearance, as shown in Figure 19. The interosseous crests of the tibiae were oriented vertically in a

Figure 19: Bowed tibiae of Burial 9

straight superior to inferior line. There was significant woven bone formation at the anterior sites of bowing. The femora were cortically thicker and heavier at the sites of bowing than the remaining areas of the shaft. The femora also exhibited additional woven bone in their distal shafts. 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 could 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 appear to be radiating fractures of unknown timing. The edges of the defects were smooth and the left central incisor was missing the inferior aspect of the tooth just below the defect. Both defects penetrated the enamel and extended into the core of the tooth. A similar radiating fracture was present on the left lateral incisor and the inferior margin of the tooth, which was well worn, appeared to mimic the morphology of the medial incisor's defects. The anterior and inferior halves of the incisors were significantly whiter than the superior portions and the lingual surfaces were covered with pitted hypoplasias. While not as common as the 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 1998). However, the most commonly acknowledged condition resulting in hypoplasia is malnutrition. The maxillary dentition of Burial 10 is pictured below in Figure 20.

Figure 20: Maxillary dentition of Burial 10

Much of the posterior mandibular dentition has been lost antemortem and the alveolus resorbed. On the left horizontal ramus, the alveolus tapered to a sharp ridge where the dentition once was, as seen in Figure 21. The right side remained broad and flat.

Figure 21: Mandible of Burial 10 showing sharp alveolar ridge

Burial 13

The individual in Burial 13 had lost the majority of their posterior mandibular dentition antemortem. The left side of the resorbed alveolus exhibited a very clear, sharp ridge where the sockets for the dentition would be. The right side, although resorbed, did not display a ridged alveolus. The mandible of Burial 13 is pictured in Figure 22.

Figure 22: Mandible of Burial 13 showing sharp alveolar ridge

Burial 14

Each humerus from Burial 14 had two antemortem, linear and grooved defects on the anterior aspect of the proximal ends of the shafts. The defects ran roughly parallel to each other and were oriented lengthwise from the proximal to distal ends of the bone. The defects on the right humerus were approximately 4.5 mm wide and 3 mm deep. They varied in length with the longest running 40 mm long and the shorter only 35 mm. The right humerus is pictured in Figure 23. The defects of the left humerus were generally slighter than those of the right. One defect was 35 mm long, 3 mm wide and 1.5 mm deep. The other was 27 mm in length, 5 mm in width, and 2 mm deep. The bone surfaces in and around the grooves were irregular and porous with areas of plaque-like bone growth consistent with a non-specific bone infection (Roberts and Manchester 2005).

Figure 23: Right humerus and defect of Burial 14

CHAPTER IV

DISCUSSION

The patterns of sex and age distribution in the sample from St. George's Caye vary from contemporaneous British populations. However, the sex and age distributions cannot be gauged as to whether or not they accurately represent the population because no demographic data for the settlement has been found. The stature and dental data, however, analyzed are consistent with the contemporaneous British and American populations against which they were compared. Overall, results from the 2011 field season indicate that future excavations and research are necessary to augment the available data from the sample and gain a clearer understanding of the population in question.

Sex and Age Distributions

More males than females were excavated from the eighteenth century cemetery at St George's Caye as 47% (n=8) of the individuals in the cemetery were estimated as male and 12% (n=2) were estimated to be female. Of those remaining, 12% (n=2) were sexually ambiguous, 12% (n=2) had too few diagnostic features from which to estimate sex, and 17% (n=3) were subadults.

Previous studies have posited a variety of reasons that could lead to the unbalanced representation of males and females in a given skeletal assemblage, including differential burial practices among the sexes and the unbalanced peopling of colonial societies in the form of male-dominated migrations (Ashmore and Gellar 2005; Engerman 2000; LeeDeeker 2009). 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 living population at the caye. However, no documented demographic data or census records have been found from the Bay Settlement that could be used test this hypothesis. 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 function to even out the sex ratio of the sample.

Where possible, 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) were subadults, 64% (n=7) were younger to middle aged adults, and only 9% (n=1) were middle to older aged adults. Six additional individuals were estimated as adults, but with no clear age group.

The ages for the individuals at St. George's Caye were relatively young in comparison to the British age-at-death distributions from the Chelsea Old Church and St. Bride's Lower samples. 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 (CHB 2011). Again, while the younger age distribution observed in the cemetery at St. George's Caye could be an accurate reflection of the population at the time, without demographic and census records the relationship remains unclear. It is possible that the relative isolation of the community at St. George's Caye may have acted as an impediment to general healthcare, which could significantly decrease life expectancies. However, there was not a significant presence of disease markers or poor health characteristics detected on the skeletons excavated. In addition, it is possible that due to the small size of the sample the true age distributions of the population are not being accurately represented.

Health Implications

Stature and Long Bone Lengths

Stature has often been used as a correlate for health in population and bioarchaeological studies because it has both a biological and an environmental component to its manifestation (Maat 2005; Steckel 1999; Steegman 1985). Not surprisingly, the exact degree of influence of environment versus genetics on stature is a topic of much speculation. However, while the influence of genes is important to stature, studies suggest that changes in average height across genetically similar groups are largely linked to differences in environmental factors (Bogin and Loucky 1997; Bogin et al. 2002; Jantz and Jantz 1999; Komlos 1990; Steckel 1999).

To assess the influence of genetic and environmental factors on stature, the male individuals excavated from the St. George's Caye cemetery were compared with males from contemporary cemetery populations from Great Britain and the United States. Previous studies on eighteenth century stature have documented a relatively greater average American stature compared to British samples (Fogel et al. 1983; Steckel 1999). Their research indicates that shortly after arrival in the United States, generations of Americans attained higher average statures than their foreign-born contemporaries. Steckel (1999) found that in the eighteenth century, typical American males were seven cm taller than British males. These studies linked stature differences between American and British populations to access to available resources in the form of healthcare and improved diet, disease rates, environment, and occupation and workload intensity.

It was expected that the average stature estimated at St. George's Caye would be more closely aligned with the British groups because of their recent migratory history and close ancestral affiliation. The St. George's Caye average male stature (166.6 cm) was slightly less than the range for the average stature of the American samples (171.2-173.0 cm) and fell within the range for the average stature of the British samples (162.1-168.9 cm) (Angel 1976; CHB 2011; Sokoloff and Villaflor 1982; Steegman 1985, 1991; Steegman and Haseley 1988). However, when analyzing long bone lengths via ANOVA, the St. George's Caye sample did not differ significantly from the American or British samples, although some significant differences were found in tibiae and radii of some of the American and British samples. Overall, stature and long bone length analyses indicate that the population at St. George's Caye was not experiencing a different level of health than that observed in contemporaneous populations.

Dental Indicators of Health

Caries and calculus were very prevalent in the St. George's Caye individuals. Caries form as the result of enamel demineralization, which occurs when plaque releases acidic bacteria onto the tooth surface (Ortner 2003). Ortner cites dietary influences such as increased carbohydrate intake and inadequate nutrition as contributing factors in the presence and number of caries. They have been described as occurring more frequently in populations that have a relatively high intake of sugars and maize, which is likely of the population at St. George’s Caye. Although the colonists were not growing and refining their own agricultural products in mass, neighboring Caribbean and Central American populations were actively engaged in agricultural pursuits (Engerman 2000; USGPO 1993; Watts 1987). Food trade or import from neighboring groups was probable given their close proximity and the exchange and purchase of enslaved individuals between populations. In particular, early Belizeans should have had easy access to sugars through trade with the neighboring Caribbean populations for which sugar plantations were an economic staple. This could partially account for the high number of caries in the sample.

Enamel hypoplasias, which were recorded in high numbers (86% of individuals) in the St. George’s Caye sample, have been linked to a variety of environmental and pathological conditions. Of these, poor nutrition during childhood is the most widely recognized (Aufderheide and Rodriguez-Martin 1998). The alveolar resorption and antemortem tooth loss common in the St. George’s Caye sample can also be indicative of periodontal disease (Waldron 2009). Overall, the prevalence of the common dental pathologies observed in the St. George’s Caye sample is consistent with those observed in the British samples, which indicates that even if the populations are experiencing some form of health stress, they were very similar in their overall dental health.

Other Pathologies

The few individualizing pathologies described for the excavated individuals do not suggest that the population was experiencing a marked reduction or increase in health. Some individuals from the St. George's Caye cemetery had Schmorl's nodes, which are more common in individuals with advancing age but can also be the result of heavy lifting and intense physical strain to the body (Mann and Hunt 2005; Waldron 2009). The presence of Schmorl's nodes and vertebral lipping in a younger individual (aged 25-39) at St. George's Caye could indicate an occupational stress consistent with the heavy labor of logwood and mahogany trades. However, because Schmorl's nodes and vertebral lipping tend to be very common pathologies they cannot be used to inform on the general health of a population without additional pathological traits (Mann and Hunt 2005; Waldron 2009).

Limitations and Future Recommendations

A major limitation in this study was the inability to remove whole bones intact from the in situ burials. Once at the lab for analysis, many of the skeletal elements necessary for metric and morphological analysis had been damaged or completely fragmented into pieces. It is therefore recommended that basic measurements and morphological analysis be taken in the field prior to the removal of the skeletal elements so that if they do not maintain their integrity after removal, some preliminary information will be accessible for future research.

Another limitation involved the inability of ancestry or country of origin to be estimated from the skeletal elements of the individuals. If enslaved individuals of

African or mixed ancestry are present in the cemetery, it is possible that they will exhibit different types and rates of pathologies than those seen in the White population due to their different social status and increased workload. They may also show different wear patterns and musculoskeletal markers to their skeletons as well. While it is likely that many of the individuals interred in the cemetery are of European origin, 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 documented living near St. George's Caye during the colonial period (Shoman 2000). Admixture between the groups occurred both during and after the period of slavery in Belize and it would be expected that there would be a presence in the cemetery of individuals of African, native, or mixed descent.

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 that were 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 belief into the colonists' mortuary practices. Lastly, in the 2010 field season two culturally modified teeth were found buried in another 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 less common in individuals of European ancestry, it is frequently associated with both Native American and African groups (Finucane et al. 2008).

A third limitation of the study was the direct comparison of skeletal statures from the cemetery at St. George's Caye to living and skeletal statures from contemporaneous populations. Skeletally estimated statures often vary from living heights and comparisons using both will introduce more opportunity for error than would skeletal or living only comparisons (Ousley 1995). However, given the scarcity of documented skeletal populations corresponding to the time period represented at St. George's Caye, the comparisons were made under the assumption that the information gleaned from the study could be further refined and reworked as more collections become available for analysis. Additionally problematic is that in order to accurately make inferences about the health and nutritional status of individuals via stature, it is necessary to know if they were native or foreign born to the area in question (Steckel 1999). This information is not readily available for the St. George's Caye population and the results of the health analysis centered on stature estimations are therefore less firmly supported than those of studies using samples with known places of birth. Although the results of the health analyses on the St. George's Caye sample were consistent with a population that was not significantly different from its contemporaries, further research and excavations need to be undertaken to increase the sample size to gain a clearer understanding of the relationship of health and nutrition in colonial Belize.

Lastly, it is recommended that in addition to continued excavation and skeletal analysis, isotopic and DNA analysis be performed where applicable to fill in the research gaps. A small sample of teeth has been submitted to determine the viability of DNA analysis on the population. If isolated and amplified, this DNA could be used as another line of evidence supporting and filling in the gaps in the sex, ancestry, and health estimates (Butler 2009). Further research projects could look into the relatedness of the individuals interred in the cemetery and test the hypothesis that the majority of Belizeans can trace their lineage to at least one of the individuals interred in the cemetery.

CHAPTER V

CONCLUSIONS

While preliminary, the excavations at St. George's Caye have already provided valuable information about the settlers who lived there. The initial aims of the project were to accumulate basic information about the early settlers in the form of estimations of biological age, sex, ancestry, and stature as represented by the individuals interred in the cemetery at St. George's Caye. The biological information gathered from the individuals excavated during the 2011 field season have provided baseline demographic information in the form of sex and age-at-death distributions and have also allowed for the preliminary assessment of health in the colony.

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 and dominantly male colonial migrations, or may 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 present in the sample analyzed. Because only sparse demographic data is available for the Bay Settlement populations, it is currently unclear whether or not the age and sex distributions accurately represent the individuals living on the caye during the eighteenth century.

Initial analyses based on historic records suggest that the cemetery is mainly comprised of individuals of European ancestry (Bolland 1977; Garber 2011:Figure 2.2; Setzekorn 1975; Usher 1907; Waddell 1961). However, indications of a more ancestrally diverse population exist. If future excavations reveal that the settlers are more racially mixed than present analyses indicate, the cemetery would be an invaluable source of information because it would exist as one of the few skeletal collections that is able to document admixture between diverse groups. Because both enslaved individuals and the slave-holding families populated the island, if research into the ancestral origins of the sample is indicative of a European population, then the cemetery would likely represent the slave-holding upper class of the society. 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.

Analyses of the individual and averaged statures derived from the sample at St. George's Caye describe a group that was noted as generally shorter than their contemporaries. However, long bone lengths from the Belizean sample were not significantly different from the British and American groups to which they were compared. Dental analysis of pathological conditions also supports the idea that the St. George's Caye group was very similar to their British counterparts. There were no other significant pathologies occurring in multiple individuals that would suggest an increased or decreased level of health in the colony. The metric, dental, and pathological data available for the sample fail to indicate that the population at St. George's Caye was experiencing health levels different from their contemporaries in both Britain and America.

Future excavation and skeletal analysis of the cemetery at St. George's Caye is recommended to further increase the body of data available to researchers who wish to understand the biological and cultural histories of the first European settlers at St. George's Caye. It is recommended that this study be used to highlight possible research avenues of future projects. Continued research should improve on the data collection techniques employed by the author and expand on the types of analyses performed.

APPENDIX A

SAMPLE INVENTORY FORM

Inventory: Codes: 1- present complete | 2- present fragmentary | 3- absent (postmortem) | 4- antemortem loss | 5- unerupted (dentition) | 6- congenitally missing

Cranium:____

	Left:	Right:		Left:	Right:
Frontal:	___		Maxilla:	___	___
Parietal:	___	___	Nasal:	___	___
Occipital:	___		Ethmoid:	___	
Temporal:	___	___	Lacrimal:	___	___
Zygomatic:	___	___	Vomer:	___	
Palate:	___	___	Sphenoid:	___	

Mandible:____

	Left:	Right:		Left:	Right:
Body:	___	___	Ramus:	___	___

Dentition:____

	Left:	Right:		Left:	Right:
Max I1:	___	___	Mand I1:	___	___
Max I2:	___	___	Mand I2:	___	___
Max C1:	___	___	Mand C1:	___	___
Max P1:	___	___	Mand P1:	___	___
Max P2:	___	___	Mand P2:	___	___
Max M1:	___	___	Mand M1:	___	___
Max M2:	___	___	Mand M2:	___	___
Max M3:	___	___	Mand M3:	___	___

Postcranium:____

	Left:	Right:		Left:	Right:
Hyoid:	___		Thoracic 1-12 (count): ___		
Clavicle:	___	___	Lumbar 1-5 (count):	___	
Scapula:	___	___	Sacrum:	___	
Humerus:	___	___	Illium:	___	___
Radius:	___	___	Pubis:	___	___
Ulna:	___	___	Ischium:	___	___
Hand:	___	___	Femur:	___	___
Manubrium:	___		Patella:	___	___
Sternal Body:	___		Tibia:	___	___
Ribs:	___	___	Fibula:	___	___
Atlas:	___		Calcaneus:	___	___
Axis:	___		Talus:	___	___
Cervical 3-7 (count): ___			Foot:	___	___

Notes: _____

APPENDIX B

BURIAL INVENTORY SHEETS

BURIAL 1

Inventory: Codes: 1- present complete; 2- present fragmentary; 3- absent (postmortem); 4- antemortem loss; 5- unerupted (dentition); 6- congenitally missing

Cranium: 2

	Left:		Right:		Left:		Right:
Frontal:		1		Maxilla:	1		2
Parietal:	2		1	Nasal:	3		3
Occipital:		2		Ethmoid:		3	
Temporal:	3		1	Lacrimal:	3		3
Zygomatic:	1		1	Vomer:		3	
Palate:	3		3	Sphenoid:		2	

Mandible: 2

	Left:	Right:		Left:	Right:
Body:	1	1	Ramus:	2	1

Dentition: 2

	Left:	Right:		Left:	Right:
Max I1:	1	1	Mand I1:	3	3
Max I2:	1	1	Mand I2:	3	3
Max C1:	1	1	Mand C1:	3	1
Max P1:	1	1	Mand P1:	1	1
Max P2:	1	1	Mand P2:	1	1
Max M1:	1	1	Mand M1:	1	1
Max M2:	3	1	Mand M2:	1	1
Max M3:	1	1	Mand M3:	1	1

Postcranium: 2

	Left:		Right:		Left:		Right:
Hyoid:		2		Thoracic 1-12 (count):		8	
Clavicle:	2		1	Lumbar 1-5 (count):		5	
Scapula:	2		2	Sacrum:		2	
Humerus:	2		2	Illium:	2		2
Radius:	1		1	Pubis:	3		2
Ulna:	2		2	Ischium:	1		1
Hand:	2		2	Femur:	1		2
Manubrium:		2		Patella:	1		2
Sternal Body:		2		Tibia:	2		2
Ribs:	2		2	Fibula:	2		2
Atlas:		2		Calcaneus:	2		2
Axis:		1		Talus:	3		1
Cervical 3-7 (count):		3		Foot:	2		2

BURIAL 2

Inventory: Codes: 1- present complete 4- antemortem loss
2- present fragmentary 5- unerupted (dentition)
3- absent (postmortem) 6- congenitally missing

Cranium: 3

	Left:		Right:		Left:		Right:
Frontal:		3		Maxilla:	3		3
Parietal:	3		3	Nasal:	3		3
Occipital:		3		Ethmoid:		3	
Temporal:	3		3	Lacrimal:	3		3
Zygomatic:	3		3	Vomer:		3	
Palate:	3		3	Sphenoid:		3	

Mandible: 2

	Left:	Right:		Left:	Right:
Body:	3	2	Ramus:	3	2

Dentition: 2

	Left:	Right:		Left:	Right:
Max I1:	3	3	Mand I1:	3	3
Max I2:	3	3	Mand I2:	3	3
Max C1:	3	3	Mand C1:	3	3
Max P1:	3	3	Mand P1:	3	3
Max P2:	3	3	Mand P2:	3	3
Max M1:	3	3	Mand M1:	3	3
Max M2:	3	3	Mand M2:	3	3
Max M3:	3	3	Mand M3:	3	1

Postcranium: 2

	Left:		Right:		Left:		Right:
Hyoid:		3		Thoracic 1-12 (count):		3	
Clavicle:	3		2	Lumbar 1-5 (count):		2	
Scapula:	2		3	Sacrum:		2	
Humerus:	2		2	Illium:	2		2
Radius:	1		2	Pubis:	2		2
Ulna:	2		2	Ischium:	2		2
Hand:	2		2	Femur:	2		2
Manubrium:		3		Patella:	1		1
Sternal Body:		3		Tibia:	2		2
Ribs:	2		2	Fibula:	2		2
Atlas:	3			Calcaneus:	2		3
Axis:		3		Talus:	1		1
Cervical 3-7 (count):		0		Foot:	2		2

BURIAL 3

Inventory: Codes: 1- present complete; 2- present fragmentary; 3- absent (postmortem); 4- antemortem loss; 5- unerupted (dentition); 6- congenitally missing

Cranium: 2

	Left:		Right:		Left:		Right:
Frontal:		1		Maxilla:	3		2
Parietal:	2		2	Nasal:	3		3
Occipital:		2		Ethmoid:		3	
Temporal:	2		2	Lacrimal:	3		3
Zygomatic:	1		1	Vomer:		3	
Palate:	3		3	Sphenoid:		3	

Mandible: 2

	Left:	Right:		Left:	Right:
Body:	1	1	Ramus:	2	2

Dentition: 2

	Left:	Right:		Left:	Right:
Max I1:	3	3	Mand I1:	1	1
Max I2:	3	1	Mand I2:	1	1
Max C1:	3	1	Mand C1:	1	1
Max P1:	3	1	Mand P1:	1	1
Max P2:	3	4	Mand P2:	1	1
Max M1:	3	4	Mand M1:	4	4
Max M2:	3	1	Mand M2:	1	1
Max M3:	3	3	Mand M3:	3	3

Postcranium: 2

	Left:		Right:		Left:		Right:
Hyoid:		3		Thoracic 1-12 (count):		11	
Clavicle:	1		1	Lumbar 1-5 (count):		5	
Scapula:	2		2	Sacrum:		2	
Humerus:	1		1	Illium:	1		1
Radius:	1		1	Pubis:	2		2
Ulna:	1		1	Ischium:	1		2
Hand:	2		2	Femur:	1		1
Manubrium:		1		Patella:	1		1
Sternal Body:		2		Tibia:	1		1
Ribs:	2		2	Fibula:	1		1
Atlas:		3		Calcaneus:	1		1
Axis:		1		Talus:	1		1
Cervical 3-7 (count):		4		Foot:	2		2

BURIAL 5

Inventory: Codes: 1- present complete; 2- present fragmentary; 3- absent (postmortem); 4- antemortem loss; 5- unerupted (dentition); 6- congenitally missing

Cranium: 2

	Left:		Right:		Left:		Right:
Frontal:		2		Maxilla:	2		2
Parietal:	2		2	Nasal:	3		3
Occipital:		2		Ethmoid:		3	
Temporal:	2		2	Lacrimal:	3		3
Zygomatic:	3		2	Vomer:		3	
Palate:	3		3	Sphenoid:		3	

Mandible: 2

	Left:	Right:		Left:	Right:
Body:	1	1	Ramus:	2	2

Dentition: 2

	Left:	Right:		Left:	Right:
Max I1:	1	1	Mand I1:	1	1
Max I2:	1	1	Mand I2:	1	1
Max C1:	1	1	Mand C1:	1	1
Max P1:	1	1	Mand P1:	1	1
Max P2:	1	3	Mand P2:	1	1
Max M1:	4	4	Mand M1:	1	1
Max M2:	1	1	Mand M2:	1	1
Max M3:	1	1	Mand M3:	1	1

Postcranium: 2

	Left:		Right:		Left:		Right:
Hyoid:		3		Thoracic 1-12 (count):		1	
Clavicle:	1		2	Lumbar 1-5 (count):		0	
Scapula:	2		2	Sacrum:		3*	
Humerus:	2		2	Illium:	2*		2*
Radius:	2		2	Pubis:	3*		3*
Ulna:	2		2	Ischium:	3*		3*
Hand:	2		2	Femur:	2		2
Manubrium:		3		Patella:	3		1
Sternal Body:		3		Tibia:	2		2
Ribs:	2		2	Fibula:	3		3
Atlas:		2		Calcaneus:	3		3
Axis:		1		Talus:	3		3
Cervical 3-7 (count):		2		Foot:	3		3

*58 pelvic fragments were recovered. However, none could be reconstructed to determine the exact element or side.

