Into the Afterlife: Archaeological Excavations and Analysis of Human Remains at the Montgomery Hill Cemetery (41NV716), Navarro County, Texas

by

Rachel Feit and Willa R. Trask

with contributions by

Jon J. Dowling and Jeremy W. Pye

Rachel Feit, Principal Investigator

Prepared for

The Tarrant Regional Water District

Texas Antiquities Permit: 6103

October 2013

***AmaTerra* Environmental, Inc.**

public version

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Technical Report No. 52

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AmaTerra Environmental, Inc.

Austin, Texas

October 2013

4009 Banister Lane, Suite 300
Austin, Texas 78704

AmaTerra Project No. 220-001

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Abstract

This report documents the results of exhumation and analysis of human burials from the Montgomery Hill Cemetery (41NV716), in Navarro County Texas. The cemetery was discovered in 2009 when a recreational user of Richland-Chambers Reservoir spotted a skull laying on the exposed beach of an island in the lake. At that time lake levels were low due to drought, and as a result, more than 100 feet of previously submerged shoreline was exposed. The skull was reported to the county sheriff and after some further investigations, it was determined that the remains belonged to a probable nineteenth century cemetery. The unmarked Montgomery Hill Cemetery had been submerged during the initial inundation of the land used to create Richland-Chambers Reservoir in 1986. When lake was constructed, no one came forward to document the cemetery, and being unmarked, advance cultural resource surveys did not record it.

In late 2011 AmaTerra Environmental, Inc. (AmaTerra) was hired by the Tarrant Regional Water District, the controlling agency, to archaeologically disinter the burials from the 25 intact grave shafts documented earlier that year. Work was conducted in compliance with the Texas Health and Safety Code (Title 8 Subchapter C, Chapter 711.0105) and the Antiquities Code of Texas (ACT) under Antiquities Permit No. 6103. Over the course of December 2011 and January 2012, archaeologists exhumed the remains of 21 children and four adults. On-site skeletal analysis of the remains and associated artifacts occurred immediately following burial removal and once analysis was completed, lab personnel packaged all burial related elements (including coffin wood) and sent them to the Corsicana police department according to the conditions on the court order for exhumation. These remains were eventually re-interred in the Woodland Cemetery in Corsicana, Texas.

Analysis and background research suggests that the Montgomery Hill Cemetery was used from roughly 1865 to probably no later than 1885 to bury African American sharecroppers (and their children) working on the Prosper K. Montgomery farm. Research was never able to determine the names or identity of any of the individuals buried in the cemetery, though 1870 census records offer several clues about who some of the individuals might be. Osteological analysis of the remains suggest a population beset by poor health and nutrition, and physical trauma in various forms. Meanwhile, analysis of artifacts placed with the dead offer a small glimpse of the rich spiritual lives and belief systems of the people who lived in this area just after the Civil War. This report will summarize the on-site excavations and analysis, and discuss the implications of the findings.

Under court order (cause no. 11-20744-CV), all remains and associated artifacts were returned to the Corsicana police department and then reinterred. Therefore, there are no materials to be curated. However, the extensive records and photographs generated from this project will be permanently curated at the Center for Archaeological Studies at Texas State University in San Marcos.

Acknowledgements

The authors of this report would like to thank Woody Frossard and Darrel Andrews of the Tarrant Regional Water District (TRWD) for their assistance and patience with this project. The unanticipated discovery of human remains in Lake Richland-Chambers presented logistical, public perception, and legal challenges for TRWD, and Woody and Darrel responded graciously in every way. We would also like to thank them for their support during the field and analysis portions of this project. We would not have been able to conduct the investigations without the use of TRWD's flat-bottomed boat to transport people and remains to and from the island every day. Bob Pritchett, also of TRWD, came to the rescue on at least one occasion to transport stranded crew back to shore when winds and waves made crossing the lake too perilous for the flat-bottomed boat. The folks at the Oak Cove Marina were very helpful in providing space and electrical hookups for AmaTerra's on-site laboratory. During the course of investigations, the Marina Café was the go-to diner for AmaTerra crew. There's no better fried catfish or grilled cheese in north Texas.