BURIAL 6

Inventory: Codes: 1- present complete | 2- present fragmentary | 3- absent (postmortem) | 4- antemortem loss | 5- unerupted (dentition) | 6- congenitally missing

Cranium: 2

	Left:		Right:		Left:		Right:
Frontal:		1		Maxilla:	1		2
Parietal:	1		1	Nasal:	2		2
Occipital:		2		Ethmoid:		2	
Temporal:	1		2	Lacrimal:	2		2
Zygomatic:	2		3	Vomer:		2	
Palate:	2		2	Sphenoid:		2	

Mandible: 2

	Left:	Right:		Left:	Right:
Body:	1	1	Ramus:	1	2

Dentition: 2

	Left:	Right:		Left:	Right:
Max I1:	1	1	Mand I1:	3	1
Max I2:	1	1	Mand I2:	1	1
Max C1:	1	1	Mand C1:	1	1
Max P1:	1	2	Mand P1:	1	1
Max P2:	1	1	Mand P2:	1	1
Max M1:	3/4	3/4	Mand M1:	4	1
Max M2:	3/4	3/4	Mand M2:	4	1
Max M3:	3/4	3/4	Mand M3:	1	1

Postcranium: 2

	Left:		Right:		Left:		Right:
Hyoid:		3		Thoracic 1-12 (count):		1	
Clavicle:	2		2	Lumbar 1-5 (count):		5	
Scapula:	2		2	Sacrum:		2	
Humerus:	2		2	Illium:	2		2
Radius:	1		1	Pubis:	2		3
Ulna:	2		2	Ischium:	2		2
Hand:	2		2	Femur:	2		2
Manubrium:		3		Patella:	1		3
Sternal Body:		3		Tibia:	2		2
Ribs:	2		2	Fibula:	2		2
Atlas:		2		Calcaneus:	3		2
Axis:		2		Talus:	2		3
Cervical 3-7 (count):		1		Foot:	2		2

BURIAL 7

Inventory: Codes: 1- present complete; 2- present fragmentary; 3- absent (postmortem); 4- antemortem loss; 5- unerupted (dentition); 6- congenitally missing

Cranium: 2

	Left:		Right:		Left:		Right:
Frontal:		2		Maxilla:	3		2
Parietal:	2		2	Nasal:	3		3
Occipital:		2		Ethmoid:		3	
Temporal:	2		1	Lacrimal:	3		3
Zygomatic:	3		3	Vomer:		3	
Palate:	3		3	Sphenoid:		3	

Mandible: 2

	Left:	Right:		Left:	Right:
Body:	3	2	Ramus:	3	2

Dentition: 2

	Left:	Right:		Left:	Right:
Max I1:	3	3	Mand I1:	3	3
Max I2:	3	3	Mand I2:	3	3
Max C1:	3	1	Mand C1:	3	1
Max P1:	3	1	Mand P1:	3	3
Max P2:	3	1	Mand P2:	3	1
Max M1:	3	1	Mand M1:	3	1
Max M2:	3	1	Mand M2:	3	1
Max M3:	3	3	Mand M3:	3	2

Postcranium: 2

	Left:		Right:		Left:		Right:
Hyoid:		3		Thoracic 1-12 (count):		10	
Clavicle:	1		2	Lumbar 1-5 (count):		5	
Scapula:	2		2	Sacrum:		2	
Humerus:	3		1	Illium:	2		2
Radius:	3		2	Pubis:	2		2
Ulna:	3		2	Ischium:	2		2
Hand:	2		2	Femur:	1		2
Manubrium:		1		Patella:	3		3
Sternal Body:		2		Tibia:	3		2
Ribs:	2		2	Fibula:	3		2
Atlas:		2		Calcaneus:	3		3
Axis:		2		Talus:	3		3
Cervical 3-7 (count):		4		Foot:	2		2

BURIAL 8

Inventory: Codes: 1- present complete; 2- present fragmentary; 3- absent (postmortem); 4- antemortem loss; 5- unerupted (dentition); 6- congenitally missing

Cranium: 3

	Left:		Right:		Left:		Right:
Frontal:		3		Maxilla:	3		3
Parietal:	3		3	Nasal:	3		3
Occipital:		3		Ethmoid:		3	
Temporal:	3		3	Lacrimal:	3		3
Zygomatic:	3		3	Vomer:		3	
Palate:	3		3	Sphenoid:		3	

Mandible: 2

	Left:	Right:		Left:	Right:
Body:	2	2	Ramus:	3	3

Dentition: 3

	Left:	Right:		Left:	Right:
Max I1:	3	3	Mand I1:	3	3
Max I2:	3	3	Mand I2:	3	3
Max C1:	3	3	Mand C1:	3	3
Max P1:	3	3	Mand P1:	3	3
Max P2:	3	3	Mand P2:	4	3
Max M1:	3	3	Mand M1:	4	4
Max M2:	3	3	Mand M2:	3	3
Max M3:	3	3	Mand M3:	4	3

Postcranium: 2

	Left:		Right:		Left:		Right:
Hyoid:		3		Thoracic 1-12 (count):		0**	
Clavicle:	3		2	Lumbar 1-5 (count):		0**	
Scapula:	2		3	Sacrum:		3	
Humerus:	3		2	Illium:	3**		3**
Radius:	3		2	Pubis:	3**		3**
Ulna:	2*		2	Ischium:	3**		3**
Hand:	2		2	Femur:	2		2
Manubrium:		3		Patella:	2		1
Sternal Body:		2		Tibia:	2		2
Ribs:	2		2	Fibula:	2		2
Atlas:		3		Calcaneus:	2		2
Axis:		2		Talus:	2		3
Cervical 3-7 (count):		0**		Foot:	2		2

*This ulna is much more gracile than the rest of the skeleton and the epiphyses are unfused. Based on morphology and position relative to surrounding graves, is most likely associated with B7.
**9 vertebral bodies were found but could not be conclusively classified.
***There are 32 unsided and unspecified pelvic fragments.

BURIAL 9

Inventory: Codes: 1- present complete; 2- present fragmentary; 3- absent (postmortem); 4- antemortem loss; 5- unerupted (dentition); 6- congenitally missing

Cranium: 2

	Left:		Right:		Left:		Right:
Frontal:		2		Maxilla:	2		2
Parietal:	2		2	Nasal:	3		3
Occipital:		2		Ethmoid:		3	
Temporal:	2		2	Lacrimal:	3		3
Zygomatic:	2		2	Vomer:		3	
Palate:	3		3	Sphenoid:		3	

Mandible: 3

	Left:	Right:		Left:	Right:
Body:	3	3	Ramus:	3	3

Dentition: 2

	Left:	Right:		Left:	Right:
Max I1:	3	3	Mand I1:	3	3
Max I2:	1	1	Mand I2:	3	3
Max C1:	1	1	Mand C1:	3	3
Max P1:	1	1	Mand P1:	3	3
Max P2:	1	1	Mand P2:	3	3
Max M1:	1	1	Mand M1:	3	3
Max M2:	1	1	Mand M2:	3	3
Max M3:	1	1	Mand M3:	3	3

Postcranium: 2

	Left:		Right:		Left:		Right:
Hyoid:		3		Thoracic 1-12 (count):		0	
Clavicle:	3		3	Lumbar 1-5 (count):		0	
Scapula:	3		3	Sacrum:		3	
Humerus:	3		3	Illium:	2		2
Radius:	3		3	Pubis:	2		2
Ulna:	2		3	Ischium:	2		2
Hand:	3		3	Femur:	3		3
Manubrium:		3		Patella:	3		3
Sternal Body:		3		Tibia:	3		3
Ribs:	2		3	Fibula:	3		3
Atlas:		3		Calcaneus:	3		3
Axis:		3		Talus:	3		3
Cervical 3-7 (count):		0		Foot:	3		3

BURIAL 10

Inventory: Codes: 1- present complete; 2- present fragmentary; 3- absent (postmortem); 4- antemortem loss; 5- unerupted (dentition); 6- congenitally missing

Cranium: 2

	Left:	Right:		Left:	Right:
Frontal:	2		Maxilla:	2	2
Parietal:	2	1	Nasal:	3	3
Occipital:	2		Ethmoid:	3	
Temporal:	2	2	Lacrimal:	3	3
Zygomatic:	3	3	Vomer:	3	
Palate:	3	3	Sphenoid:	3	

Mandible: 2

	Left:	Right:		Left:	Right:
Body:	1	1	Ramus:	1	2

Dentition: 2

	Left:	Right:		Left:	Right:
Max I1:	1	1	Mand I1:	1	1
Max I2:	1	1	Mand I2:	3	3
Max C1:	3	3	Mand C1:	1	1
Max P1:	3	1	Mand P1:	1	1
Max P2:	3	1	Mand P2:	4	2
Max M1:	1/3*	3	Mand M1:	4	4
Max M2:	1/3*	3	Mand M2:	4	4
Max M3:	3	3	Mand M3:	1	1

Postcranium: 2

	Left:	Right:		Left:	Right:
Hyoid:	3		Thoracic 1-12 (count):	0**	
Clavicle:	3	2	Lumbar 1-5 (count):	1**	
Scapula:	2	2	Sacrum:	2	
Humerus:	2	2	Illium:	2	2
Radius:	3	2	Pubis:	2	2
Ulna:	2	2	Ischium:	2	2
Hand:	2	2	Femur:	2***	2***
Manubrium:	3		Patella:	3****	2
Sternal Body:	3		Tibia:	2	2
Ribs:	3	2	Fibula:	2***	2***
Atlas:	3		Calcaneus:	2	2
Axis:	3		Talus:	1	1
Cervical 3-7 (count):	0**		Foot:	2	2

*Either a LM^1 or a LM^2 was recovered and complete

**10 misc. vertebral bodies were found
***A total of 4 separate femora and 3 fibulae were found in B10
****A left patella was bagged as extra but appears to match/articulate with one of the femora of B10

BURIAL 11

Inventory: Codes: 1- present complete, 2- present fragmentary, 3- absent (postmortem), 4- antemortem loss, 5- unerupted (dentition), 6- congenitally missing

Cranium 1: 2

	Left:		Right:		Left:		Right:
Frontal:		1		Maxilla:	3		3
Parietal:	1		1	Nasal:	3		3
Occipital:		2		Ethmoid:		3	
Temporal:	2		1	Lacrimal:	3		3
Zygomatic:	2		1	Vomer:		3	
Palate:	3		3	Sphenoid:		3	

Mandible 1: 3

	Left:	Right:		Left:	Right:
Body:	3	3	Ramus:	3	3

Dentition 1: 2

	Left:	Right:		Left:	Right:
Max I1:	3	3	Mand I1:	3	3
Max I2:	3	3	Mand I2:	3	3
Max C1:	3	3	Mand C1:	3	3
Max P1:	3	3	Mand P1:	3	3
Max P2:	3	3	Mand P2:	3	3
Max M1:	3	3	Mand M1:	3	3
Max M2:	1/3*	1/3*	Mand M2:	3	3
Max M3:	3	3	Mand M3:	3	3

*One unsided M^2 was recovered

Cranium 2: 2

	Left:		Right:		Left:		Right:
Frontal:		2		Maxilla:	3		3
Parietal:	2		2	Nasal:	3		3
Occipital:		2		Ethmoid:		3	
Temporal:	3		3	Lacrimal:	3		3
Zygomatic:	3		3	Vomer:		3	
Palate:	3		3	Sphenoid:		3	

Mandible 2: 2

	Left:	Right:		Left:	Right:
Body:	1	1	Ramus:	2	1

Dentition 2: 2

	Left:	Right:		Left:	Right:
Max I1:	3	3	Mand I1:	1	1
Max I2:	3	3	Mand I2:	1	1
Max C1:	3	3	Mand C1:	1	1
Max P1:	3	3	Mand P1:	1	1
Max P2:	3	3	Mand P2:	1	1
Max M1:	3	3	Mand M1:	1	1
Max M2:	3	3	Mand M2:	1	1
Max M3:	3	3	Mand M3:	3	1

Postcranium: 2

	Left:		Right:		Left:		Right:
Hyoid:		3		Thoracic 1-12 (count):		0	
Clavicle:	3		3	Lumbar 1-5 (count):		0	
Scapula:	3		3	Sacrum:		3	
Humerus:	3*		3*	Illium:	3		2
Radius:	3		3	Pubis:	3		3
Ulna:	3		2	Ischium:	3		2
Hand:	3		3	Femur:	3		3
Manubrium:		3		Patella:	3		3
Sternal Body:		3		Tibia:	3		3
Ribs:	3		3	Fibula:	3		3
Atlas:		3		Calcaneus:	3		3
Axis:		3		Talus:	3		3
Cervical 3-7 (count):		0		Foot:	3		3

*A partial unsided humeral head was recovered.

BURIAL 13

Inventory:	Codes:	
	1- present complete	4- antemortem loss
	2- present fragmentary	5- unerupted (dentition)
	3- absent (postmortem)	6- congenitally missing

Cranium: 2

	Left:		Right:		Left:		Right:
Frontal:		2		Maxilla:	2		2
Parietal:	2		2	Nasal:	3		3
Occipital:		2		Ethmoid:		3	
Temporal:	2		2	Lacrimal:	3		3
Zygomatic:	2		2	Vomer:		3	
Palate:	3		3	Sphenoid:		3	

Mandible: 2

	Left:	Right:		Left:	Right:
Body:	1	1	Ramus:	2	2

Dentition: 2

	Left:	Right:		Left:	Right:
Max I1:	3	3	Mand I1:	1	1
Max I2:	3	3	Mand I2:	1	3
Max C1:	1	3	Mand C1:	1	3
Max P1:	1	1	Mand P1:	1	4
Max P2:	1	1	Mand P2:	1	1
Max M1:	1	1	Mand M1:	4	1
Max M2:	1	3	Mand M2:	4	3/4
Max M3:	3	1	Mand M3:	1	4

Postcranium: 2

	Left:		Right:		Left:		Right:
Hyoid:		3		Thoracic 1-12 (count):		1	
Clavicle:	2		2	Lumbar 1-5 (count):		0	
Scapula:	2		2	Sacrum:		3	
Humerus:	2		2	Illium:	3		2
Radius:	2		2	Pubis:	3		2
Ulna:	2		3	Ischium:	3		3
Hand:	2		2	Femur:	2		2
Manubrium:		3		Patella:	1		1
Sternal Body:		3		Tibia:	2		2
Ribs:	3		2	Fibula:	3		2
Atlas:		3		Calcaneus:	2		2
Axis:		1		Talus:	2		2
Cervical 3-7 (count):		0		Foot:	2		2

BURIAL 14

Inventory: Codes: 1- present complete, 2- present fragmentary, 3- absent (postmortem), 4- antemortem loss, 5- unerupted (dentition), 6- congenitally missing

Cranium: 2

	Left:		Right:		Left:		Right:
Frontal:		2		Maxilla:	3		3
Parietal:	2		2	Nasal:	3		3
Occipital:		2		Ethmoid:		3	
Temporal:	3		3	Lacrimal:	3		3
Zygomatic:	3		3	Vomer:		3	
Palate:	3		3	Sphenoid:		3	

Mandible: 2

	Left:	Right:		Left:	Right:
Body:	1	2	Ramus:	2	3

Dentition: 2

	Left:	Right:		Left:	Right:
Max I1:	3	3	Mand I1:	3	3
Max I2:	3	3	Mand I2:	3	3
Max C1:	3	3	Mand C1:	3	3
Max P1:	3	3	Mand P1:	1	1
Max P2:	3	3	Mand P2:	1	1
Max M1:	3	3	Mand M1:	4	4
Max M2:	3	3	Mand M2:	1	1
Max M3:	3	3	Mand M3:	1	3

Postcranium: 2

	Left:		Right:		Left:		Right:
Hyoid:		3		Thoracic 1-12 (count):		7	
Clavicle:	2		1	Lumbar 1-5 (count):		4	
Scapula:	2		2	Sacrum:		2	
Humerus:	2		2	Illium:	2		2
Radius:	2		1	Pubis:	2		2
Ulna:	2		2	Ischium:	3		3
Hand:	2		2	Femur:	2		2
Manubrium:				Patella:	2		2
Sternal Body:		2		Tibia:	2		2
Ribs:	2		2	Fibula:	2		2
Atlas:		3		Calcaneus:	3		2
Axis:		3		Talus:	2		2
Cervical 3-7 (count):		0		Foot:	2		2

BURIAL 15

Inventory: Codes: 1- present complete; 2- present fragmentary; 3- absent (postmortem); 4- antemortem loss; 5- unerupted (dentition); 6- congenitally missing

Cranium: 2

	Left:	Right:		Left:	Right:
Frontal:	3		Maxilla:	3	3
Parietal:	3	3	Nasal:	3	3
Occipital:	2		Ethmoid:	3	
Temporal:	3	2	Lacrimal:	3	3
Zygomatic:	3	3	Vomer:	3	
Palate:	3	3	Sphenoid:	3	

Mandible: 3

	Left:	Right:		Left:	Right:
Body:	3	3	Ramus:	3	3

Dentition: 3

	Left:	Right:		Left:	Right:
Max I1:	3	3	Mand I1:	3	3
Max I2:	3	3	Mand I2:	3	3
Max C1:	3	3	Mand C1:	3	3
Max P1:	3	3	Mand P1:	3	3
Max P2:	3	3	Mand P2:	3	3
Max M1:	3	3	Mand M1:	3	3
Max M2:	3	3	Mand M2:	3	3
Max M3:	3	3	Mand M3:	3	3

Postcranium: 2

	Left:	Right:		Left:	Right:
Hyoid:	3		Thoracic 1-12 (count):	0*	
Clavicle:	2	3	Lumbar 1-5 (count):	1	
Scapula:	3	3	Sacrum:	2	
Humerus:	3	3	Illium:	2**	2**
Radius:	2**	2**	Pubis:	2**	2**
Ulna:	3	3	Ischium:	2**	2**
Hand:	2**	2**	Femur:	2**	2**
Manubrium:	3		Patella:	1**	1**
Sternal Body:	3		Tibia:	2**	2**
Ribs:	2	2	Fibula:	2**	2**
Atlas:	3		Calcaneus:	3**	3**
Axis:	3		Talus:	2**	1**
Cervical 3-7 (count):	0*		Foot:	2**	3**

*An additional cervical or thoracic body was recovered.

**There are 3 femora, 4 tibia, 5 fibula, 2 radii, 3 tali, 4 lateral cuneiforms, 2 right MT5s, and numerous hand/feet bones that are of unknown original origin. See notes.

BURIAL 16

Inventory: Codes: 1- present complete; 2- present fragmentary; 3- absent (postmortem); 4- antemortem loss; 5- unerupted (dentition); 6- congenitally missing

Cranium: 2

	Left:		Right:		Left:		Right:
Frontal:		2		Maxilla:	3		2
Parietal:	1		1	Nasal:	3		3
Occipital:		2		Ethmoid:		3	
Temporal:	1		1	Lacrimal:	3		3
Zygomatic:	1		3	Vomer:		3	
Palate:	3		3	Sphenoid:		3	

Mandible: 2

	Left:	Right:		Left:	Right:
Body:	1	1	Ramus:	2	2

Dentition: 2

	Left:	Right:		Left:	Right:
Max I1:	3	3	Mand I1:	1	1
Max I2:	3	3	Mand I2:	1	1
Max C1:	3	3	Mand C1:	1	1
Max P1:	3	1	Mand P1:	1	1
Max P2:	3	3	Mand P2:	3	4
Max M1:	3	3	Mand M1:	1	2
Max M2:	3	3	Mand M2:	2	1
Max M3:	3	3	Mand M3:	6	6

Postcranium: 2

	Left:		Right:		Left:		Right:
Hyoid:		3		Thoracic 1-12 (count):		10	
Clavicle:	1		2	Lumbar 1-5 (count):		5	
Scapula:	2		2	Sacrum:		2	
Humerus:	2		2	Illium:	2		2
Radius:	1		1	Pubis:	2		2
Ulna:	1		1	Ischium:	2		2
Hand:	2		2	Femur:	2		2
Manubrium:		2		Patella:	1		1
Sternal Body:		3		Tibia:	2		2
Ribs:	2		2	Fibula:	2		2
Atlas:		2		Calcaneus:	2		2
Axis:		1		Talus:	1		1
Cervical 3-7 (count):		4		Foot:	2		2

BURIAL 17

Inventory: Codes: 1- present complete; 2- present fragmentary; 3- absent (postmortem); 4- antemortem loss; 5- unerupted (dentition); 6- congenitally missing

Cranium: 2

	Left:		Right:		Left:		Right:
Frontal:		1		Maxilla:	3		2
Parietal:	2		1	Nasal:	2		2
Occipital:		2		Ethmoid:		3	
Temporal:	3		1	Lacrimal:	3		3
Zygomatic:	3		2	Vomer:		3	
Palate:	3		3	Sphenoid:		2	

Mandible: 2

	Left:	Right:		Left:	Right:
Body:	1	1	Ramus:	3	2

Dentition: 2

	Left:	Right:		Left:	Right:
Max I1:	1	1	Mand I1:	1	1
Max I2:	1	1	Mand I2:	1	1
Max C1:	3	1	Mand C1:	1	3
Max P1:	1	1	Mand P1:	3	3
Max P2:	1	1	Mand P2:	3	3
Max M1:	1	1	Mand M1:	4	4
Max M2:	2	3	Mand M2:	4	4
Max M3:	1	1	Mand M3:	1	1

Postcranium: 2

	Left:		Right:		Left:		Right:
Hyoid:		3		Thoracic 1-12 (count):		4	
Clavicle:	1		1	Lumbar 1-5 (count):		3	
Scapula:	2		2	Sacrum:		2	
Humerus:	1		2	Illium:	1		1
Radius:	1		1	Pubis:	1		2
Ulna:	1		1	Ischium:	1		3
Hand:	2		2	Femur:	1		1
Manubrium:		2		Patella:	1		1
Sternal Body:		2		Tibia:	1		1
Ribs:	2		2	Fibula:	2		2
Atlas:		3		Calcaneus:	2		2
Axis:		2		Talus:	2		2
Cervical 3-7 (count):		4		Foot:	2		2

APPENDIX C

SEX ESTIMATION DATA

Cranial Codes:	1- Likely Female	3- Indeterminate	5- Likely Male
	2- Possible Female	4- Possible Male	"-" - Inobservable

Pelvic Codes:

Phenice:	Absent- Masculine	Present- Feminine	"-" – Inobservable
	Broad- Masculine	Sharp- Feminine	
Sciatic Notch:	1- Likely Female	3- Indeterminate	5- Likely Male
	2- Possible Female	4- Possible Male	"-" – Inobservable

BURIAL 1: MALE

CRANIUM: AMBIGUOUS

	Left:		Right:
Mastoid:	3		2
Nuchal Crest:		-	
Supraorbital Margin:	3		3
Supraorbital Ridge:		3	
Mental Eminence:		1	

Notes: Nuchal crest is fragmentary but appears morphologically gracile

PELVIS: MALE

	Left:	Right:
Ventral Arc:	-	Absent
Subpubic Concavity:	-	Absent
Ischiopubic Ramus:	-	Broad
Sciatic Notch:	5	5

Notes: Pubis is triangular in shape. There is no preauricular sulcus.

POSTCRANIAL METRICS: MALE

	Left:	Right:
Humeral Head:	-	47mm
Femoral Head:	52mm	51mm

Cranial Codes:	1- Likely Female	3- Indeterminate	5- Likely Male
	2- Possible Female	4- Possible Male	"-" - Inobservable

Pelvic Codes:

Phenice:	Absent- Masculine	Present- Feminine	"-" – Inobservable
	Broad- Masculine	Sharp- Feminine	
Sciatic Notch:	1- Likely Female	3- Indeterminate	5- Likely Male
	2- Possible Female	4- Possible Male	"-" – Inobservable

BURIAL 2: MALE

CRANIUM: N/A

	Left:		Right:
Mastoid:	-		-
Nuchal Crest:		-	
Supraorbital Margin:	-		-
Supraorbital Ridge:		-	
Mental Eminence:		-	

PELVIS: AMBIGUOUS

	Left:	Right:
Ventral Arc:	-	-
Subpubic Concavity:	-	-
Ischiopubic Ramus:	-	-
Sciatic Notch:	-	3

Notes: There is no preauricular sulcus.

POSTCRANIAL METRICS: MALE

	Left:	Right:
Humeral Head:	-	-
Femoral Head:	49	-

Cranial Codes:	1- Likely Female	3- Indeterminate	5- Likely Male
	2- Possible Female	4- Possible Male	"-" - Inobservable

Pelvic Codes:

Phenice:	Absent- Masculine	Present- Feminine	"-" – Inobservable
	Broad- Masculine	Sharp- Feminine	
Sciatic Notch:	1- Likely Female	3- Indeterminate	5- Likely Male
	2- Possible Female	4- Possible Male	"-" – Inobservable

BURIAL 3: MALE

CRANIUM: POSSIBLE FEMALE

	Left:		Right:
Mastoid:	3		3
Nuchal Crest:		2/3	
Supraorbital Margin:	2		2
Supraorbital Ridge:		2	
Mental Eminence:		3	

PELVIS: MALE

	Left:	Right:
Ventral Arc:	Absent	Absent
Subpubic Concavity:	Absent	Absent
Ischiopubic Ramus:	Broad	Broad
Sciatic Notch:	5	5

Notes: The preauricular sulci are very narrow and shallow.