The Corsicana Police Department Chief, Randy Bratton was very accommodating to AmaTerra staff, facilitating burial storage at the department until they could be reinterred at the Woodland Cemetery. Bruce McManus of the Navarro County Historical Commission was invaluable as a source of information providing critical research leads and linkages during all stages of this project. Jeanette Neal Whitcombe helped reporting by graciously donating time to digitize field drawings of burials. The GenWeb site for Navarro County, maintained by Edward Williams and Barbara Knox, is a treasury of information about Navarro County history. The detail in this report would not have been possible without this important resource. Finally we would like to thank Henry Jennings, Ola Mae Calloway, Mabel Scott, Allen Swift, B. J. Perry, Joe Bonner, Carolyn Montgomery Taylor, Lee Estes Issaacs, and Eleanor Washington for talking to us about their family histories and about Navarro County history in general. This report is all about the untold story.

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Chapter 1

Introduction

by Rachel Feit

During 2011, the State of Texas experienced one of the worst droughts on record. Very little rain fell across the majority of the state during the first six months of the year and by June 2011 record heat was already plaguing most counties. Over the course of the summer, which was the hottest one ever recorded in Texas, lakes and reservoir levels dropped drastically. This dramatic drop in lake levels profoundly impacted not just the state's water resources but, unexpectedly, the state's cultural resources as well. As a result of falling lake and reservoir levels, cultural resources that were buried long ago under water were uncovered and many were in imminent danger of looting, destruction, and other impacts as they lay exposed on beaches and shorelines.

This report documents the archaeological investigations that occurred at one such site, 41NV716 (also known as the Montgomery Hill Cemetery), which was initially discovered during the drought of 2009 along the shoreline of Richland-Chambers Reservoir (**Figure 1-1**).

The site is an African American cemetery that was not marked at the time Richland-Chambers reservoir was built in the 1980s. It was discovered in 2009 when a recreational user of the lake spotted a skull lying on the surface of Chambers Creek Island, located in the Chambers Creek arm of the lake, near Eureka. He gathered up the skull and a few other skeletal remains and brought them to the Navarro County sheriff's office. A bioarchaeologist working with AR Consultants, Dr. Catrina Banks Whitley, was called to evaluate the remains, and based on photographs of the cranium, mandible, and first and second cervical vertebrae she assessed the individual was probably male and likely of African American descent. She also concluded that based on the fragmentary nature of the remains, bone discoloration, and the absence of soft tissue, the remains were probably not part of a crime scene but related to a historic period burial. In August of 2009, archaeologists accompanied representatives of the Sheriff's department and the Texas Parks and Wildlife department to the location of the find and found numerous additional fragments of human skeleton, some roughly articulated vertebrae, and eroded pieces of coffin wood scattered across a 30 meter area of the exposed shore surface (Whitley and Skinner 2012). Further inspection of the beach found nineteenth and early twentieth century domestic debris (bottle glass, ceramics, cut nails, miscellaneous metal) exposed across the surface (**Figure 1-2**).

Archaeologists speculated that the human remains could relate to a nineteenth century cemetery, and that the individuals buried there may have been former bondsmen and women of the Montgomery family who owned this land from 1865 to the time it was acquired for the reservoir. Before formal archaeological investigations could occur to assess the beach for more burial remains, it rained and water levels rose, re-submerging the exposed shoreline.

Figure 1-1. Aerial View of Project Location.

The 2011 drought re-exposed the shoreline where the remains were found in 2009. By summer, the lake level in Richland-Chambers Reservoir was more than six feet below normal pool elevation and approximately 25 meters (80 feet) of normally submerged shoreline was

Figure 1-2. View of the beach with debris across the surface.

exposed. In July of that year, the Tarrant Regional Water District (TRWD, the reservoir's controlling agency) hired AR Consultants to survey the area where the skull was found in 2009 and look for additional remains or grave shafts related to an unmarked cemetery. The survey performed in July and August 2011 employed visual reconnaissance together with shovel scraping, hand-trenching, and use of a motorized leaf blower to identify additional remains, artifacts and grave shafts on the exposed shoreline. The survey documented additional disarticulated human skeletal elements, domestic debris, two handles, interpreted as coffin handles, and 25 rectangular to oval-shaped stains representing grave shafts. The stains were aligned in roughly uniform manner along an east-west axis.