POSTCRANIAL METRICS: MALE

	Left:	Right:
Humeral Head:	49mm	48mm
Femoral Head:	48mm	46.5mm

Cranial Codes:	1- Likely Female 2- Possible Female	3- Indeterminate 4- Possible Male	5- Likely Male "-" - Inobservable

Pelvic Codes:

Phenice:	Absent- Masculine Broad- Masculine	Present- Feminine Sharp- Feminine	"-" – Inobservable
Sciatic Notch:	1- Likely Female 2- Possible Female	3- Indeterminate 4- Possible Male	5- Likely Male "-" – Inobservable

BURIAL 5: MALE

CRANIUM: MALE

	Left:		Right:
Mastoid:	5		5
Nuchal Crest:		3	
Supraorbital Margin:	5		5
Supraorbital Ridge:		5	
Mental Eminence:		2	

PELVIS: N/A

	Left:	Right:
Ventral Arc:	-	-
Subpubic Concavity:	-	-
Ischiopubic Ramus:	-	-
Sciatic Notch:	-	-

POSTCRANIAL METRICS: N/A

	Left:	Right:
Humeral Head:	-	-
Femoral Head:	-	-

Cranial Codes:	1- Likely Female	3- Indeterminate	5- Likely Male
	2- Possible Female	4- Possible Male	"-" - Inobservable

Pelvic Codes:

Phenice:	Absent- Masculine	Present- Feminine	"-" – Inobservable
	Broad- Masculine	Sharp- Feminine	
Sciatic Notch:	1- Likely Female	3- Indeterminate	5- Likely Male
	2- Possible Female	4- Possible Male	"-" – Inobservable

BURIAL 6: MALE

CRANIUM: FEMALE

	Left:		Right:
Mastoid:	1		-
Nuchal Crest:		1	
Supraorbital Margin:	4		4
Supraorbital Ridge:		2	
Mental Eminence:		2	

PELVIS: MALE

	Left:	Right:
Ventral Arc:	Absent	-
Subpubic Concavity:	Absent	-
Ischiopubic Ramus:	Broad	-
Sciatic Notch:	3	3

Notes: Pubis is triangular in shape. There is no preauricular sulcus.

POSTCRANIAL METRICS: MALE

	Left:	Right:
Humeral Head:	-	-
Femoral Head:	-	48.5mm

Cranial Codes:	1- Likely Female	3- Indeterminate	5- Likely Male
	2- Possible Female	4- Possible Male	"-" - Inobservable

Pelvic Codes:

Phenice:	Absent- Masculine	Present- Feminine	"-" – Inobservable
	Broad- Masculine	Sharp- Feminine	
Sciatic Notch:	1- Likely Female	3- Indeterminate	5- Likely Male
	2- Possible Female	4- Possible Male	"-" – Inobservable

BURIAL 7: N/A - SUBADULT

CRANIUM: N/A - SUBADULT

	Left:		Right:
Mastoid:	-		1
Nuchal Crest:		-	
Supraorbital Margin:	1		1
Supraorbital Ridge:		1	
Mental Eminence:		-	

PELVIS: N/A

	Left:	Right:
Ventral Arc:	-	-
Subpubic Concavity:	-	-
Ischiopubic Ramus:	-	-
Sciatic Notch:	-	-

POSTCRANIAL METRICS: N/A

	Left:	Right:
Humeral Head:	-	-
Femoral Head:	-	-

Cranial Codes:	1- Likely Female	3- Indeterminate	5- Likely Male
	2- Possible Female	4- Possible Male	"-" - Inobservable

Pelvic Codes:

Phenice:	Absent- Masculine	Present- Feminine	"-" – Inobservable
	Broad- Masculine	Sharp- Feminine	
Sciatic Notch:	1- Likely Female	3- Indeterminate	5- Likely Male
	2- Possible Female	4- Possible Male	"-" – Inobservable

BURIAL 8: INDETERMINATE

CRANIUM: N/A

	Left:		Right:
Mastoid:	-		-
Nuchal Crest:		-	
Supraorbital Margin:	-		-
Supraorbital Ridge:		-	
Mental Eminence:		-	

PELVIS: N/A

	Left:	Right:
Ventral Arc:	-	-
Subpubic Concavity:	-	-
Ischiopubic Ramus:	-	-
Sciatic Notch:	-	-

POSTCRANIAL METRICS: N/A

	Left:	Right:
Humeral Head:	-	-
Femoral Head:	-	-

Cranial Codes:	1- Likely Female	3- Indeterminate	5- Likely Male
	2- Possible Female	4- Possible Male	"-" - Inobservable

Pelvic Codes:

Phenice:	Absent- Masculine	Present- Feminine	"-" – Inobservable
	Broad- Masculine	Sharp- Feminine	
Sciatic Notch:	1- Likely Female	3- Indeterminate	5- Likely Male
	2- Possible Female	4- Possible Male	"-" – Inobservable

BURIAL 9: AMBIGUOUS

CRANIUM: AMBIGUOUS

	Left:		Right:
Mastoid:	3		-
Nuchal Crest:		3	
Supraorbital Margin:	-		-
Supraorbital Ridge:		4	
Mental Eminence:		-	

Notes: The abnormal pathology of the skull (see Appendix H, Burial 9) obscures sex estimation traits.

PELVIS: INDETERMINATE

	Left:	Right:
Ventral Arc:	-	-
Subpubic Concavity:	-	-
Ischiopubic Ramus:	-	-
Sciatic Notch:	2/3	-

Notes: Pubis is triangular in shape. There is no preauricular sulcus on the left innominate.

POSTCRANIAL METRICS: N/A

	Left:	Right:
Humeral Head:	-	-
Femoral Head:	-	-

Cranial Codes:	1- Likely Female	3- Indeterminate	5- Likely Male
	2- Possible Female	4- Possible Male	"-" - Inobservable

Pelvic Codes:

Phenice:	Absent- Masculine	Present- Feminine	"-" – Inobservable
	Broad- Masculine	Sharp- Feminine	
Sciatic Notch:	1- Likely Female	3- Indeterminate	5- Likely Male
	2- Possible Female	4- Possible Male	"-" – Inobservable

BURIAL 10: AMBIGUOUS

CRANIUM: AMBIGUOUS

	Left:		Right:
Mastoid:	3		-
Nuchal Crest:		5	
Supraorbital Margin:	4		4
Supraorbital Ridge:		4	
Mental Eminence:		3	

PELVIS: N/A

	Left:	Right:
Ventral Arc:	-	-
Subpubic Concavity:	-	-
Ischiopubic Ramus:	-	-
Sciatic Notch:	-	-

POSTCRANIAL METRICS: N/A

	Left:	Right:
Humeral Head:	-	-
Femoral Head:	-	-

Cranial Codes:	1- Likely Female	3- Indeterminate	5- Likely Male
	2- Possible Female	4- Possible Male	"-" - Inobservable

Pelvic Codes:

Phenice:	Absent- Masculine	Present- Feminine	"-" – Inobservable
	Broad- Masculine	Sharp- Feminine	
Sciatic Notch:	1- Likely Female	3- Indeterminate	5- Likely Male
	2- Possible Female	4- Possible Male	"-" – Inobservable

BURIAL 11: CRANIUM 1 – MALE; CRANIUM 2- FEMALE; INNOMINATE - INDETERMINATE

CRANIUM 1: MALE

	Left:		Right:
Mastoid:	-		4
Nuchal Crest:		5	
Supraorbital Margin:	5		5
Supraorbital Ridge:		5	
Mental Eminence:		-	

PELVIS 1: N/A

	Left:	Right:
Ventral Arc:	-	-
Subpubic Concavity:	-	-
Ischiopubic Ramus:	-	-
Sciatic Notch:	-	-

POSTCRANIAL METRICS 1: N/A

	Left:	Right:
Humeral Head:	-	-
Femoral Head:	-	-

CRANIUM 2: FEMALE

	Left:		Right:
Mastoid:	-		-
Nuchal Crest:		2	
Supraorbital Margin:	-		4
Supraorbital Ridge:		2	
Mental Eminence:		2	

PELVIS 2: N/A

	Left:	Right:
Ventral Arc:	-	-
Subpubic Concavity:	-	-
Ischiopubic Ramus:	-	-
Sciatic Notch:	-	-

POSTCRANIAL METRICS 2: N/A

	Left:	Right:
Humeral Head:	-	-
Femoral Head:	-	-

UNASSOCIATED PELVIS: INDETERMINATE

	Left:	Right:
Ventral Arc:	-	-
Subpubic Concavity:	-	-
Ischiopubic Ramus:	-	-
Sciatic Notch:	-	4

Cranial Codes:	1- Likely Female	3- Indeterminate	5- Likely Male
	2- Possible Female	4- Possible Male	"-" - Inobservable

Pelvic Codes:

Phenice:	Absent- Masculine	Present- Feminine	"-" – Inobservable
	Broad- Masculine	Sharp- Feminine	
Sciatic Notch:	1- Likely Female	3- Indeterminate	5- Likely Male
	2- Possible Female	4- Possible Male	"-" – Inobservable

BURIAL 13: FEMALE

CRANIUM: POSSIBLE FEMALE

	Left:		Right:
Mastoid:	3		5
Nuchal Crest:		3	
Supraorbital Margin:	2		-
Supraorbital Ridge:		3	
Mental Eminence:		2	

PELVIS: POSSIBLE FEMALE

	Left:	Right:
Ventral Arc:	-	-
Subpubic Concavity:	-	-
Ischiopubic Ramus:	-	-
Sciatic Notch:	-	2/3

Notes: The right preauricular sulcus is present.

POSTCRANIAL METRICS: N/A

	Left:	Right:
Humeral Head:	-	-
Femoral Head:	-	-

Cranial Codes:	1- Likely Female	3- Indeterminate	5- Likely Male
	2- Possible Female	4- Possible Male	"-" - Inobservable

Pelvic Codes:

Phenice:	Absent- Masculine	Present- Feminine	"-" – Inobservable
	Broad- Masculine	Sharp- Feminine	
Sciatic Notch:	1- Likely Female	3- Indeterminate	5- Likely Male
	2- Possible Female	4- Possible Male	"-" – Inobservable

BURIAL 14: N/A - SUBADULT

CRANIUM: N/A

	Left:		Right:
Mastoid:	-		-
Nuchal Crest:		-	
Supraorbital Margin:	-		-
Supraorbital Ridge:		-	
Mental Eminence:		-	

PELVIS: N/A - SUBADULT

	Left:	Right:
Ventral Arc:	-	-
Subpubic Concavity:	-	-
Ischiopubic Ramus:	-	-
Sciatic Notch:	3	-

Notes: The left preauricular sulcus is present but very narrow and shallow.

POSTCRANIAL METRICS (SUBADULT): N/A

	Left:	Right:
Humeral Head:	-	-
Femoral Head:	-	-

Cranial Codes:	1- Likely Female	3- Indeterminate	5- Likely Male
	2- Possible Female	4- Possible Male	"-" - Inobservable

Pelvic Codes:

Phenice:	Absent- Masculine	Present- Feminine	"-" – Inobservable
	Broad- Masculine	Sharp- Feminine	
Sciatic Notch:	1- Likely Female	3- Indeterminate	5- Likely Male
	2- Possible Female	4- Possible Male	"-" – Inobservable

BURIAL 15: SUBADULT – N/A; ADULT – INDETERMINATE

CRANIUM (SUBADULT): N/A - SUBADULT

	Left:		Right:
Mastoid:	-		-
Nuchal Crest:		1	
Supraorbital Margin:	-		-
Supraorbital Ridge:		-	
Mental Eminence:		-	

Notes: Nuchal crest morphologically gracile but the small size and very clear lambdoidal suture lines indicate that the element is likely that of a juvenile.

PELVIS (SUBADULT): N/A

	Left:	Right:
Ventral Arc:	-	-
Subpubic Concavity:	-	-
Ischiopubic Ramus:	-	-
Sciatic Notch:	-	-

POSTCRANIAL METRICS (SUBADULT): N/A

	Left:	Right:
Humeral Head:	-	-
Femoral Head:	-	-

CRANIUM (ADULT): N/A

	Left:		Right:
Mastoid:	-		-
Nuchal Crest:		-	
Supraorbital Margin:	-		-
Supraorbital Ridge:		-	
Mental Eminence:		-	

PELVIS (ADULT): INDETERMINATE

	Left:	Right:
Ventral Arc:	-	-
Subpubic Concavity:	-	-
Ischiopubic Ramus:	-	-
Sciatic Notch:	2	-

Notes: The left preauricular sulcus is very shallow but wide.

POSTCRANIAL METRICS (ADULT): N/A

	Left:	Right:
Humeral Head:	-	-
Femoral Head:	-	-

Cranial Codes:	1- Likely Female	3- Indeterminate	5- Likely Male
	2- Possible Female	4- Possible Male	“-” - Inobservable

Pelvic Codes:

Phenice:	Absent- Masculine	Present- Feminine	“-“ – Inobservable
	Broad- Masculine	Sharp- Feminine	
Sciatic Notch:	1- Likely Female	3- Indeterminate	5- Likely Male
	2- Possible Female	4- Possible Male	“-” – Inobservable

BURIAL 16: AMBIGUOUS

CRANIUM: AMBIGUOUS

	Left:		Right:
Mastoid:	3		2
Nuchal Crest:		3	
Supraorbital Margin:	5		-
Supraorbital Ridge:		-	
Mental Eminence:		4	

PELVIS: AMBIGUOUS

	Left:	Right:
Ventral Arc:	-	-
Subpubic Concavity:	-	-
Ischiopubic Ramus:	-	-
Sciatic Notch:	2/3	-

Notes: The left preauricular sulcus is absent.

POSTCRANIAL METRICS: AMBIGUOUS

	Left:	Right:
Humeral Head:	-	44mm
Femoral Head:	45mm	45mm

Cranial Codes:	1- Likely Female	3- Indeterminate	5- Likely Male
	2- Possible Female	4- Possible Male	"-" - Inobservable

Pelvic Codes:

Phenice:	Absent- Masculine	Present- Feminine	"-" – Inobservable
	Broad- Masculine	Sharp- Feminine	
Sciatic Notch:	1- Likely Female	3- Indeterminate	5- Likely Male
	2- Possible Female	4- Possible Male	"-" – Inobservable

BURIAL 17: MALE

CRANIUM: AMBIGUOUS

			Left:	Right:
Mastoid:	-		3	
Nuchal Crest:		-		
Supraorbital Margin:	4		4	
Supraorbital Ridge:		5		
Mental Eminence:		4		

PELVIS: MALE

	Left:	Right:
Ventral Arc:	Absent	-
Subpubic Concavity:	Absent	-
Ischiopubic Ramus:	Broad	-
Sciatic Notch:	4	4

Notes: Pubis is triangular in shape and both preauricular sulci are absent.

POSTCRANIAL METRICS: MALE

	Left:	Right:
Humeral Head:	44mm	-
Femoral Head:	47.5mm	48mm

APPENDIX D

AGE ESTIMATION DATA

BURIAL 1: 18-30

Cranial Suture Closure:

Codes:	0- Open	3- completely obliterated
	1- <50% fused	"-"- Inobservable
	2- >50% fused	*- Right side used

In instances where one observation per composite region is missing, the score will be widened to capture all possible closure outcomes for the missing observation. Where more than one observation is missing, age is not estimated.

Midlambdoid:	0*	Midcoronal:	1*
Lambda:	0	Pterion:	-
Obelion:	0	Sphenofrontal:	-
Anterior Sagittal:	1	Inferior Sphenotemporal:	1
Bregma:	0	Superio Sphenotemporal:	-
Midcoronal:	1*		
Pterion:	-		

Vault Score:	2-5	Lateral-Anterior Score:	-

Estimated age range: 18-48

Epiphyseal Union:
Clavicle: The medial clavicles of both sides are in the process of fusion.
Sternum: The sternal bodies are in fusion. At least two have fused together and at least two remain unfused.

Estimated age range: 18-30 for clavicle, late teen to early 20s for sternum

Sternal Rib Ends:
Description: Based on 13 intact rib specimens. There is very clear scalloping of the rib ends and no spiny growths or areas of bone degradation. Rib walls are thick and mostly V-shaped.

Estimated phase and age range: Phase 2, aged 18-25 for white males

Right Pubic Symphysis:
Description: Face is partially eroded but still shows obvious billowing and well-marked ridges. An outline is present around the majority of the face, but the border of the lower extremity is not yet complete.

Estimated phase and age range: Phase 1-2, aged 15-33 for males and 15-40 for females

Left Auricular Surface:
Description: Very clear, raised transverse organization and ridges. Surface is finely granular and beginning to show signs of coarsening. A slight apical depression is present and the inferior demiface is marginally lipping.

Estimated phase and age range: Phase 2, aged 25-29

Right Auricular Surface:
Description: Same as the left but with clearer striae.
Estimated phase and age range: Phase 2-3, aged 25-35

BURIAL 2: 35-44

Right Auricular Surface:
Description: Transverse organization is still visible but not marked. The surface is coarsely granular to compact with osteophyte growth on the inferior demiface.
Estimated phase and age range: Phase 4-5, aged 35-44

BURIAL 3: 40-59

Cranial Suture Closure:

Codes: 0- Open	3- completely obliterated
1- <50% fused	"-"- Inobservable
2- >50% fused	*- Right side used

In instances where one observation per composite region is missing, the score will be widened to capture all possible closure outcomes for the missing observation. Where more than one observation is missing, age is not estimated.

Midlambdoid:	-	Midcoronal:	1*
Lambda:	-	Pterion:	-
Obelion:	3	Sphenofrontal:	-
Anterior Sagittal:	1	Inferior Sphenotemporal:	-
Bregma:	2	Superio Sphenotemporal:	-
Midcoronal:	1*		
Pterion:	-		

Vault Score: - Lateral-Anterior Score: -

Estimated age range: -

Sternal Rib Ends:
Description: Based on 10 intact sternal rib end specimens. Ribs are thinly edged and most have U-shaped depressions. Edges are moderately irregular, with the centers raised and edges tapering inwards. Microporosity is visible in the depressions of the rib ends and there is no osteophyte growth visible.
Estimated phase and age range: Phase 4-5, aged 22-52

Left Pubic Symphysis:
Description: The surface is slightly eroded. No signs of billowing or striae remain and a distinct rim has formed around the symphyseal face on all margins excluding the dorsal aspect. The face is not depressed despite the presence of the rim and the pubic tubercle appears to be fully separated from the face. Few ossific nodules are present in the upper extremity.

Estimated phase and age range: Phase 4, aged 25-57

Left Auricular Surface:
Description: Surface is partially eroded. A deep apical depression is present there is no distinction between the auricular surface and retroauricular area. Bone appears compact and there are no remnants of transverse organization visible.

Estimated phase and age range: Phase 6-7, aged 45-59

Right Auricular Surface:
Description: Morphologically the same as the left.

Estimated phase and age range: Phase 6-7, aged 45-59

BURIAL 5: 24-75

Cranial Suture Closure:

Codes: 0- Open	3- completely obliterated
1- <50% fused	"-"- Inobservable
2- >50% fused	*- Right side used

In instances where one observation per composite region is missing, the score will be widened to capture all possible closure outcomes for the missing observation. Where more than one observation is missing, age is not estimated.

Midlambdoid:	2	Midcoronal:	2
Lambda:	2	Pterion:	-
Obelion:	3	Sphenofrontal:	-
Anterior Sagittal:	2	Inferior Sphenotemporal:	1
Bregma:	1	Superio Sphenotemporal:	-
Midcoronal:	2		
Pterion:	-		

Vault Score: 12-15 Lateral-Anterior Score: -

Estimated age range: 24-75

BURIAL 6: 25-39

Cranial Suture Closure:

Codes: 0- Open — 3- completely obliterated
1- <50% fused — "-"- Inobservable
2- >50% fused — *- Right side used

In instances where one observation per composite region is missing, the score will be widened to capture all possible closure outcomes for the missing observation. Where more than one observation is missing, age is not estimated.

Midlambdoid:	1	Midcoronal:	1
Lambda:	0	Pterion:	2
Obelion:	0	Sphenofrontal:	2
Anterior Sagittal:	1	Inferior Sphenotemporal:	-
Bregma:	0	Superio Sphenotemporal:	1
Midcoronal:	1		
Pterion:	2		

Vault Score: 5 — Lateral-Anterior Score: 6-9

Estimated age range: 23-48 based on the best fit of both scores

Left Pubic Symphysis:
Description: The pubic tubercle is not fully separated. The face is only depressed in the superior margin and the rim is not clearly defined, particularly on the ventral and inferior edges. Because of erosion, it is unclear whether the face architecture displays remnants of billowing or break-down defects.

Estimated phase and age range: Minimum Phase 2, aged 20+ for females

Left Auricular Surface:
Description: The boundary of the auricular surface is not clearly defined and there is transverse organization present on the superior demiface. The surface is finely granular.

Estimated phase and age range: Phase 2-3, aged 25-34

Right Auricular Surface:
Description: There is no transverse organization and minimal retroauricular activity. Subchondral defects are visible in the inferior demiface. The surface is finely granular on the inferior aspect, but almost compact looking superiorly.

Estimated phase and age range: Phase 3-4, 30-39

BURIAL 7: 11-18

Dental Eruption:
Description: All adult dentition are fully erupted with the exception of the first and second right mandibular molars, which have not quite fully erupted from the alveolus.

Estimated age range: late teens-younger adult

Epiphyseal Union:
Long Bones: The long bone epiphyses are open, but the humeral head, distal humerus, and proximal and distal femur are present (some fragmentary).
Clavicle: The left medial clavicle is unfused.
Scapula: The right coracoid is unfused.
Vertebrae: The lumbar are fully fused, thoracic arches are fused but not all are fused to the centra. Fusion is unobservable in the cervical vertebrae.
Phalanges: There are 9 unfused phalangeal ends.
Innominate: The pubes have not begun fusing to the ilium, but the ischia appear to have begun fusion to the ilium. It is unclear to what degree the ischia and pubes are fused.

Estimated age range: 11-17 (pelvis), under 30 (clavicle), mid-late teens (scapula), young to mid teen (long bones), mid to late teen (phalanges). Overall: Teenaged

Sternal Rib Ends:
Description: Based on 5 intact sternal rib end specimens. The rib ends show marked billowing. The surfaces are not concave, but sit level with the edge of the rib, with slight areas of indentation. There is no delineation of the edges of the rib end and they are clearly rounded. There is no porosity and any defects appear to be the result of post-mortem wear.

Estimated phase and age range: Phase 0-1, aged under 18 for white males

Right Pubic Symphysis:
Description: The symphyseal face shows marked billowing and transverse organization. There is no delineation of the face border and the pubic tubercle is not visible.

Estimated phase and age range: Phase 1, aged 15-23 for males and 15-24 for females

BURIAL 8: 28-71

Sternal Rib Ends:
Description: Based on 1 intact sternal rib end. The face of the rib end is very depressed. One side of the rib wall is thicker (approx. 5mm), while the other is very thin. The edges are no longer rounded, and there are only slight bony growths along the rim. The surface of bone on the thick edge is very porous.

Estimated phase and age range: Phase 5-6, aged 28-71 for white males.

BURIAL 9: 20+

Cranial Suture Closure:

Codes: 0- Open 3- completely obliterated
1- <50% fused "-"- Inobservable
2- >50% fused *- Right side used

In instances where one observation per composite region is missing, the score will be widened to capture all possible closure outcomes for the missing observation. Where more than one observation is missing, age is not estimated.

Midlambdoid:	3	Midcoronal:	1*
Lambda:	3	Pterion:	-
Obelion:	3	Sphenofrontal:	-
Anterior Sagittal:	3	Inferior Sphenotemporal:	-
Bregma:	0	Superio Sphenotemporal:	-
Midcoronal:	1*		
Pterion:	-		

Vault Score: 13-16 Lateral-Anterior Score: -

Estimated age range: 24-75 Note: Age estimation based on suture closure is not recommended because the rate of closure on this individual appears to be pathologically influenced.

Left Auricular Surface:
Description: The auricular surface is too eroded to be confidently scored; however, it is noted as visibly youthful in appearance. There is fine granularity near the apex, no osteophyte activity, and no lipping.

Estimated phase and age range: Phase 1-3, aged 20-34 Note: The surface is eroded and should not be interpreted as a confident estimation.

Dentition:
Description: All maxillary dentition is fully erupted and has minimal wear.

Estimated age range: Minimum of younger adult, middle to older adult not likely

BURIAL 10: 24-75

Cranial Suture Closure:

Codes: 0- Open | 3- completely obliterated
1- <50% fused | "-"- Inobservable
2- >50% fused | *- Right side used

Midlambdoid:	2	Midcoronal:	1*
Lambda:	1	Pterion:	-
Obelion:	3	Sphenofrontal:	-
Anterior Sagittal:	2	Inferior Sphenotemporal:	1
Bregma:	1	Superio Sphenotemporal:	-
Midcoronal:	1*		
Pterion:	-		

Vault Score: 10-13 Lateral-Anterior Score: -

Estimated age range: 24-75

Dentition:
Description: The dentition is fully erupted.
Estimated age range: Minimum younger adult

BURIAL 11: CRANIUM 1 – 24-75; CRANIUM 2 – ADULT; PELVIS – ADULT

Cranium 1 Suture Closure:

Codes: 0- Open | 3- completely obliterated
1- <50% fused | "-"- Inobservable
2- >50% fused | *- Right side used

In instances where one observation per composite region is missing, the score will be widened to capture all possible closure outcomes for the missing observation. Where more than one observation is missing, age is not estimated.

Midlambdoid:	2	Midcoronal:	2
Lambda:	1	Pterion:	2*
Obelion:	3	Sphenofrontal:	-
Anterior Sagittal:	2	Inferior Sphenotemporal:	-
Bregma:	2	Superio Sphenotemporal:	1
Midcoronal:	2		
Pterion:	2*		

Vault Score: 14 Lateral-Anterior Score: -

Estimated age range: 24-75

Cranium 2 Suture Closure:

Codes: 0- Open 3- completely obliterated
1- <50% fused "-"- Inobservable
2- >50% fused *- Right side used

In instances where one observation per composite region is missing, the score will be widened to capture all possible closure outcomes for the missing observation. Where more than one observation is missing, age is not estimated.

Midlambdoid:	0	Midcoronal:	0*
Lambda:	0	Pterion:	-
Obelion:	-	Sphenofrontal:	-
Anterior Sagittal:	1	Inferior Sphenotemporal:	-
Bregma:	0	Superio Sphenotemporal:	-
Midcoronal:	0*		
Pterion:	-		

Vault Score: - Lateral-Anterior Score: -

Estimated age range: Indeterminate. A low degree of suture closure is observed.

Dentition of Cranium 2:
Description: Dentition is fully erupted.
Estimated age range: Minimum younger adult

Innominate Union:
Ischium, ilium, and pubis are fused.
Estimated age range: Adult

BURIAL 13: 28-49

Cranial Suture Closure:
Codes: 0- Open 3- completely obliterated
1- <50% fused "-"- Inobservable
2- >50% fused *- Right side used

Midlambdoid:	3	Midcoronal:	2
Lambda:	2	Pterion:	-
Obelion:	3	Sphenofrontal:	-
Anterior Sagittal:	3	Inferior Sphenotemporal:	-
Bregma:	3	Superio Sphenotemporal:	-
Midcoronal:	2		
Pterion:	-		

Vault Score: 16-19 Lateral-Anterior Score:

Estimated age range: 23-76

Sternal Rib Ends:
Description: Based on 2 intact rib end specimens. Rib ends are depressed and U-shaped with thin walls and irregular margins. Osteophyte activity is beginning to form.
Estimated phase and age range: Phase 5, aged 28-52 for white males

Right Auricular Surface:
Description: The surface appears to be made of compact bone with both micro and macroporosity present. There is one large ridge running down the length of the surface centrally. There is no clear delineation between the preauricular surface and the retroauricular area.

Estimated phase and age range: Phase 5-6, aged 40-49

BURIAL 14: 11-18

Epiphyseal Union:
Clavicle: Both ends of the left clavicle are unfused.
Scapula: The glenoid facets are in the process of fusion
Lumbar: 3 bodies recovered were completely fused to the arches
Thoracic: In all vertebrae there were still signs of fusion (a notch where the body meets the arch)
Left Pelvis: Acetabulum fully fused,
Right Humerus: Distally fused, proximally unfused.
Left Humerus: Distally fused
Right Radius: Unfused proximally
Left Radius: Unfused proximally and distally
Right Ulna: Unfused proximally and distally
Left Ulna: Unfused proximally and distally
Right Femur: Unfused proximally
Left Femur: Proximally unfused, with exception of the lesser trochanter which is in the process of fusion.
Left Tibia: Unfused proximally
Right Fibula: Unfused distally
Metatarsals: Two unfused heads were recovered
Metacarpals: MC3s had fused distally, 3 unidentified MCs fused distally, 2 unfused heads
Numerous partial epiphyses were recovered as well as 10 phalangeal epiphyses
Estimated age range: mid-late teens (metacarpals), early-mid teens (metatarsals), mid teens (fibula), up to late teens (tibia), late teens (femur), early-mid teens (ulna), up to late teens (radius), mid teens (humerus), mid teens (scapula), under 30 (clavicle). Overall range: mid teenage

Dentition:
Description: All teeth are erupted except for the LM_3, which has broken through the alveolar bone but isn't quite level with the other dentition present.
Estimated phase and age range: late teen-younger adult

Sternal Rib Ends:
Description: Based on 5 intact rib end specimens. The surface of the rib ends is slightly raised and generally smooth. There is no distinct rim or erosion and the bone surface is finely grained. The exception is the R1, which is billowed and slightly porous.
Estimated phase and age range: Phase 0, aged under 18 for white males based on Phase 1 estimates as Phase 0 age ranges are not given

Left Auricular Surface:
Description: Somewhat eroded. On the superior demiface the border between the auricular surface and the retroauricular area is poorly defined and the bone is finely granular. Raised transverse billows are present around the area of the apex. The margins of the inferior demiface are also poorly defined.
Estimated phase and age range: Phase 1-2, aged 20-29

Right Auricular Surface:
Description: partially eroded. The surface is finely granular and exhibits no apical activity. There are remnants of transverse organization visible despite surface erosion.
Estimated phase and age range: Phase 1-2, aged 20-29

BURIAL 15: SUBADULT – 16-23; ADULT – 40-44

Left Auricular Surface Pelvis 1 (ADULT):
Description: There is a distinct rim around the surface. There is compact bone visible along the margins of the auricular surface and the remaining surfaces are coarsely granular. Macroporosity is present and there is retroauricular activity present, although it is not marked.
Estimated phase and age range: Phase 5, aged 40-44

Left and Right Auricular Surface Pelvis 2 (SUBADULT):
Description: Only portions of the auricular surfaces are present but both exhibit clear striations and transverse organization over a finely granular surface.
Estimated phase and age range: Phase 1-2, aged under 29

Epiphyseal Union Pelvis 2 9SUBADULT):
Ischial tuberosities: The ischial tuberosities of both sides are in the process of fusion.
Clavicle: The medial end of the left clavicle is in fusion
Estimated age range: 16-23

BURIAL 16: 30-39

Cranial Suture Closure:
Codes: 0- Open 3- completely obliterated
1- <50% fused "-"- Inobservable
2- >50% fused *- Right side used
In instances where one observation per composite region is missing, the score will be widened to capture all possible closure outcomes for the missing observation. Where more than one observation is missing, age is not estimated.

Midlambdoid:	1	Midcoronal:	1
Lambda:	0	Pterion:	-
Obelion:	0	Sphenofrontal:	-
Anterior Sagittal:	1	Inferior Sphenotemporal:	0
Bregma:	0	Superio Sphenotemporal:	-
Midcoronal:	1		
Pterion:	-		

Vault Score: 3-6 Lateral-Anterior Score: -

Estimated age range: 22-48

Right Auricular Surface:
Description: Slight billowing and striae; bone is coarsely granular and microporosity is present; compact bone can be seen on the inferior demiface; very slight apical lipping; slight to mild retroauricular activity
Estimated phase and age range: placed in phase 3-4, age estimated as 30-39 years

BURIAL 17: 30-46

Cranial Suture Closure:
Codes: 0- Open 3- completely obliterated
1- <50% fused "-"- Inobservable
2- >50% fused *- Right side used
In instances where one observation per composite region is missing, the score will be widened to capture all possible closure outcomes for the missing observation. Where more than one observation is missing, age is not estimated.

Midlambdoid:	0*	Midcoronal:	1*
Lambda:	-	Pterion:	2*
Obelion:	2*	Sphenofrontal:	2*
Anterior Sagittal:	2*	Inferior Sphenotemporal:	1*
Bregma:	2*	Superio Sphenotemporal:	1*
Midcoronal:	1*		
Pterion:	2*		

Vault Score: 9-12 Lateral-Anterior Score: 7

Estimated age range: 32-65, based on best fit method using both composite scores

Left Pubic Symphysis:
Description: Face is partially eroded. Some transverse organization is present. The outline of the symphyseal face is clearly delineated and there are no signs of lipping or breakdown. The pubic tubercle is not fully separated from the symphysis.

Estimated phase and age range: Phase 3, aged 21-46 for males

Left Auricular Surface:
Description: Surface is partially eroded. There is an obvious raised ridge extending from the superior to inferior margins. Edges of the surface are finely granular and there is no compact bone visible. Surface is more coarsely granular along the ridge. There is no retroauricular activity. Surface is generally smooth.

Estimated phase and age range: Phase 3, aged 30-34

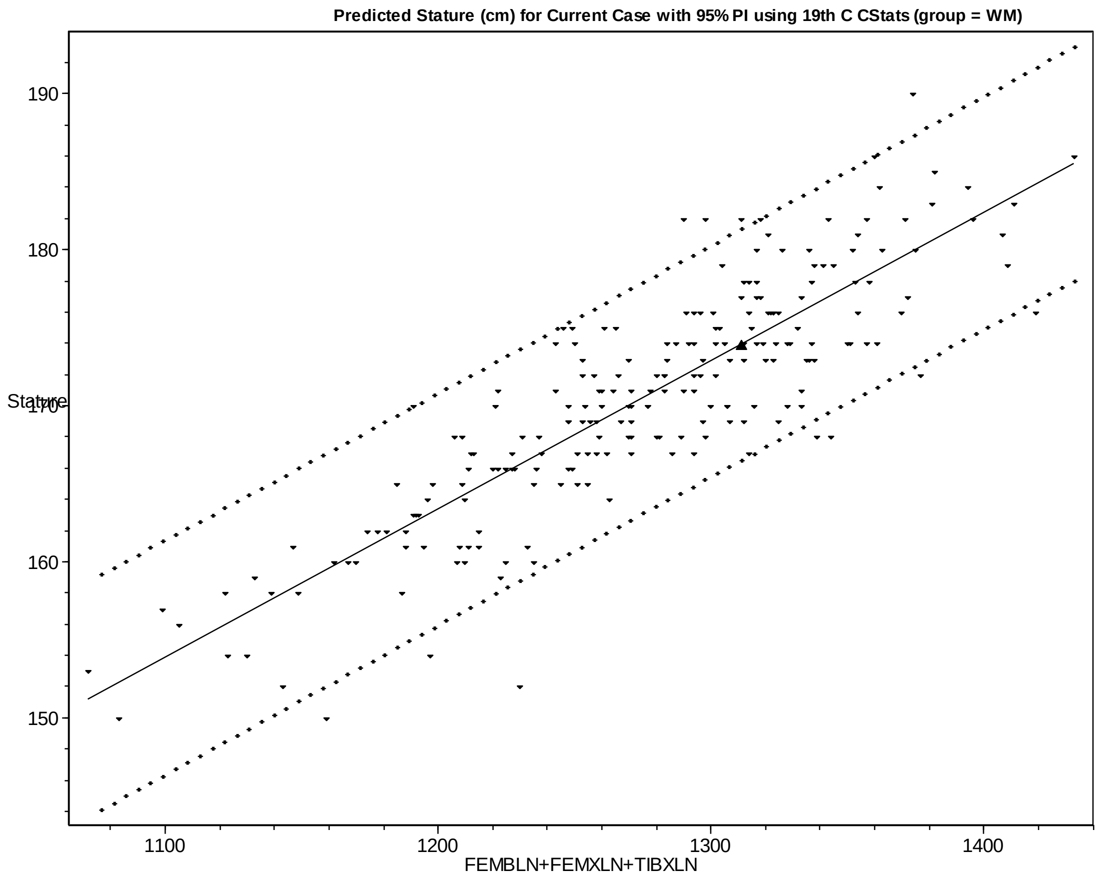
APPENDIX E

STATURE ESTIMATION DATA

BURIAL 1

Fordisc 3.1 Cadaver Stature Estimation for Current Case with 95% PI

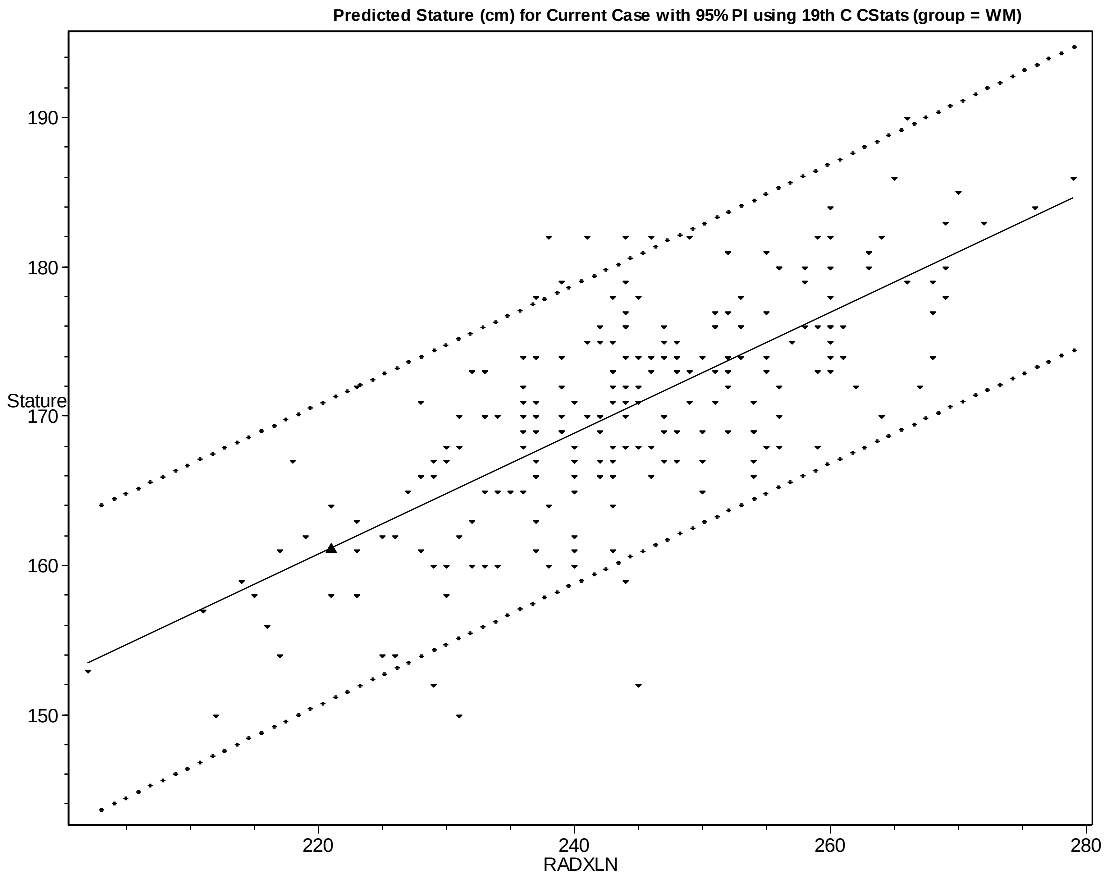
173.9 cm +/- 7.4 cm (prediction interval 166.5 to 181.3 cm); formula is:0.09499 * FEMBLN+FEMXLN+TIBXLN (1311 mm) + 49.367 cm



BURIAL 2

Fordisc 3.1 Cadaver Stature Estimation for Current Case with 95% PI

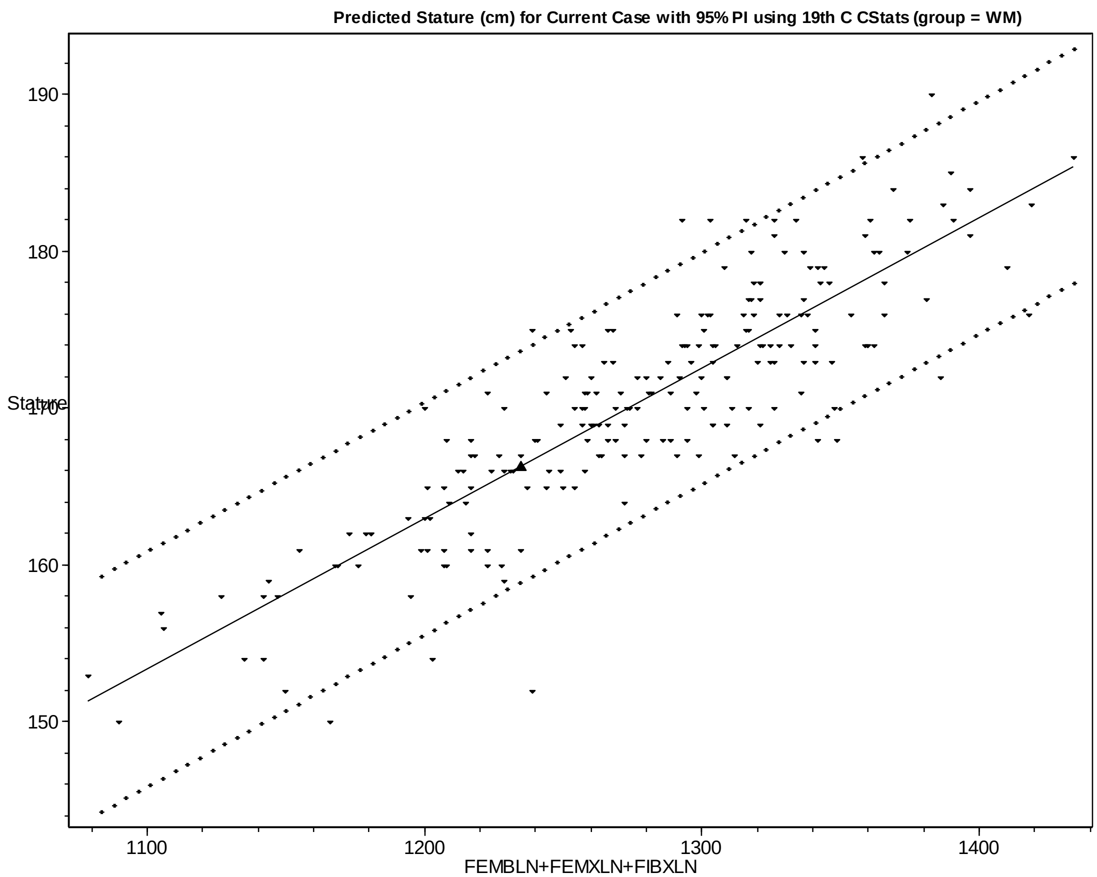
161.1 cm +/- 10.1 cm (prediction interval 151.0 to 171.2 cm); formula is:0.40437 * RADXLN (221 mm) + 71.750 cm



BURIAL 3

Fordisc 3.1 Cadaver Stature Estimation for Current Case with 95% PI

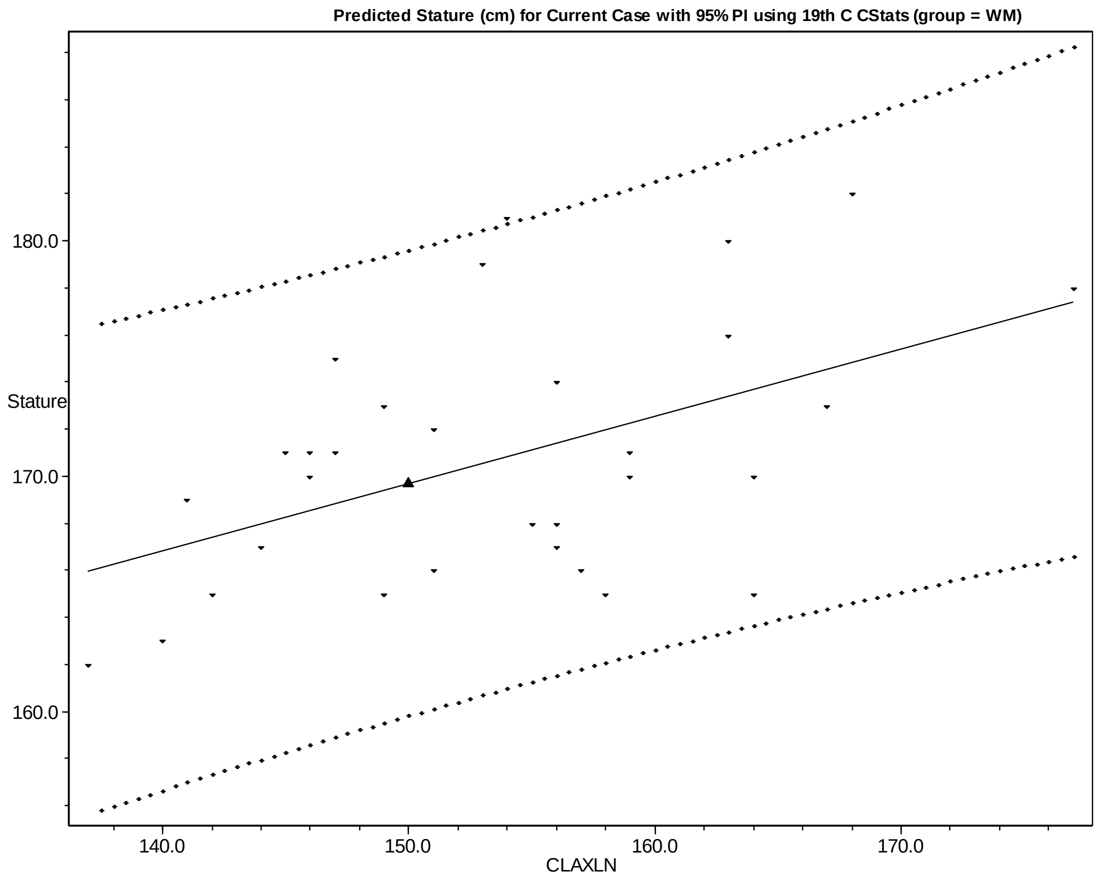
166.3 cm +/- 7.4 cm (prediction interval 158.9 to 173.7 cm); formula is:0.09597 * FEMBLN+FEMXLN+FIBXLN (1235 mm) + 47.776 cm



BURIAL 5

Fordisc 3.1 Cadaver Stature Estimation for Current Case with 95% PI

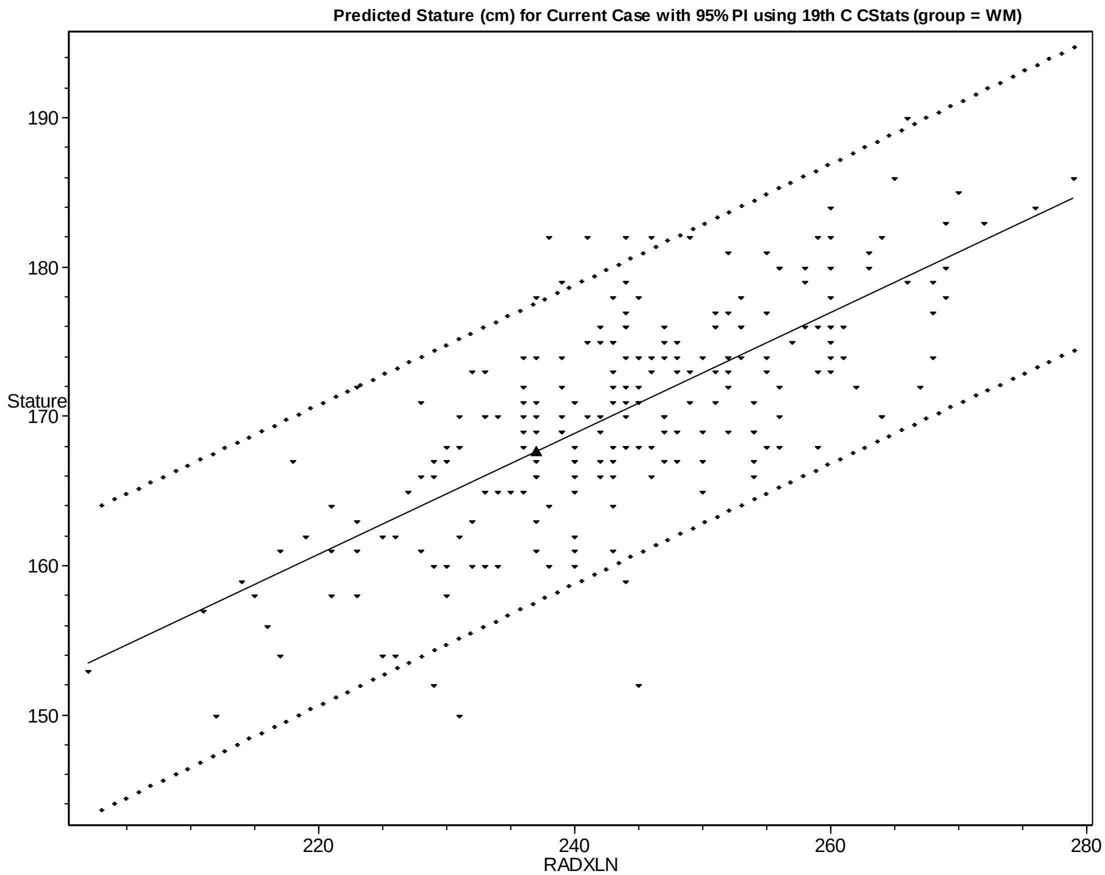
169.7 cm +/- 9.9 cm (prediction interval 159.8 to 179.6 cm); formula is:0.28546 * CLAXLN (150 mm) + 126.873 cm



BURIAL 6

Fordisc 3.1 Cadaver Stature Estimation for Current Case with 95% PI

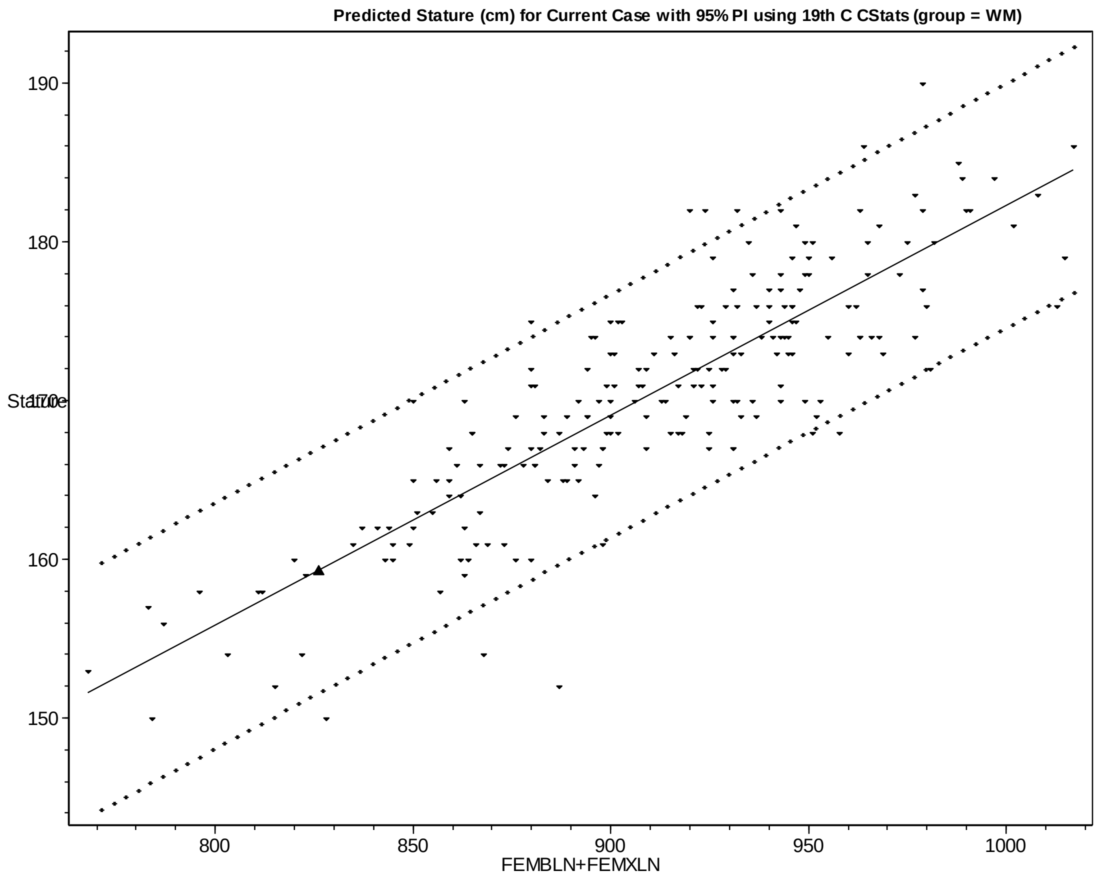
167.6 cm +/- 10.0 cm (prediction interval 157.6 to 177.6 cm); formula is:0.40437 * RADXLN (237 mm) + 71.750 cm



BURIAL 7

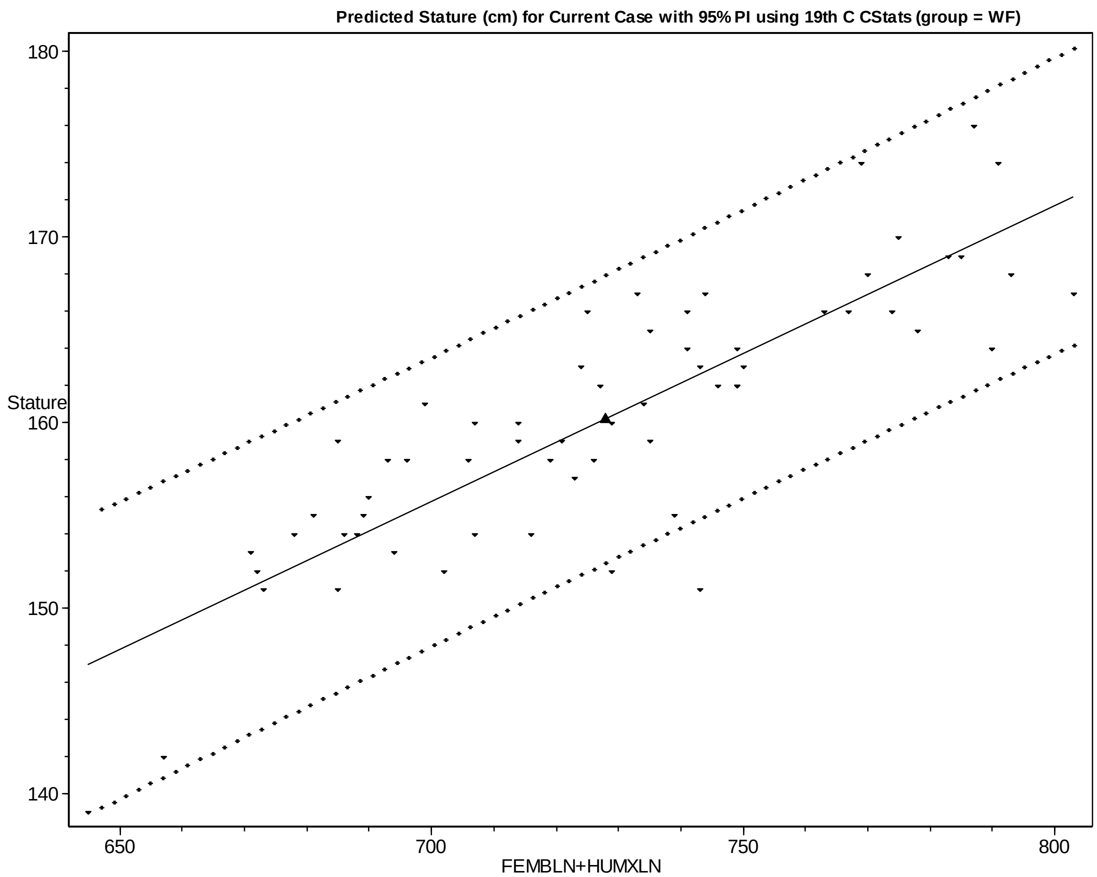
Fordisc 3.1 Cadaver Stature Estimation for Current Case with 95% PI

159.2 cm +/- 7.7 cm (prediction interval 151.5 to 166.9 cm); formula is:0.13232 * FEMBLN+FEMXLN (826 mm) + 49.950 cm



Fordisc 3.1 Cadaver Stature Estimation for Current Case with 95% PI

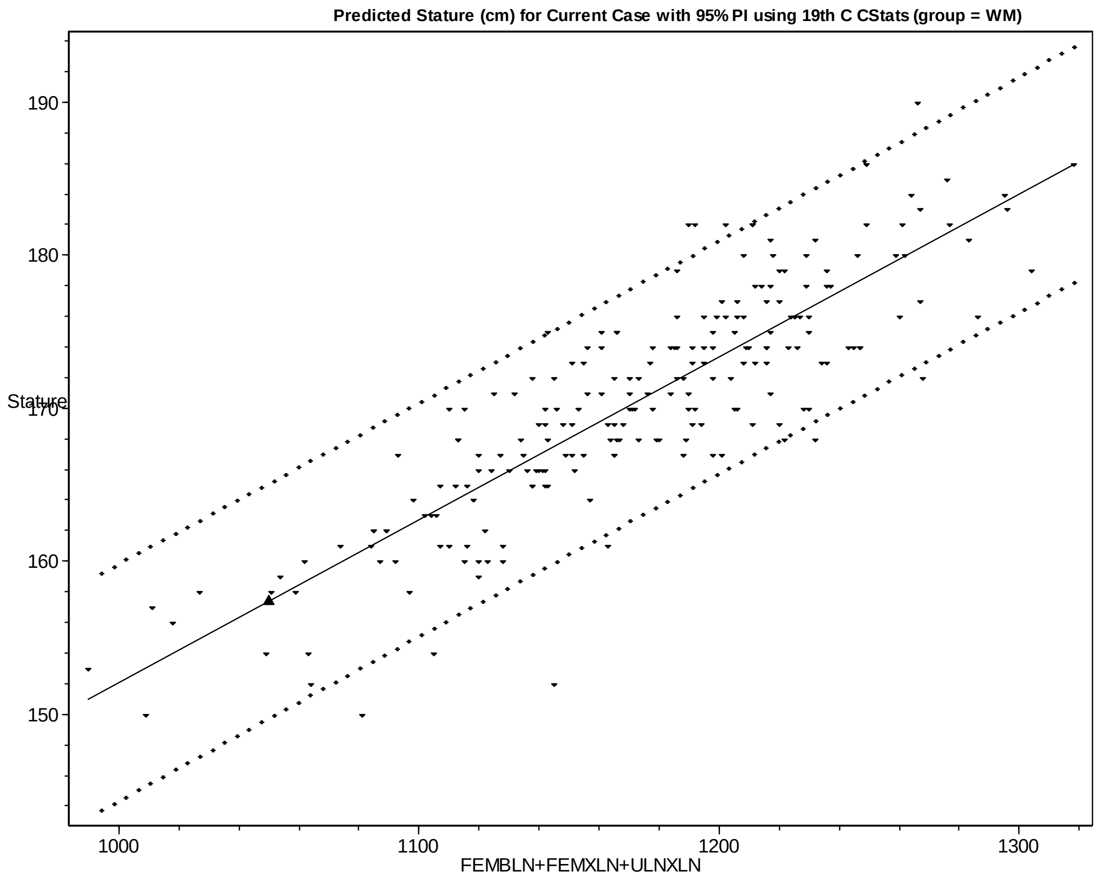
160.2 cm +/- 7.8 cm (prediction interval 152.4 to 167.9 cm); formula is:0.15972 * FEMBLN+HUMXLN (728 mm) + 43.898 cm



BURIAL 10

Fordisc 3.1 Cadaver Stature Estimation for Current Case with 95% PI

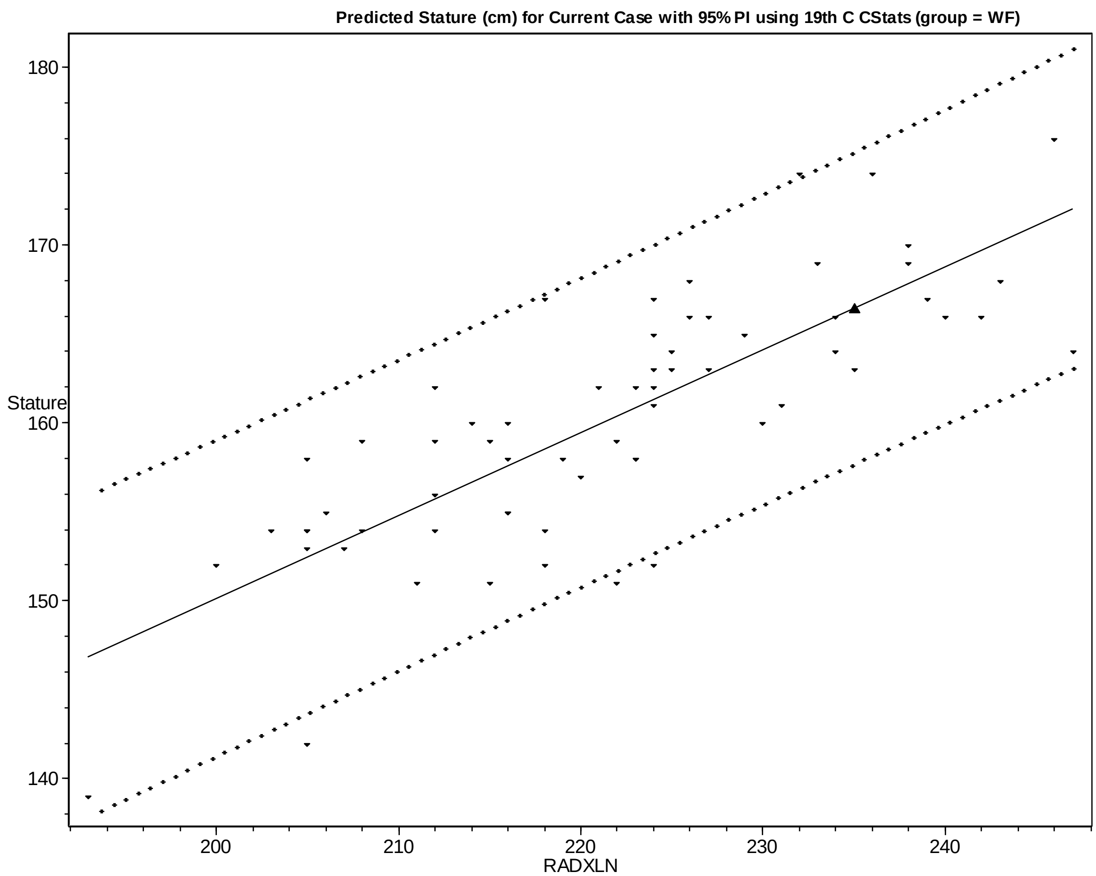
157.4 cm +/- 7.7 cm (prediction interval 149.7 to 165.1 cm); formula is:0.10629 * FEMBLN+FEMXLN+ULNXLN (1050 mm) + 45.794 cm



BURIAL 13

Fordisc 3.1 Cadaver Stature Estimation for Current Case with 95% PI

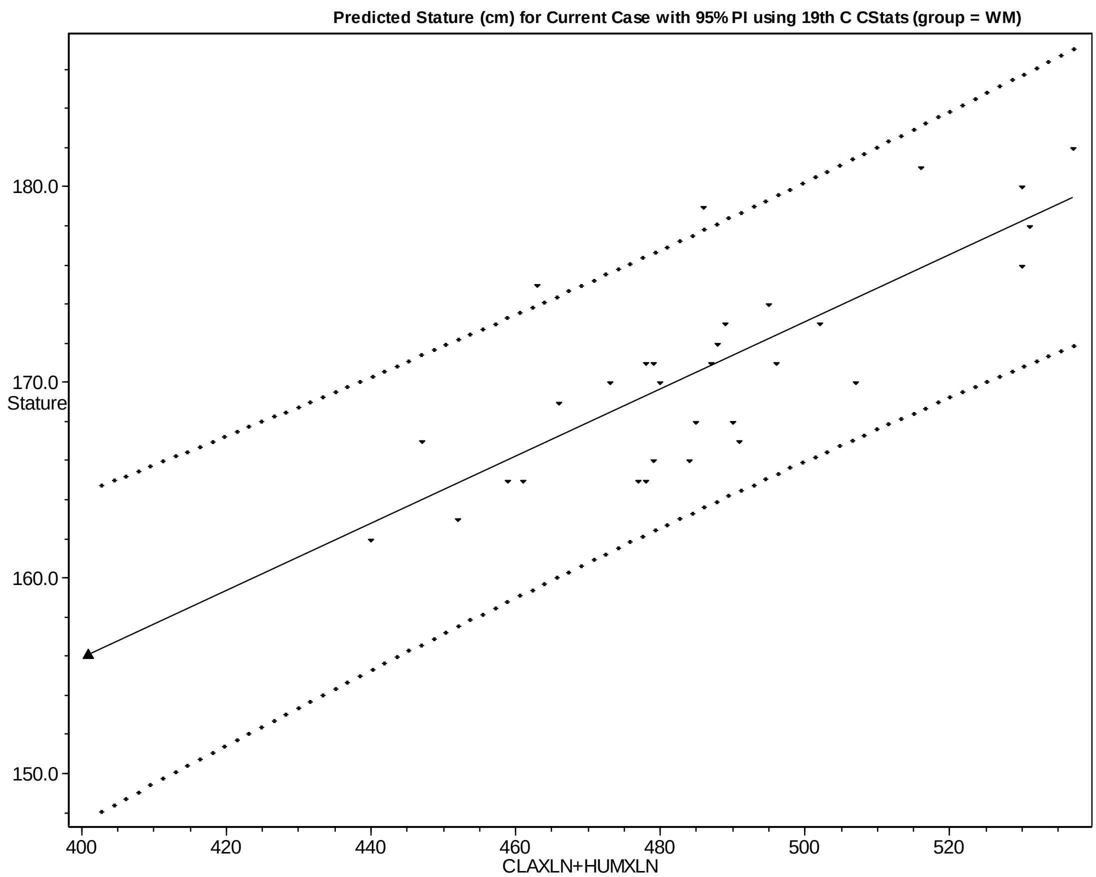
166.4 cm +/- 8.8 cm (prediction interval 157.7 to 175.2 cm); formula is:0.46559 * RADXLN (235 mm) + 57.018 cm



BURIAL 14

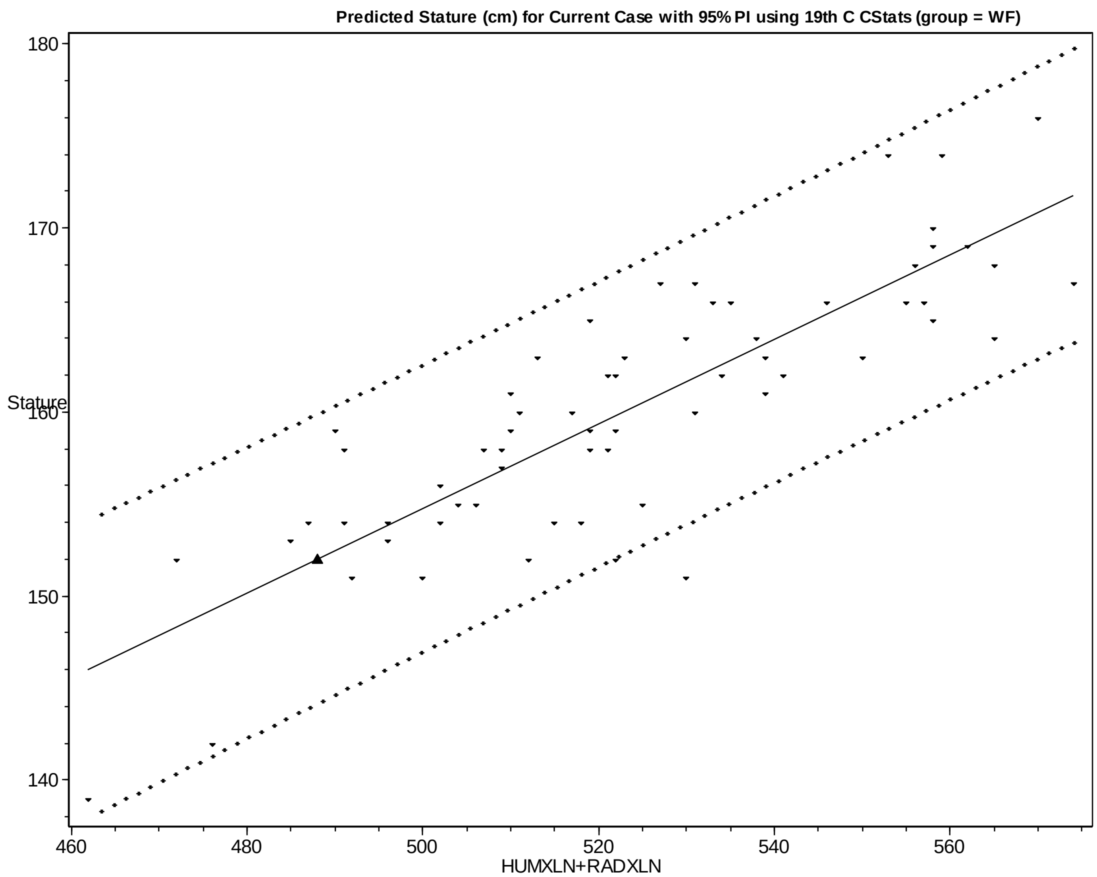
Fordisc 3.1 Cadaver Stature Estimation for Current Case with 95% PI

156.1 cm +/- 8.4 cm (prediction interval 147.7 to 164.5 cm); formula is:0.17184 * CLAXLN+HUMXLN (401 mm) + 87.170 cm



Fordisc 3.1 Cadaver Stature Estimation for Current Case with 95% PI

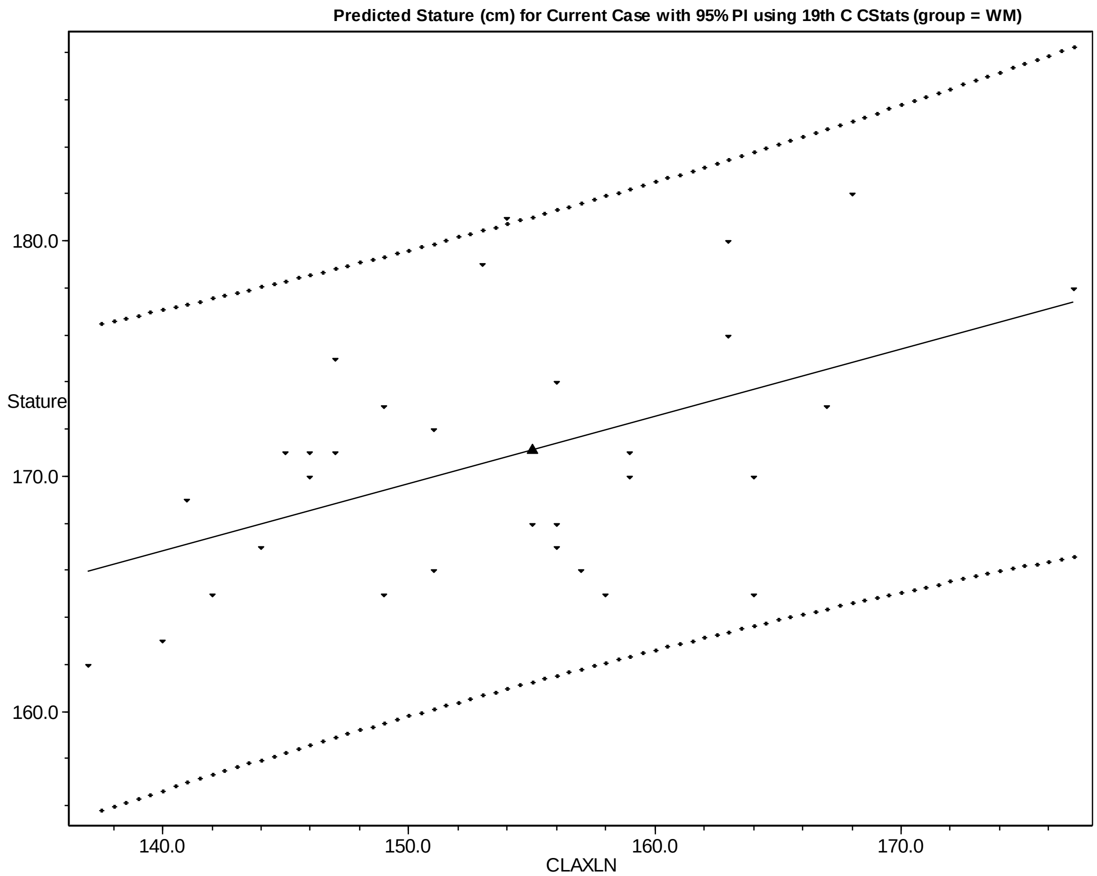
152.0 cm +/- 7.9 cm (prediction interval 144.1 to 159.9 cm); formula is:0.22972 * HUMXLN+RADXLN (488 mm) + 39.900 cm



BURIAL 15

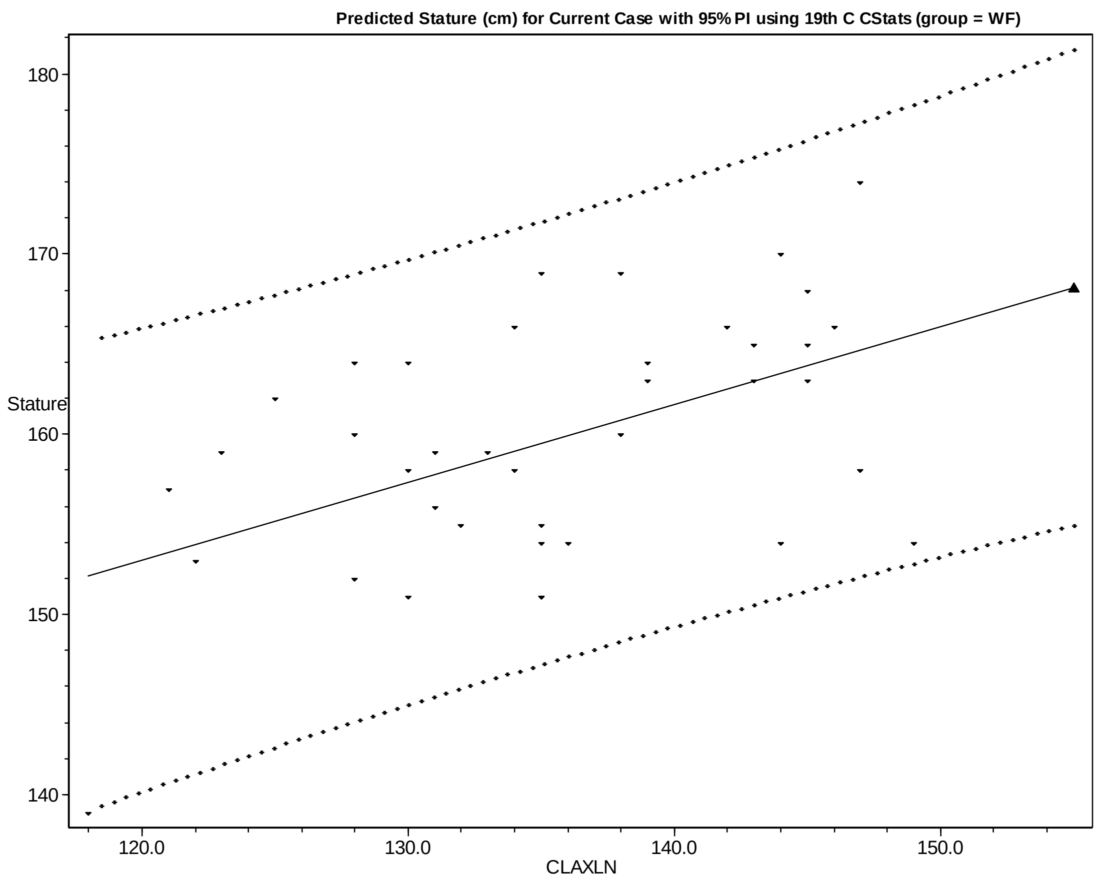
Fordisc 3.1 Cadaver Stature Estimation for Current Case with 95% PI

171.1 cm +/- 9.9 cm (prediction interval 161.2 to 181.0 cm); formula is:0.28546 * CLAXLN (155 mm) + 126.873 cm



Fordisc 3.1 Cadaver Stature Estimation for Current Case with 95% PI

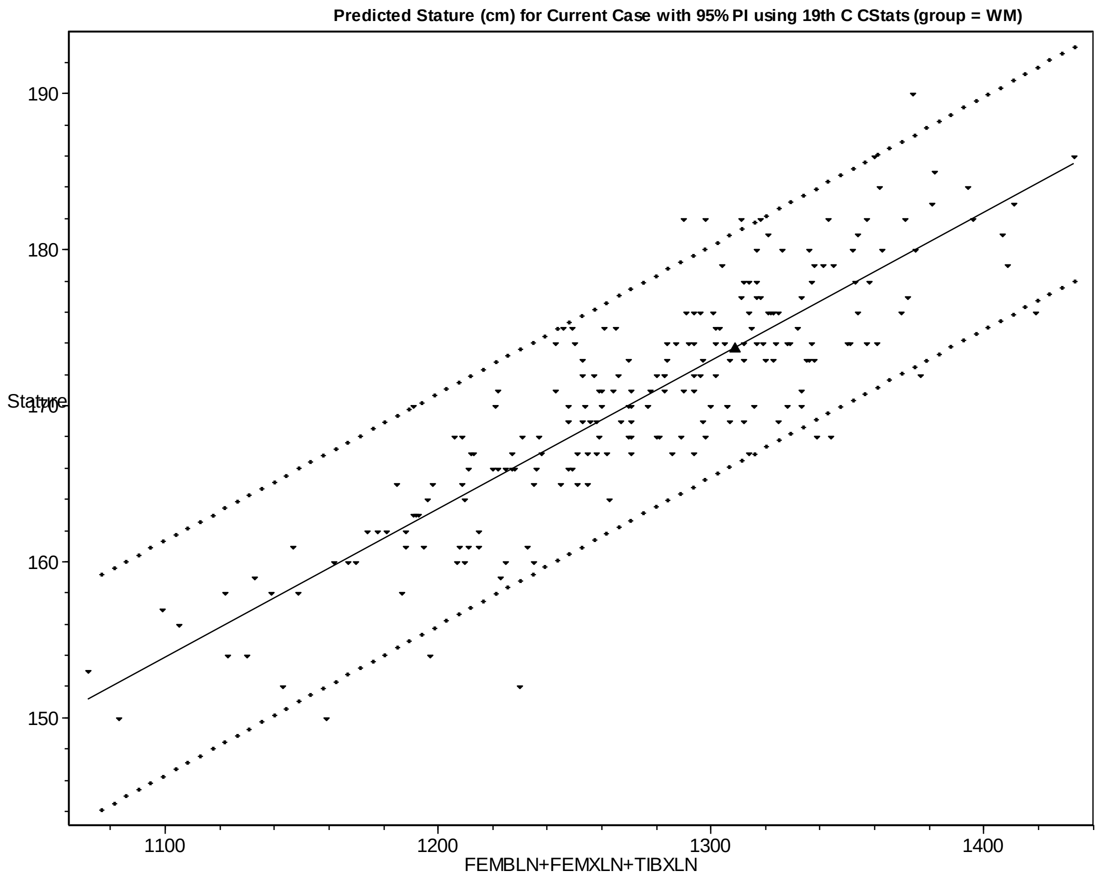
168.1 cm +/- 13.2 cm (prediction interval 154.9 to 181.3 cm); formula is:0.43222 * CLAXLN (155 mm) + 101.143 cm



BURIAL 16

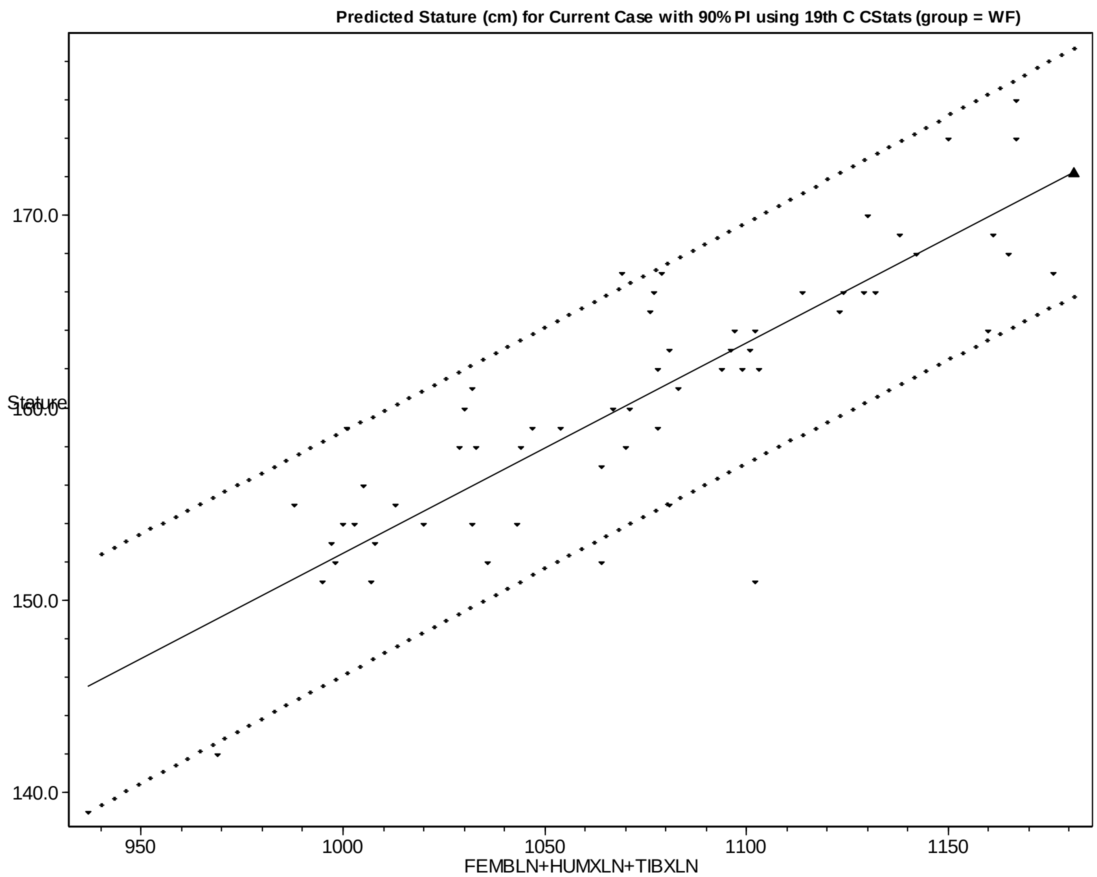
Fordisc 3.1 Cadaver Stature Estimation for Current Case with 95% PI

173.7 cm +/- 7.4 cm (prediction interval 166.3 to 181.1 cm); formula is:0.09499 * FEMBLN+FEMXLN+TIBXLN (1309 mm) + 49.367 cm



Fordisc 3.1 Cadaver Stature Estimation for Current Case with 95% PI

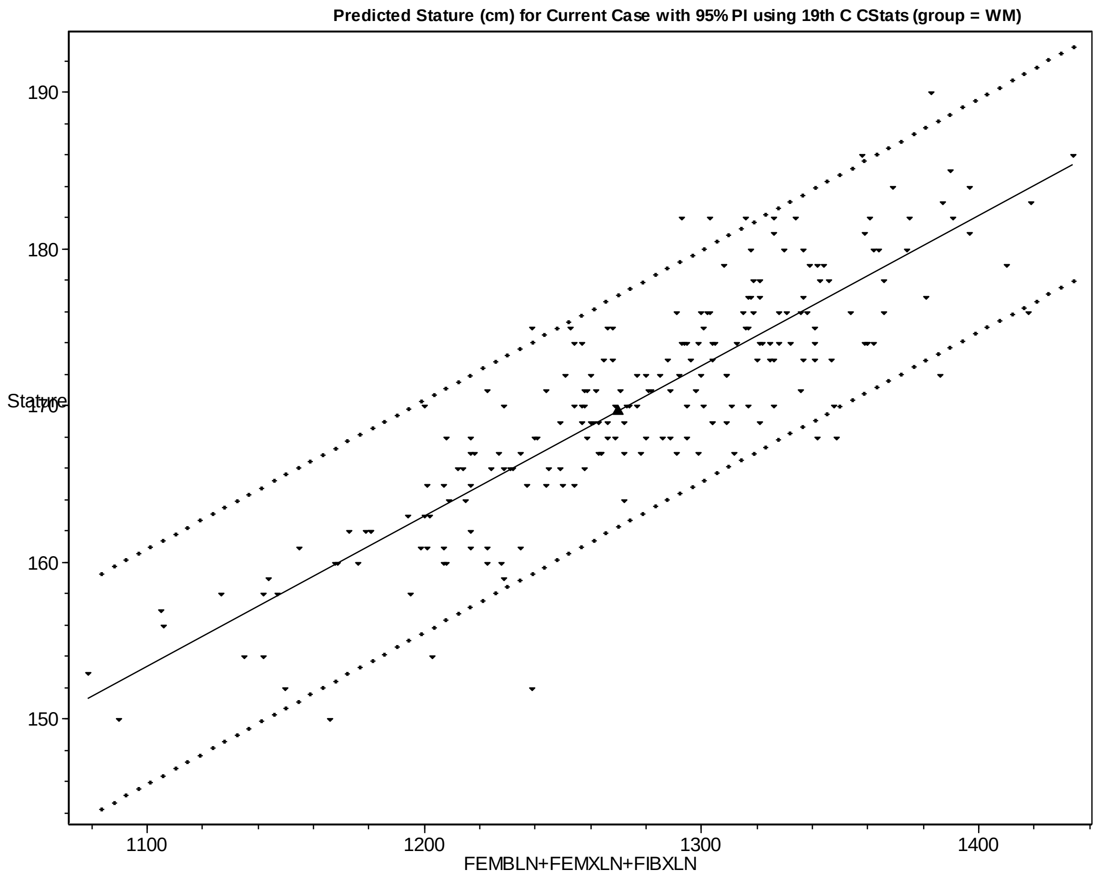
172.2 cm +/- 7.7 cm (prediction interval 164.5 to 179.9 cm); formula is:0.10937 * FEMBLN+HUMXLN+TIBXLN (1181 mm) + 43.064 cm



BURIAL 17

Fordisc 3.1 Cadaver Stature Estimation for Current Case with 95% PI

169.7 cm +/- 7.4 cm (prediction interval 162.3 to 177.0 cm); formula is:0.09597 * FEMBLN+FEMXLN+FIBXLN (1270 mm) + 47.776 cm



APPENDIX F

ANCESTRY ESTIMATION DATA

FORDISC 3.0 RESULTS BY BURIAL NUMBER:

	CRANIAL			POSTCRANIAL		
ID#	GROUPED AS	POSTERIOR PROB.	TYPICALITY	GROUPED AS	POSTERIOR PROB.	TYPICALITY
B1	EUROPEAN	0.525	0.097	EUROPEAN	0.989	0.996
B2	--	--	--	EUROPEAN	0.989	0.089
B3	EUROPEAN	0.507	0.572	EUROPEAN	0.996	0.989
B5	AFRICAN	0.495	0.903	EUROPEAN	0.835	0.888
B6	EUROPEAN	0.543	0.422	EUROPEAN	0.999	0.933
B8	--	--	--	EUROPEAN	0.992	0.397
B9	AFRICAN	0.562	0.846	--	--	--
B 10	EUROPEAN	0.977	0.313	EUROPEAN	0.999	0.171
B 10A	--	--	--	EUROPEAN	0.911	0.998
B 11	EUROPEAN	0.765	0.179	--	--	--
B 13	EUROPEAN	0.996	0.094	EUROPEAN	0.987	0.766
B 15	--	--	--	EUROPEAN	0.801	0.77
B 16	--	--	--	EUROPEAN	0.858	0.9
B 17	EUROPEAN	0.989	0.112	EUROPEAN	0.99	0.817

DESCRIPTIVE DATA:

BURIAL 2
Description: Molars are not crenulated. Suture patterns are simple, and the nasal aperture is narrow with an obvious sill.

BURIAL 3
Description: There is no post-bregmatic depression. Zygomatics are small and retreating and the suture pattern is simple. The upper margins of the eye orbits appear angular.

BURIAL 6
Description: There is a moderately sharp nasal sill with pronounced nasal spine and narrow aperture. There is moderate prognathism and the maxillary dental arcade is parabolic.

BURIAL 9
Description: Wormian bones are present. Maxillary palate is not crowded and the molars are not crenulated. The dental arcade is parabolic to elliptical. There is no post-bregmatic depression and the nuchal crest is slightly hooked. The nasal sill is not clearly defined and slopes downward to the dentition. The nasal aperture is moderate in width. Marked depression of P^4 and M^1s on the maxilla.

BURIAL 10
Description: Maxillary and mandibular incisors are very clearly shovel-shaped. Nasal sill is guttered and the molars are crenulated. There is a wormian bone present by the left mastoid process. There is a large inion hook and no post-bregmatic depression.

BURIAL 11
Description of Cranium 1: There is a large inion hook present. There is no post-bregmatic depression. The eye orbits are set far apart. Wormian bones are present on the coronal and lambdoidal sutures.

Description of Cranium 2: There is a slight post-bregmatic depression and the dental arcade is U-shaped.

BURIAL 17
Description: Prominent chin, sloping and angled orbits, tall nasal aperture, no post-bregmatic depression, very little prognathism.

APPENDIX G

DENTAL DESCRIPTIONS

BURIAL 1
Mandibular: There is obvious hypoplasia across the entire arcade and slight wear to the individual teeth.

Maxillary: There is obvious hypoplasia across the entire arcade and slight wear to the individual teeth.

BURIAL 2
Mandibular dentition: RM3 is slightly worn but has no caries, hypoplasia, or calculus formation.

BURIAL 3
Mandibular: The LM_2 has a small (1mm) caries located centrally on the buccal aspect of the tooth. The RM_2 has a similarly placed large (2.5mm) caries. There is an abscess in the socket of the RM_1 on the buccal side. There is obvious wear to the occlusal surfaces of the incisors and canines. Hypoplasia is evident throughout the arcade but there is no calculus formation. The dentition is stained bluish-black.

Maxillary: There is a small (1mm) caries on the RM_2 located in the center of the lingual aspect of the tooth. No calculus is visible in the maxillary dentition but hypoplasia present. Maxillary teeth are stained a brownish-red. A RI_2 was found in the burial but thought to be unassociated with the remains.

BURIAL 5
Mandibular: There is severe wear to the incisors and left half of the dental arcade. LP_4 through RM_2 all exhibit calculus build up but no mandibular teeth show signs of hypoplasia. The LM_1 has a 1mm caries on the borders of the occlusal and buccal surfaces about one-third of the way distally past the proximal surface.

Maxillary: There is no calculus or hypoplasia on the maxillary teeth. The occlusal surface is well worn, particularly that of the incisors and canines.

BURIAL 6
Mandibular: There is a large interproximal caries on the LM3, which covers the entire proximal surface. The RM3 also has a large (3mm in diameter) interproximal caries. Calculus build up is evident on the labial aspects of the incisors and canines and the lingual aspects of the incisors. The canine crowns are angled medially. Hypoplasia and attrition are clearly marked.

Maxillary: The maxillary dentition exhibit moderate wear, hypoplasia and calculus.

BURIAL 7
Mandibular: The RM2 has an occlusal caries just lingual to the center where the cusps meet. It is 2mm in diameter. The RM1 has two small (<1mm) caries, one located centrally on the buccal aspect, 2mm below the occlusal surface. The other is occlusally located, central, and 1.5mm from the lingual end.

Maxillary: The only calculus visible is on the buccal aspects of both right premolars.

BURIAL 8
N/A

BURIAL 9
Maxillary: There is obvious hypoplasia and calculus of the premolars and molars. RM1 has a small (>1mm) caries forming on the proximo-lingual occlusal surface. Both M1s exhibit brown-colored pits on their disto-lingual surfaces. The incisors are slightly worn and the LI2 and LC1 exhibit labial calculus. The LM3 has a 2.5mm defect running from the occlusal surface to the crown base on the distal aspect. It is notch shaped at the occlusal surface and tapers down to form an oval shape when viewed distally.

BURIAL 10
Mandibular: There is calculus formation on the lingual side of the mandibular incisors and canines. The LM_3 is set at an angle so that the crown points superior-medially and the root points inferio-laterally. LM_2 through PL_4 have been lost and the sockets completely absorbed. There are transverse grooves running across the incisors and canines that appear to be consistent with intentional modification or hypoplasia. The incisors and canines display marked wear. $LP_3$and LC_1 are covered in small (<1mm) pit-like depressions. RP_4 is missing the crown and $RM_{1\&2}$ were lost antemortem and show complete resorption. RM_3 has a caries, 2mm in diameter, on the lingual aspect, centrally located and touching the occlusal surface.

Maxillary: The alveolus of RM^1 is very porous, possibly indicating either infection or the beginning of resorption. RP^3 has two lingual caries approximately 1mm in size each. The incisors are all worn, but the medial incisors are much less worn that the lateral. There are circular defects in the center of the labial aspects of the medial incisors, each with radiating fractures. The LI^1 is also missing its inferior aspect. The LM^{1or2} has a 1-2mm caries centrally located on the occlusal surface. Hypoplasia is evident across the arcade.

BURIAL 11
Cranium 2 Mandibular: There is slight wear to the incisors. Lingual and labial calculus is present on all teeth.

BURIAL 13
Mandibular: Calculus is evident lingually and interproximally, especially on the central incisors. LP3 has a distal caries over the interproximal surface and extending into the labial aspect. RP4 has a proximal and interproximal caries approximately 1.5mm in diameter, centrally located 2mm below the occlusal surface. Teeth exhibit hypoplasia and have blue staining. The arcade exhibits mild wear.

Maxillary: Hypoplasia is evident as well as blue staining. There is calculus build up (particularly on the molars), and slightly more wear than is seen on the mandibular elements.

BURIAL 14
Mandibular: LM_1 and RM_1 have been lost antemortem and sockets clearly show resorption. The arcade appears crowded. No caries are present but calculus build up is present on both P3s. Very clear hypoplasia is exhibited.

BURIAL 15
N/A

BURIAL 16
Mandibular: There is moderate wear on the mandibular teeth. Wear is more pronounced on the incisors and the right half of the dental arcade. All teeth have both lingual and labial calculus build up excluding the RM_2 and LM_1 which only exhibit lingual calculus. Dental hypoplasia is evident throughout the arcade. The LM_1 has a distal caries extending from the most superior margin of the root to midway between the root and crown covering the majority of the distal surface. It has two additional small (<1mm) caries in the distal and medial cusps. The LP_3 has a labio-medial caries approximately 1 mm in diameter located 1.5 mm below the occlusal surface.

Maxillary: The RP^3 exhibits hypoplasia on the crown and and calculus of the root.

BURIAL 17
Mandibular: There is marked build up on the lingual surfaces of the incisors and canines. There is wear to the incisors. LM_3 has a small caries on the proximo-buccal occlusal surface in the center. Enamel hypoplasia is evident across the dental arcade.

Maxillary: LP^4 has a small caries in the distal interproximal surface approximately 1/3 of the way below the occlusal surface and centrally located. Both I^1s have marked calculus build up lingually. The RP^3 has a caries covering 1/3 of the occlusal surface located disto-lingually. There is one additional upper premolar associated with the burial but is significantly more worn than any other teeth. Enamel hypoplasia is evident across the dental arcade.

APPENDIX H

PATHOLOGY, TRAUMA, AND NOTES

BURIAL 1
A metal coffin plate was found in association with Burial 1.

BURIAL 2
This burial is very poorly preserved and consequently, it is extremely fragmentary.

BURIAL 3
The long bones and patella are very heavy and display strong muscle markings. Located on the right frontal, one-third of the way distally from bregma and 6 mm away from the coronal suture a coin was adhered to the bone. The bone was removed and visually inspected. It is most likely a Spanish Reale . Beneath the coin and still adhering to the bone is some sort of fabric.

Approximately 3 mm below the coin is a slight depression in the skull, measuring approximately 17 mm in diameter and 1 mm deep.

BURIAL 5
Cranial pathology: There are three lesions (approx. 3-4mm in max diameter) located endocranially, with one on the right and two on the left parietals. The left lesions are located 4 mm off of the sagittal suture about one-third of the way down the suture past bregma. The right lesion is located 2 mm away from the midpoint of the sagittal. Approximately two-thirds of the way down the sagittal suture and 1 mm away from the midline is another lesion of the left parietal, measuring approximately 1 mm in diameter. A second 1 mm lesion of the left parietal is located one-fifth of the way down the sagittal and 3 mm from the midline. At bregma there is a small (<1mm) lesion, and on the left frontal, about 3 cm above the medial eye orbit is a 4 mm lesion. None of these defects penetrate the skull and the edges are smooth. Another 7.5 mm defect sits parallel to the right external auditory meatus, just above the mastoid process. This is a penetrating defect and exhibits slightly rougher edges than those located endocranially. There are 3 ectocranial cut marks on the left frontal, likely resulting from a trowel or shovel. They range from 11 to 18 mm long.

B5 is extremely fragile and thus fragmented very easily

BURIAL 6
Cranial trauma: There is an approximately 7 cm linear cut across the left frontal. A distal fracture indicates it may be postmortem, in this case likely from the blade of a shovel.

Postcranial trauma: The right tibia has a hole approximately 9mm in diameter on the anterior crest with radiating fractures. It is likely postmortem in nature, possibly the result of root damage or a probing rod.

BURIAL 7
Cranial pathology: There is a smooth-edged depression superior to the right eye orbit on the frontal. It is not penetrating but is visible both endo- and ectocranially. Ectocranially, the defect is circular and has an uneven, wavy surface. Endocranially, it is

crescent-shaped with an uneven surface. Another defect is just lateral to lambda along the lambdoidal suture on the right parietal. The lesion is circular and the base is slightly pitted. The edges and base are smooth and the depth of the pit nearly reaches the endocranial surface.

BURIAL 8

Pathology: The right radius has a mid-shaft defect on the lateral side. It is a groove approximately 13mm long, 7mm wide and 1.5mm deep. The bone along the surface of the defect is striated and compact. Seven of the vertebral bodies had defects in their centers on either one or both sides. All of the defects were depressions, but the shapes varied. Some depressions were linear, others circular, and the remaining were a combination of the two.

The left ulna found in B8 is most likely the left ulna of B7. It is much more gracile in size and shape than the right ulna and other long bones of B8, and is at the same stage of epiphyseal union as the skeleton in B7. The individual in B8 is fully fused. Additionally, B7 is situated directly superior to B8, and displaced only slightly to the left so that when viewing both in situ, the lower extremity and left side of B8 is all that is visible.

BURIAL 9

B9 was collected as a small cache of bone and assumed to be out of its original context. It was recovered as a fragmented skull resting beside a faunal pelvis with a few additional elements in close proximity but initially appearing to be unassociated with surrounding burials. The elements of B9 were pulled to clear room for the excavation of B10. Additional elements found in B10 indicate that the two graves may be commingled. The left acetabulum of B9 was articulated to two different left femora found in B10 and found to more closely articulate with the pathological femur.

BURIAL 10

Cranial pathology: There are two perfectly circular depressions on the left and right parietal endocrania, ¼ of the way down the sagittal suture, approximately 5mm laterally on each side. They are between 1 and 2mm deep. There is moderate pitting on the occipitals and parietals.

Postcranial pathology: Two of the femora are bowed in appearance. Viewed posteriorly, the linea aspera is oriented normally in a straight superior-inferior line. However, the lateral side of bone is built up to twice as much as the medial side. The difference is most marked in the superior half of the bones. They are also cortically thicker and heavier at the sites of bowing. Ventrally and inferiorly on the left femur is a large area of pitting, porosity and striae, possibly associated with periosteal infection. The right femur has a break extending through the bone. The defect is a rectangular hole, approximately 40mm from superior to inferior margin and 20mm wide medio-laterally. The edges are jagged and rough, showing no signs of bone response or healing. There was no root present or growing through the defect at the time of excavation.

The tibiae show marked bowing and have a classic saber-shin appearance. Viewed laterally, the interosseus crests are oriented correctly in a straight superior to inferior line. There is prolific bone growth on the anterior side.
The fibulae also show signs of periosteal infection and bone remodeling
Within B10 there are 2 humeri, 2 ulnae, 1 radius, 4 femora, 2 tibia, 3 fibulae, and a patella. Some of these elements were determined as to be unassociated with B10 and were bagged and catalogued as "extra". Association was based on limb position relative to cranial and trunk positions.
The humeri and ulnae are relatively small and gracile.

Found bagged as "extra" were the distal portions of femora matching those labeled as associated as well as a matching left patella.
Remaining "extra" elements were matching left and right non-pathological femurs, a right fibula with no obvious pathology and 32 misc. fragments.

BURIAL 11
B11 was established based the presence of a skull oriented similarly to the surrounding burials. While excavating the area around it, another skull was discovered directly beside it. Both are analyzed as B11 but the first cranium found is noted as "crania 1" and the second found as "crania 2".

Crania 1 pathology: There is a traumatic defect on the left parietal. The defect begins half way down the sagittal suture, 41mm away from midline at the center of the defect. It is oval in shape and angled in the manner of a key-hole entry defect. The maximum length is 33.5mm with a maximum width of 15mm. The edges are jagged and there are no obvious signs of healing. There are 4 radiating fractures coming from the trauma, which has penetrated through the entire crania. The exit wound is located on the occipital bone just below and to the right of lambda. The exit defect is roughly circular with a maximum diameter of 29 mm. Two radiating fractures are visible ectocranially and a concentric fracture is visible endocranially. There is one lesion/depression on the left parietal approximately 10 mm in diameter and 2 mm deep. It is located three-quarters of the way down and 10 mm off the lambdoidal suture at the center of the defect.

Crania 2 pathology: There are endocranial lesions on the right and left parietals along the sagittal suture approximately one-third of the way down the suture line. The majority of the lesions are approximately 2 mm in diameter, and the largest is 6 mm in diameter. The lesions are up to 2 mm deep. On the ectocranial surface opposite of the lesions the bone is bossed and pitted. There is slight bossing and pitting above the nuchal crest.

BURIAL 13
Taphonomic notes: The left humerus has a circular defect on the trochlea measuring 10 mm in diameter. The size and shape are consistent with root damage.

BURIAL 14
Pathology: There are two proximal and anterior defects, both tubular in appearance and running parallel to each other down the length of the right humerus. They are approximately 4.5 mm wide and 3 mm deep, while the longer defect is 40 mm long and the shorter only 35 mm. The left humerus has two linear defects on the proximo-anterior aspect. They are also roughly parallel. The shorter defect is 27 mm long by 5 mm wide by 2 mm deep. The longer defect is 35 mm long by 3 mm wide by 1.5 mm deep. The left patella has a small pea-shaped defect on the lateral facet, 7 mm long by 3 mm wide and 2 mm deep. The right patella has a large anterior defect, approximately 10 mm wide, 3 mm deep, and extending into the fragmented apex. Pitting occurs on the inferior demifaces of the right and left auricular surfaces. A distal portion of a metatarsal was recovered with a very bulbous, possibly pathological base

BURIAL 15
A minimum of three individuals was found in Burial 15. Because the ages for the cranial and clavicular elements appear more similar to the sub-adult pelvis, they are grouped as one individual. Size, weight, and muscle markings were analyzed on all long bone elements recovered. Two femora, two tibiae, and two fibulae display morphologies consistent with that of the sub-adult remains. An additional femur, two tibiae, two fibulae, and the radii were pair matched and grouped with the adult pelvic remains. One additional fibular shaft was found in association with the burial that is representative of a third individual. There are multiple elements of the hands, feet, and axial skeleton that were unable to be assigned to any one of the three individuals identified.

BURIAL 16
A mass of rusted metal is adhering to the lateral side of the left ulna, just distal to the coronoid process. The left capitates is also adhered to a small mass of rusted metal.

BURIAL 17
Small oval defect on the right temporal that measures approximately 20 mm long and 8 mm high at its greatest height. It has 2 radiating fractures superior to it as well as one superior concentric fracture. There are no lesions visible in the crania.
The long bones are heavy and the right arm is longer than the left.

APPENDIX I

METRIC DATA FROM ST. GEORGE'S CAYE

ID#	CLAXLN L	CLAXLN R	CLAAPD L	CLAAPD R	CLAVRD L	CLAVRD R
BURIAL 1		154		14		10
BURIAL 2						
BURIAL 3	157	154	13.5	13	12	12
BURIAL 5	150	149	13	13.5	11	
BURIAL 6		149		13.5		11
BURIAL 7	127		12		9	
BURIAL 8						
BURIAL 9						
BURIAL 10				12.5		9
BURIAL 10-A						
BURIAL 11						
BURIAL 13	153		13		10.5	
BURIAL 14	134		12		10.5	
BURIAL 15						
BURIAL 15-A	155		14		11	
BURIAL 16	139		14	12	10	11
BURIAL 17	159	159	12	13.5	9	9.5

ID#	SCAPHT L	SCAPHT R	SCAPBP L	SCAPBP R	HUMXLN L	HUMXLN R
BURIAL 1						325
BURIAL 2						
BURIAL 3				150	318	319
BURIAL 5						
BURIAL 6						
BURIAL 7						315
BURIAL 8						
BURIAL 9						
BURIAL 10						
BURIAL 10-A						
BURIAL 11						
BURIAL 13						
BURIAL 14					267	270
BURIAL 15						
BURIAL 15-A						
BURIAL 16						332
BURIAL 17					318	

ID#	HUMEBR L	HUMEBR R	HUMHDD L	HUMHDD R	HUMMXD L	HUMMXD R
BURIAL 1	63	64		47	23	23.5
BURIAL 2	61	61			24	22.5
BURIAL 3	60	62	49	48	23.5	26
BURIAL 5						
BURIAL 6	63	66			25	24.5
BURIAL 7		56				22
BURIAL 8		63				26
BURIAL 9						
BURIAL 10						
BURIAL 10-A						
BURIAL 11						
BURIAL 13					23.5	22.5
BURIAL 14					24.5	25
BURIAL 15						
BURIAL 15-A						
BURIAL 16	63	64		44	22	23
BURIAL 17	61	62	44		22	22

ID#	HUMMWD L	HUMMWD R	RADXLN L	RADXLN R	RADAPD L	RADAPD R
BURIAL 1	19	20	244	240	12	
BURIAL 2	19.5	20	221		13	
BURIAL 3	19	19	233	230	12.5	12.5
BURIAL 5						
BURIAL 6	22.5	21	237	245	13	14
BURIAL 7		18				
BURIAL 8		20.5				13
BURIAL 9						
BURIAL 10				224		12
BURIAL 10-A						
BURIAL 11						
BURIAL 13	20	21	235		12.5	12.5
BURIAL 14	18	18	221		13	
BURIAL 15						
BURIAL 15-A						
BURIAL 16	16	16	252	254	11.5	11
BURIAL 17	16	17	234	239	11.5	12

ID#	RADTVD L	RADTVD R	ULNXLN L	ULNXLN R	ULNDVD L	ULNDVD R
BURIAL 1	14.5	15		250	14	13
BURIAL 2	19				18	18.5
BURIAL 3	15.5	16.5	247	246	16.5	17.5
BURIAL 5					13	14
BURIAL 6	17	18			16	15
BURIAL 7						13
BURIAL 8		17			12.5	15
BURIAL 9						
BURIAL 10		15.5	233		12.5	12
BURIAL 10-A						
BURIAL 11						
BURIAL 13	16.5	17			13	
BURIAL 14	16.5				15	15
BURIAL 15						
BURIAL 15-A						
BURIAL 16	14	15	260	268	16	15.5
BURIAL 17	13	14	253	259	12	13

ID#	ULNTVD L	ULNTVD R	ULNPHL L	ULNPHL R	ULNCIR L	ULNCIR R
BURIAL 1	17	18	231	227	38	40
BURIAL 2	13	12				
BURIAL 3	14	14	219	219	40	40
BURIAL 5	16	16			34	35
BURIAL 6	19	17.5			43	
BURIAL 7		16				
BURIAL 8	15	20	208		38	
BURIAL 9						
BURIAL 10	18	19	208	205	35	40
BURIAL 10-A						
BURIAL 11						
BURIAL 13	16					
BURIAL 14	17.5	17.5				
BURIAL 15						
BURIAL 15-A						
BURIAL 16	13.5	12.5	237	241	35	35
BURIAL 17	14	15	226	232	32	35

ID#	SACAHT	SACABR	SACS1B	INNOHT L	INNOHT R	ILIABR L	ILIABR R
BURIAL 1							
BURIAL 2							
BURIAL 3				225	223	153	150
BURIAL 5							
BURIAL 6					204		157
BURIAL 7			52			135	140
BURIAL 8							
BURIAL 9							
BURIAL 10							
BURIAL 10-A							
BURIAL 11							
BURIAL 13							
BURIAL 14							
BURIAL 15							
BURIAL 15-A							
BURIAL 16							
BURIAL 17				209		151	150

ID#	PUBISLENGTH L	PUBISLENGTH R	ISCHLGTH L	ISCHLGTH R	FEMXLN L
BURIAL 1			98	95	468
BURIAL 2					
BURIAL 3			76	80	447
BURIAL 5					
BURIAL 6				58	
BURIAL 7		66	79		413
BURIAL 8					
BURIAL 9					
BURIAL 10					412
BURIAL 10-A					
BURIAL 11					
BURIAL 13					
BURIAL 14					
BURIAL 15					
BURIAL 15-A					
BURIAL 16					460
BURIAL 17	77		96	98	458

ID#	FEMXLN R	FEMBLN L	FEMBLN R	FEMEBR L	FEMEBR R	FEMHDD L
BURIAL 1		463		84		52
BURIAL 2						49
BURIAL 3	445	444	442	80	81	48
BURIAL 5						
BURIAL 6						48.5
BURIAL 7		413				
BURIAL 8						
BURIAL 9						
BURIAL 10	412	405	407			
BURIAL 10-A						46
BURIAL 11						
BURIAL 13						
BURIAL 14						
BURIAL 15						
BURIAL 15-A						
BURIAL 16	460	454	456			45
BURIAL 17	455	457	453	78	80	47.5

ID#	FEMHDD R	FEMSAP L	FEMSAP R	FEMTSD L	FEMTSD R	FEMMAP L
BURIAL 1	51	25.5	26	31	32	29
BURIAL 2		26.5	28	35	34	29.5
BURIAL 3	46.5	28	29	26	27	30
BURIAL 5		27.5	29	29.5	29	29.5
BURIAL 6		27	27	35	35	36
BURIAL 7		26	26	27	27.5	26
BURIAL 8						32
BURIAL 9						
BURIAL 10		32	30.5	36	34	32.5
BURIAL 10-A		26	29	33.5	30	28
BURIAL 11						
BURIAL 13		31	32	28	27	30
BURIAL 14		27	30	30	30	30.5
BURIAL 15						31
BURIAL 15-A		23.5	23.5	30.5	30.5	26.5
BURIAL 16	45	26	26	33.5	31.5	26
BURIAL 17	48	29	27	34	33	24.5

ID#	FEMMAP R	FEMMTV L	FEMMTV R	FEMCIR L	FEMCIR R	TIBXLN L
BURIAL 1	28.5	26	26	85	85	380
BURIAL 2	28.5	29	30			
BURIAL 3	29	27	26.5	90	88	356
BURIAL 5	29.5	28	28.5	90	90	
BURIAL 6	32.5	30.5	29	100	97	
BURIAL 7	26	26	27	83	84	
BURIAL 8	30	28.5	29.5	96	93	
BURIAL 9						
BURIAL 10	32	32	31	97	96	
BURIAL 10-A	29	28.5	29	88	90	
BURIAL 11						
BURIAL 13	28.5	27	26.5	90	86	
BURIAL 14	30.5	27.5	26.5	90	91	
BURIAL 15		30		97		
BURIAL 15-A	26	25	24	80	80	
BURIAL 16	27	27	27.5	83	84	385
BURIAL 17	23.5	29	29	85	85	366

ID#	TIBXLN R	TIBPEB L	TIBPEB R	TIBDEB L	TIBDEB R	TIBNFX L
BURIAL 1	377	73		49	50	29
BURIAL 2					50	35
BURIAL 3	360	72	73	54	54	33.5
BURIAL 5						35
BURIAL 6						36
BURIAL 7						
BURIAL 8						39
BURIAL 9						
BURIAL 10						38
BURIAL 10-A						
BURIAL 11						
BURIAL 13						33
BURIAL 14						33
BURIAL 15						35
BURIAL 15-A						31.5
BURIAL 16	394			46	47	34
BURIAL 17	364	70	71	50	52	34

ID#	TIBNFX R	TIBNFT L	TIBNFT R	TIBCIR L	TIBCIR R	FIBXLN L
BURIAL 1	30	22.5	25	84	88	
BURIAL 2	36	27.5	26			
BURIAL 3	33.5	24	23.5	92	93	344
BURIAL 5		24		95		
BURIAL 6	36	26	26	97	96	
BURIAL 7	33		23		90	
BURIAL 8	39	28.5	28.5	103	106	
BURIAL 9						
BURIAL 10	39	24	25	100	100	
BURIAL 10-A						
BURIAL 11						
BURIAL 13	32.5	27	27.5	93	94	
BURIAL 14		24		90		
BURIAL 15	36	27	27	97	100	
BURIAL 15-A	33	21.5	22	85	87	
BURIAL 16	34	24	24	94	93	
BURIAL 17	35.5	24	25	94	93	

ID#	FIBXLN R	FIBMDM L	FIBMDM R	CALCXL L	CALCXL R	CALCBR L
BURIAL 1				80	81	
BURIAL 2		15	14			
BURIAL 3	340	13.5	14	79.5	79	45
BURIAL 5						
BURIAL 6						
BURIAL 7						
BURIAL 8						
BURIAL 9						
BURIAL 10						
BURIAL 10-A						
BURIAL 11						
BURIAL 13			15.5			
BURIAL 14						
BURIAL 15						
BURIAL 15-A						
BURIAL 16						
BURIAL 17	355	12	12.5			

ID#	CALCBR R	GOL	XCB	ZYB	BBH	BNL	BPL	MAB	MAL	AUB	UFHT	WFB
BURIAL 1	41.5	185						61	46			95
BURIAL 2												
BURIAL 3	41.5	182										95.5
BURIAL 5								65		125		102
BURIAL 6		185	131					53	56	115	66.5	102
BURIAL 7			130									94.5
BURIAL 8												
BURIAL 9		181	140					61	46			
BURIAL 10		188	142									
BURIAL 10-A												
BURIAL 11		196	141							124		99.5
BURIAL 13												
BURIAL 14												
BURIAL 15												
BURIAL 15-A												
BURIAL 16			37							125		
BURIAL 17												

ID#	UFBR (FMB)	NLH	NLB	OBB L	OBB R	OBH L	OBH R	EKB	DKB	FRC	PAC
BURIAL 1	98		23.5							112	118
BURIAL 2											
BURIAL 3	101.5									116	112
BURIAL 5	107										109.5
BURIAL 6	110.5	50.5	20	41.5	41	31.5	32	99	20	111.5	104
BURIAL 7	96.5										114
BURIAL 8											
BURIAL 9										109	116
BURIAL 10	102		23							119	119
BURIAL 10-A											
BURIAL 11	110									120	125
BURIAL 13											120
BURIAL 14											
BURIAL 15											
BURIAL 15-A											
BURIAL 16											101
BURIAL 17											

ID#	OCC	FOL	FOB	MDH L	MDH R	ASB	ZMB	MOW	Chin Height	BH@MF L
BURIAL 1					20				30	28
BURIAL 2										
BURIAL 3				25	24				33	31
BURIAL 5	96			28	27.5				30	32.5
BURIAL 6	102			28					33	32
BURIAL 7				26						
BURIAL 8										24
BURIAL 9	95			31						
BURIAL 10				25.5						31
BURIAL 10-A										
BURIAL 11	95		30		34					
BURIAL 13				30	30				32	24
BURIAL 14									30	25
BURIAL 15										
BURIAL 15-A										
BURIAL 16				23	25				33.5	30
BURIAL 17										

ID#	BH@MF R	BT@MF L	BT@MF R	BIG DIA	BIG BR	MinRB R	MinRB R
BURIAL 1	27	10	10	98	118	29	29.5
BURIAL 2							29
BURIAL 3	33	10	10.5	92.5	115	26.5	27.5
BURIAL 5	32	11	12				
BURIAL 6	32	11	11.5	109.5	127	34	34
BURIAL 7	29		11				
BURIAL 8	26	12.5	12				
BURIAL 9							
BURIAL 10	37	10.5	11.5			31	
BURIAL 10-A							
BURIAL 11							
BURIAL 13	26.5	9.5	10			31	
BURIAL 14		10				32.6	
BURIAL 15							
BURIAL 15-A							
BURIAL 16	26.5	12	12.6	98	123.5	27.5	29
BURIAL 17							

APPENDIX J

SAS OUTPUT: ANOVA AND TUKEY TESTS

Femur 21

Group Codes: 1- St. George's Caye
2- Cross Bones
3- Chelsea Old Church
4- St. Brides Lower
5- Missouri
6- Misc American
7- Snake Hill

The GLM Procedure
Class Level Information

Class	Levels	Values
group	7	1 2 3 4 5 6 7

Number of Observations Read	14
Number of Observations Used	14
Sum of Frequencies Read	169
Sum of Frequencies Used	169

Femur 22
The GLM Procedure
Dependent Variable: y
Frequency: freq

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	4872.90312	812.15052	1.50	0.1799
Error	162	87473.99850	539.96295		
Corrected Total	168	92346.90162			

R-Square	Coeff Var	Root MSE	y Mean
0.052767	5.129424	23.23710	453.0158

Source	DF	Type I SS	Mean Square	F Value	Pr > F
group	6	4872.903117	812.150520	1.50	0.1799

Source	DF	Type III SS	Mean Square	F Value	Pr > F
group	6	4872.903117	812.150520	1.50	0.1799

Femur 23

The GLM Procedure

Tukey's Studentized Range (HSD) Test for y

NOTE: This test controls the Type I experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	162
Error Mean Square	539.963
Critical Value of Studentized Range	4.22249

Comparisons significant at the 0.05 level are indicated by ***.

group Comparison	Difference Between Means	Simultaneous 95% Confidence Limits	
7 - 5	6.230	-16.055	28.515
7 - 2	9.790	-28.060	47.640
7 - 6	10.350	-11.617	32.317
7 - 3	13.590	-5.461	32.641
7 - 1	15.670	-18.854	50.194
7 - 4	15.970	-1.413	33.353
5 - 7	-6.230	-28.515	16.055
5 - 2	3.560	-34.791	41.911
5 - 6	4.120	-18.700	26.940
5 - 3	7.360	-12.668	27.388
5 - 1	9.440	-25.633	44.513
5 - 4	9.740	-8.709	28.189
2 - 7	-9.790	-47.640	28.060
2 - 5	-3.560	-41.911	34.791
2 - 6	0.560	-37.607	38.727
2 - 3	3.800	-32.767	40.367
2 - 1	5.880	-40.662	52.422
2 - 4	6.180	-29.546	41.906
6 - 7	-10.350	-32.317	11.617
6 - 5	-4.120	-26.940	18.700
6 - 2	-0.560	-38.727	37.607
6 - 3	3.240	-16.434	22.914
6 - 1	5.320	-29.552	40.192
6 - 4	5.620	-12.443	23.683
3 - 7	-13.590	-32.641	5.461
3 - 5	-7.360	-27.388	12.668

3 - 2	-3.800	-40.367	32.767
3 - 6	-3.240	-22.914	16.434
3 - 1	2.080	-31.032	35.192
3 - 4	2.380	-11.995	16.755
1 - 7	-15.670	-50.194	18.854
1 - 5	-9.440	-44.513	25.633
1 - 2	-5.880	-52.422	40.662

Femur 24

The GLM Procedure

Tukey's Studentized Range (HSD) Test for y

Comparisons significant at the 0.05 level are indicated by ***.

group Comparison	Difference Between Means	Simultaneous 95% Confidence Limits	
1 - 6	-5.320	-40.192	29.552
1 - 3	-2.080	-35.192	31.032
1 - 4	0.300	-31.882	32.482
4 - 7	-15.970	-33.353	1.413
4 - 5	-9.740	-28.189	8.709
4 - 2	-6.180	-41.906	29.546
4 - 6	-5.620	-23.683	12.443
4 - 3	-2.380	-16.755	11.995
4 - 1	-0.300	-32.482	31.882

Femur 25

The GLM Procedure
Least Squares Means

Coefficients for group Least Square Means

Effect	group Level 1	2	3	4	5	6	7
Intercept	1	1	1	1	1	1	1
group 1	1	0	0	0	0	0	0
group 2	0	1	0	0	0	0	0
group 3	0	0	1	0	0	0	0
group 4	0	0	0	1	0	0	0

group	5	0	0	0	0	1	0	0
group	6	0	0	0	0	0	1	0
group	7	0	0	0	0	0	0	1

group	y LSMEAN	Standard Error	Pr > |t|
1	449.000000	10.391948	<.0001
2	454.880000	11.618551	<.0001
3	451.080000	3.872850	<.0001
4	448.700000	2.860290	<.0001
5	458.440000	5.477038	<.0001
6	454.320000	5.330957	<.0001
7	464.670000	5.070752	<.0001

Tibia 26

Group Codes: 1- St. George's Caye 5- Missouri
2- Cross Bones 6- Misc American
3- Chelsea Old Church 7- Snake Hill
4- St. Brides Lower

The GLM Procedure

Class Level Information

Class	Levels	Values
group	7	1 2 3 4 5 6 7

Number of Observations Read	14
Number of Observations Used	14
Sum of Frequencies Read	173
Sum of Frequencies Used	173

tibia 27

The GLM Procedure

Dependent Variable: y

Frequency: freq

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	7241.60472	1206.93412	2.92	0.0098
Error	166	68564.52990	413.03934		
Corrected Total	172	75806.13462			

R-Square	Coeff Var	Root MSE	y Mean
0.095528	5.510603	20.32337	368.8048

Source	DF	Type I SS	Mean Square	F Value	Pr > F

group	6	7241.604718	1206.934120	2.92	0.0098

Source	DF	Type III SS	Mean Square	F Value	Pr > F
group	6	7241.604718	1206.934120	2.92	0.0098

tibia 28

The GLM Procedure

Tukey's Studentized Range (HSD) Test for y

NOTE: This test controls the Type I experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	166
Error Mean Square	413.0393
Critical Value of Studentized Range	4.22120

Comparisons significant at the 0.05 level are indicated by ***.

group Comparison	Difference Between Means	Simultaneous 95% Confidence Limits		
7 - 2	7.750	-21.784	37.284	
7 - 5	9.500	-9.282	28.282	
7 - 1	10.100	-22.400	42.600	
7 - 6	13.640	-4.525	31.805	
7 - 4	16.090	2.262	29.918	***
7 - 3	19.970	4.333	35.607	***
2 - 7	-7.750	-37.284	21.784	
2 - 5	1.750	-29.112	32.612	
2 - 1	2.350	-38.343	43.043	
2 - 6	5.890	-24.600	36.380	
2 - 4	8.340	-19.783	36.463	
2 - 3	12.220	-16.835	41.275	
5 - 7	-9.500	-28.282	9.282	
5 - 2	-1.750	-32.612	29.112	
5 - 1	0.600	-33.111	34.311	
5 - 6	4.140	-16.112	24.392	
5 - 4	6.590	-9.884	23.064	

5 - 3	10.470	-7.549	28.489	
1 - 7	-10.100	-42.600	22.400	
1 - 2	-2.350	-43.043	38.343	
1 - 5	-0.600	-34.311	33.111	
1 - 6	3.540	-29.831	36.911	
1 - 4	5.990	-25.233	37.213	
1 - 3	9.870	-22.196	41.936	
6 - 7	-13.640	-31.805	4.525	
6 - 2	-5.890	-36.380	24.600	
6 - 5	-4.140	-24.392	16.112	
6 - 1	-3.540	-36.911	29.831	
6 - 4	2.450	-13.317	18.217	
6 - 3	6.330	-11.046	23.706	
4 - 7	-16.090	-29.918	-2.262	***
4 - 2	-8.340	-36.463	19.783	
4 - 5	-6.590	-23.064	9.884	

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The GLM Procedure

Tukey's Studentized Range (HSD) Test for y

Comparisons significant at the 0.05 level are indicated by ***.

group Comparison	Difference Between Means	Simultaneous 95% Confidence Limits		
4 - 1	-5.990	-37.213	25.233	
4 - 6	-2.450	-18.217	13.317	
4 - 3	3.880	-8.893	16.653	
3 - 7	-19.970	-35.607	-4.333	***
3 - 2	-12.220	-41.275	16.835	
3 - 5	-10.470	-28.489	7.549	
3 - 1	-9.870	-41.936	22.196	
3 - 6	-6.330	-23.706	11.046	
3 - 4	-3.880	-16.653	8.893	

tibia 30

The GLM Procedure
Least Squares Means

Coefficients for group Least Square Means

Effect	group Level 1	2	3	4	5	6	7
Intercept	1	1	1	1	1	1	1
group 1	1	0	0	0	0	0	0
group 2	0	1	0	0	0	0	0
group 3	0	0	1	0	0	0	0
group 4	0	0	0	1	0	0	0
group 5	0	0	0	0	1	0	0
group 6	0	0	0	0	0	1	0
group 7	0	0	0	0	0	0	1

group	y LSMEAN	Standard Error	Pr > |t|
1	371.750000	10.161685	<.0001
2	374.100000	9.088887	<.0001
3	361.880000	3.485429	<.0001
4	365.760000	2.482895	<.0001
5	372.350000	4.929141	<.0001
6	368.210000	4.662501	<.0001
7	381.850000	3.911234	<.0001

Humerus 31

Group Codes:	1- St. George's Caye	5- Missouri
	2- Cross Bones	6- Misc American
	3- Chelsea Old Church	7- Snake Hill
	4- St. Brides Lower	

The GLM Procedure

Class Level Information

Class	Levels	Values
group	7	1 2 3 4 5 6 7

Number of Observations Read	14
Number of Observations Used	14
Sum of Frequencies Read	183
Sum of Frequencies Used	183

humerus 32

The GLM Procedure

Dependent Variable: y

Frequency: freq

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	2509.33769	418.22295	1.33	0.2440
Error	176	55143.63060	313.31608		
Corrected Total	182	57652.96829			

R-Square	Coeff Var	Root MSE	y Mean
0.043525	5.471083	17.70074	323.5326

Source	DF	Type I SS	Mean Square	F Value	Pr > F

group	6	2509.337693	418.222949	1.33	0.2440

Source	DF	Type III SS	Mean Square	F Value	Pr > F
group	6	2509.337693	418.222949	1.33	0.2440

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The GLM Procedure

Tukey's Studentized Range (HSD) Test for y

NOTE: This test controls the Type I experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	176
Error Mean Square	313.3161
Critical Value of Studentized Range	4.21825

Comparisons significant at the 0.05 level are indicated by ***.

group Comparison	Difference Between Means	Simultaneous 95% Confidence Limits	
5 - 3	0.610	-14.953	16.173
5 - 7	1.070	-17.597	19.737
5 - 1	4.380	-25.134	33.894
5 - 4	5.960	-8.415	20.335
5 - 6	6.160	-12.230	24.550
5 - 2	24.300	-8.917	57.517
3 - 5	-0.610	-16.173	14.953
3 - 7	0.460	-15.103	16.023
3 - 1	3.770	-23.886	31.426
3 - 4	5.350	-4.670	15.370
3 - 6	5.550	-9.680	20.780
3 - 2	23.690	-7.888	55.268
7 - 5	-1.070	-19.737	17.597
7 - 3	-0.460	-16.023	15.103
7 - 1	3.310	-26.204	32.824
7 - 4	4.890	-9.485	19.265
7 - 6	5.090	-13.300	23.480

7 - 2	23.230	-9.987	56.447
1 - 5	-4.380	-33.894	25.134
1 - 3	-3.770	-31.426	23.886
1 - 7	-3.310	-32.824	26.204
1 - 4	1.580	-25.425	28.585
1 - 6	1.780	-27.560	31.120
1 - 2	19.920	-20.404	60.244
4 - 5	-5.960	-20.335	8.415
4 - 3	-5.350	-15.370	4.670
4 - 7	-4.890	-19.265	9.485
4 - 1	-1.580	-28.585	25.425
4 - 6	0.200	-13.814	14.214
4 - 2	18.340	-12.669	49.349
6 - 5	-6.160	-24.550	12.230
6 - 3	-5.550	-20.780	9.680
6 - 7	-5.090	-23.480	13.300

humerus 34

The GLM Procedure

Tukey's Studentized Range (HSD) Test for y

Comparisons significant at the 0.05 level are indicated by ***.

group Comparison	Difference Between Means	Simultaneous 95% Confidence Limits	
6 - 1	-1.780	-31.120	27.560
6 - 4	-0.200	-14.214	13.814
6 - 2	18.140	-14.923	51.203
2 - 5	-24.300	-57.517	8.917
2 - 3	-23.690	-55.268	7.888
2 - 7	-23.230	-56.447	9.987
2 - 1	-19.920	-60.244	20.404
2 - 4	-18.340	-49.349	12.669
2 - 6	-18.140	-51.203	14.923

humerus 35

The GLM Procedure
Least Squares Means

Coefficients for group Least Square Means

Effect		group Level 1	2	3	4	5	6	7
Intercept		1	1	1	1	1	1	1
group	1	1	0	0	0	0	0	0
group	2	0	1	0	0	0	0	0
group	3	0	0	1	0	0	0	0
group	4	0	0	0	1	0	0	0
group	5	0	0	0	0	1	0	0
group	6	0	0	0	0	0	1	0
group	7	0	0	0	0	0	0	1

group	y LSMEAN	Standard Error	Pr > |t|
1	323.250000	8.850368	<.0001
2	303.330000	10.219525	<.0001
3	327.020000	2.764391	<.0001
4	321.670000	1.908720	<.0001
5	327.630000	4.425184	<.0001
6	321.470000	4.293059	<.0001
7	326.560000	4.425184	<.0001

Radius 36

Group Codes:

1- St. George's Caye	4- Missouri
2- Chelsea Old Church	5- Misc American
3- St. Brides Lower	6- Snake Hill

The GLM Procedure

Class Level Information

Class	Levels	Values
group	6	1 2 3 4 5 6

Number of Observations Read	12
Number of Observations Used	12
Sum of Frequencies Read	176
Sum of Frequencies Used	176

radius 37

The GLM Procedure

Dependent Variable: y

Frequency: freq

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	1966.49380	393.29876	2.32	0.0450
Error	170	28761.78570	169.18697		
Corrected Total	175	30728.27950			

R-Square	Coeff Var	Root MSE	y Mean
0.063996	5.455295	13.00719	238.4324

Source	DF	Type I SS	Mean Square	F Value	Pr > F

group	5	1966.493798	393.298760	2.32	0.0450

Source	DF	Type III SS	Mean Square	F Value	Pr > F
group	5	1966.493798	393.298760	2.32	0.0450

radius 38

The GLM Procedure

Tukey's Studentized Range (HSD) Test for y

NOTE: This test controls the Type I experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	170
Error Mean Square	169.187
Critical Value of Studentized Range	4.07647

Comparisons significant at the 0.05 level are indicated by ***.

group Comparison	Difference Between Means	Simultaneous 95% Confidence Limits		
6 - 5	5.030	-8.331	18.391	
6 - 4	7.730	-5.152	20.612	
6 - 2	10.080	-0.849	21.009	
6 - 3	10.410	0.702	20.118	***
6 - 1	12.110	-4.591	28.811	
5 - 6	-5.030	-18.391	8.331	
5 - 4	2.700	-11.021	16.421	
5 - 2	5.050	-6.856	16.956	
5 - 3	5.380	-5.417	16.177	
5 - 1	7.080	-10.276	24.436	
4 - 6	-7.730	-20.612	5.152	
4 - 5	-2.700	-16.421	11.021	
4 - 2	2.350	-9.017	13.717	
4 - 3	2.680	-7.519	12.879	
4 - 1	4.380	-12.611	21.371	
2 - 6	-10.080	-21.009	0.849	
2 - 5	-5.050	-16.956	6.856	

2 - 4	-2.350	-13.717	9.017	
2 - 3	0.330	-7.253	7.913	
2 - 1	2.030	-13.532	17.592	
3 - 6	-10.410	-20.118	-0.702	***
3 - 5	-5.380	-16.177	5.417	
3 - 4	-2.680	-12.879	7.519	
3 - 2	-0.330	-7.913	7.253	
3 - 1	1.700	-13.030	16.430	
1 - 6	-12.110	-28.811	4.591	
1 - 5	-7.080	-24.436	10.276	
1 - 4	-4.380	-21.371	12.611	
1 - 2	-2.030	-17.592	13.532	
1 - 3	-1.700	-16.430	13.030	

radius 39

The GLM Procedure
Least Squares Means

Coefficients for group Least Square Means

Effect	group Level 1	2	3	4	5	6
Intercept	1	1	1	1	1	1
group 1	1	0	0	0	0	0
group 2	0	1	0	0	0	0
group 3	0	0	1	0	0	0
group 4	0	0	0	1	0	0
group 5	0	0	0	0	1	0
group 6	0	0	0	0	0	1

group	y LSMEAN	Standard Error	Pr > |t|
1	235.000000	4.916255	<.0001
2	237.030000	2.230715	<.0001
3	236.700000	1.394517	<.0001
4	239.380000	3.251797	<.0001
5	242.080000	3.476318	<.0001
6	247.110000	3.065824	<.0001

Ulna 40

Group Codes: 1- St. George's Caye 5- Missouri
2- Cross Bones 6- Misc American
3- Chelsea Old Church 7- Snake Hill
4- St. Brides Lower

The GLM Procedure

Class Level Information

Class	Levels	Values
group	7	1 2 3 4 5 6 7

Number of Observations Read	14
Number of Observations Used	14
Sum of Frequencies Read	185
Sum of Frequencies Used	185

ulna 41

The GLM Procedure

Dependent Variable: y

Frequency: freq

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	2230.50278	371.75046	1.97	0.0718
Error	178	33538.86150	188.42057		
Corrected Total	184	35769.36428			

R-Square	Coeff Var	Root MSE	y Mean
0.062358	5.335464	13.72664	257.2717

Source	DF	Type I SS	Mean Square	F Value	Pr > F

group	6	2230.502781	371.750463	1.97	0.0718

Source	DF	Type III SS	Mean Square	F Value	Pr > F
group	6	2230.502781	371.750463	1.97	0.0718

ulna 42

The GLM Procedure

Tukey's Studentized Range (HSD) Test for y

NOTE: This test controls the Type I experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	178
Error Mean Square	188.4206
Critical Value of Studentized Range	4.21770

Comparisons significant at the 0.05 level are indicated by ***.

group Comparison	Difference Between Means	Simultaneous 95% Confidence Limits		
7 - 2	7.060	-13.767	27.887	
7 - 6	9.240	-6.601	25.081	
7 - 5	9.310	-4.949	23.569	
7 - 3	10.520	-1.475	22.515	
7 - 4	11.100	0.311	21.889	***
7 - 1	18.460	-2.367	39.287	
2 - 7	-7.060	-27.887	13.767	
2 - 6	2.180	-19.900	24.260	
2 - 5	2.250	-18.724	23.224	
2 - 3	3.460	-16.046	22.966	
2 - 4	4.040	-14.749	22.829	
2 - 1	11.400	-14.491	37.291	
6 - 7	-9.240	-25.081	6.601	
6 - 2	-2.180	-24.260	19.900	
6 - 5	0.070	-15.964	16.104	
6 - 3	1.280	-12.779	15.339	
6 - 4	1.860	-11.185	14.905	

6 - 1	9.220	-12.860	31.300	
5 - 7	-9.310	-23.569	4.949	
5 - 2	-2.250	-23.224	18.724	
5 - 6	-0.070	-16.104	15.964	
5 - 3	1.210	-11.039	13.459	
5 - 4	1.790	-9.281	12.861	
5 - 1	9.150	-11.824	30.124	
3 - 7	-10.520	-22.515	1.475	
3 - 2	-3.460	-22.966	16.046	
3 - 6	-1.280	-15.339	12.779	
3 - 5	-1.210	-13.459	11.039	
3 - 4	0.580	-7.365	8.525	
3 - 1	7.940	-11.566	27.446	
4 - 7	-11.100	-21.889	-0.311	***
4 - 2	-4.040	-22.829	14.749	
4 - 6	-1.860	-14.905	11.185	

ulna 43

The GLM Procedure

Tukey's Studentized Range (HSD) Test for y

Comparisons significant at the 0.05 level are indicated by ***.

group Comparison	Difference Between Means	Simultaneous 95% Confidence Limits	
4 - 5	-1.790	-12.861	9.281
4 - 3	-0.580	-8.525	7.365
4 - 1	7.360	-11.429	26.149
1 - 7	-18.460	-39.287	2.367
1 - 2	-11.400	-37.291	14.491
1 - 6	-9.220	-31.300	12.860
1 - 5	-9.150	-30.124	11.824
1 - 3	-7.940	-27.446	11.566
1 - 4	-7.360	-26.149	11.429

ulna 44

The GLM Procedure
Least Squares Means

Coefficients for group Least Square Means

Effect		group Level 1	2	3	4	5	6	7
Intercept		1	1	1	1	1	1	1
group	1	1	0	0	0	0	0	0
group	2	0	1	0	0	0	0	0
group	3	0	0	1	0	0	0	0
group	4	0	0	0	1	0	0	0
group	5	0	0	0	0	1	0	0
group	6	0	0	0	0	0	1	0
group	7	0	0	0	0	0	0	1

group	y LSMEAN	Standard Error	Pr > |t|
1	248.600000	6.138739	<.0001
2	260.000000	6.138739	<.0001
3	256.540000	2.256645	<.0001
4	255.960000	1.415795	<.0001
5	257.750000	3.431659	<.0001
6	257.820000	4.138737	<.0001
7	267.060000	3.329199	<.0001

Clavicle 45

Group Codes:	1- St. George's Caye	5- Missouri
	2- Cross Bones	6- Misc American
	3- Chelsea Old Church	7- Snake Hill
	4- St. Brides Lower	

The GLM Procedure

Class Level Information

Class	Levels	Values
group	7	1 2 3 4 5 6 7

Number of Observations Read	14
Number of Observations Used	14
Sum of Frequencies Read	178
Sum of Frequencies Used	178

clavicle 46

The GLM Procedure

Dependent Variable: y

Frequency: freq

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	171.18405	28.53067	0.40	0.8806
Error	171	12308.16620	71.97758		
Corrected Total	177	12479.35025			

R-Square	Coeff Var	Root MSE	y Mean
0.013717	5.631759	8.483960	150.6449

Source	DF	Type I SS	Mean Square	F Value	Pr > F

group	6	171.1840494	28.5306749	0.40	0.8806

Source	DF	Type III SS	Mean Square	F Value	Pr > F
group	6	171.1840494	28.5306749	0.40	0.8806

clavicle 47

The GLM Procedure

Tukey's Studentized Range (HSD) Test for y

NOTE: This test controls the Type I experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	171
Error Mean Square	71.97758
Critical Value of Studentized Range	4.21968

Comparisons significant at the 0.05 level are indicated by ***.

group Comparison	Difference Between Means	Simultaneous 95% Confidence Limits	
1 - 5	0.050	-11.421	11.521
1 - 3	0.400	-10.260	11.060
1 - 4	1.210	-8.687	11.107
1 - 6	2.280	-9.759	14.319
1 - 2	3.760	-11.062	18.582
1 - 7	4.080	-8.677	16.837
5 - 1	-0.050	-11.521	11.421
5 - 3	0.350	-7.533	8.233
5 - 4	1.160	-5.656	7.976
5 - 6	2.230	-7.437	11.897
5 - 2	3.710	-9.260	16.680
5 - 7	4.030	-6.518	14.578
3 - 1	-0.400	-11.060	10.260
3 - 5	-0.350	-8.233	7.533
3 - 4	0.810	-4.529	6.149
3 - 6	1.880	-6.809	10.569
3 - 2	3.360	-8.898	15.618

3 - 7	3.680	-5.979	13.339
4 - 1	-1.210	-11.107	8.687
4 - 5	-1.160	-7.976	5.656
4 - 3	-0.810	-6.149	4.529
4 - 6	1.070	-6.664	8.804
4 - 2	2.550	-9.050	14.150
4 - 7	2.870	-5.940	11.680
6 - 1	-2.280	-14.319	9.759
6 - 5	-2.230	-11.897	7.437
6 - 3	-1.880	-10.569	6.809
6 - 4	-1.070	-8.804	6.664
6 - 2	1.480	-11.994	14.954
6 - 7	1.800	-9.362	12.962
2 - 1	-3.760	-18.582	11.062
2 - 5	-3.710	-16.680	9.260
2 - 3	-3.360	-15.618	8.898

clavicle 48

The GLM Procedure

Tukey's Studentized Range (HSD) Test for y

Comparisons significant at the 0.05 level are indicated by ***.

group Comparison	Difference Between Means	Simultaneous 95% Confidence Limits	
2 - 4	-2.550	-14.150	9.050
2 - 6	-1.480	-14.954	11.994
2 - 7	0.320	-13.800	14.440
7 - 1	-4.080	-16.837	8.677
7 - 5	-4.030	-14.578	6.518
7 - 3	-3.680	-13.339	5.979
7 - 4	-2.870	-11.680	5.940
7 - 6	-1.800	-12.962	9.362
7 - 2	-0.320	-14.440	13.800

clavicle 49

The GLM Procedure
Least Squares Means

Coefficients for group Least Square Means

Effect		group Level 1	2	3	4	5	6	7
Intercept		1	1	1	1	1	1	1
group	1	1	0	0	0	0	0	0
group	2	0	1	0	0	0	0	0
group	3	0	0	1	0	0	0	0
group	4	0	0	0	1	0	0	0
group	5	0	0	0	0	1	0	0
group	6	0	0	0	0	0	1	0
group	7	0	0	0	0	0	0	1

group	y LSMEAN	Standard Error	Pr > |t|
1	151.860000	3.206636	<.0001
2	148.100000	3.794142	<.0001
3	151.460000	1.575432	<.0001
4	150.650000	0.848396	<.0001
5	151.810000	2.120990	<.0001
6	149.580000	2.449108	<.0001
7	147.780000	2.827987	<.0001

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