Under the Texas Health and Safety Code (Title 8, Subchapter E, Chapter 711.010), which the Texas Legislature amended in 2009, landowners are required to record unmarked cemeteries with the County Clerk's office. In the event a cemetery is impacted by other land uses, the landowner is required to preserve the remains in place, and allow reasonable access to descendants, or disinter them under supervision of a licensed funeral director or a qualified archaeologist (Chapters 711.04 and 711.0105). Since the cemetery is currently in a reservoir and lake levels were expected to rise again in the future, the TRWD (landowner) considered several options for managing impacts to the Montgomery Hill Cemetery, including preservation in place using a concrete cap, excavation by a mortuary, and archaeological excavation. Ultimately, due to the historical aspect of the cemetery, and the difficulty of preservation in place, the TRWD made the decision to disinter the bodies with assistance from professional archaeologists working under a Texas Antiquities Permit.

The TRWD hired AmaTerra[1] to conduct the archaeological disinterment of the 25 burials identified at the Montgomery Hill Cemetery. A court order (cause no. 11-20744-CV) was obtained from the County Court to disinter the bodies. Since the cemetery is located on land owned and controlled by a political subdivision of the State of Texas, a permit under the Antiquities Code of Texas was also required.

AmaTerra conducted work under Permit No. 6103 with Rachel Feit as Principal Investigator. Willa Trask served as the Project Bioarchaeologist, leading the laboratory analysis of skeletal remains. AmaTerra Project Archaeologists Jon Dowling and Amanda Murphy worked on the field portion of this project at the Field Director level. Crew members included Antonio Padilla, Larkin Kennedy, Bruce Darnell, Noel Steinle, and Molly Palmison. Project Manager Nick Trierweiler conducted quality control inspections.

All 25 stains identified as grave shafts by AR Consultants at the time of survey were confirmed to be burial shafts. Moreover, AR Consultants' project or estimation number and location of adult vs. child burials was accurate (Whitley and Skinner 2012:22-27). Four adults were represented among the 25 burial shafts and 21 children ranging in age from fetal/pre-term/stillborn to pre-adolescent [Note: One individual was definitely pre-term.]. Osteological analysis of the adult skeletal traits strongly suggest that all were of African American or potentially had some degree of African American admixture (see Chapter 7 for additional info). The burials excavated ranged in depth from about 30 centimeters (cm) below the surface to more than a meter below surface, with most burials being about 50–70 cm below datum levels (datum was set at an arbitrary 100 meter [m] elevation). The remains were analyzed in an on-site laboratory and then turned over to the Corsicana Police Department within 24 hours of removal to be held for eventual reinterment.

Archival research, oral history, and artifacts associated with the burials suggest that the remains were probably interred during the period when Prosper King Montgomery owned the property and over the course of no more than about 20 years. All of the coffins were made with cut nails and based on this and other evidence we believe that none of the burials post-date 1885, with the earliest ones likely occurring during the early post-Civil War years.

Work began in early December of 2011. When investigations began, the lake level had dropped to more than 8 feet below normal pool elevation. Close to 50 m (150 ft) of beach was exposed, and the burials closest to the water's edge were more than 16 meters (48 feet) from it. The plan for excavations was to work for approximately 13 days before the year-end holidays, break for two weeks over the holidays, then complete the investigations over the next 12–13 days. However, an unexpectedly rainy winter turned out to be a significant challenge to completing fieldwork as planned. Over the course of investigations, which lasted through the end of January, Navarro County received approximately 11.37 inches (in.) of rain. Rain and wind both caused work delays, and muddy conditions at the site following rains hindered progress on the excavations. Lake levels began rising in late December and continued through the end of the project. A major rainstorm occurred two days before the last three burials were

1 Formerly Ecological Communications Corporation (EComm). EComm became AmaTerra in January 2012 midway through the course of this project.

disinterred, dumping several inches of rain within 24 hours. The day after the storm, lake levels rose precipitously. Areas closest to the water, where graves had already been disinterred, were already under water and lake levels were continuing to rise. The last burial was removed just as the water line began to lap against the edge of the cell around the grave (**Figure 1-3**).

Within a day of the final disinterrment, rising waters completely re-submerged the site. The hillside containing the former Montgomery Hill Cemetery is once again under water.

Remaining sections of this report include Chapter 2: Site Setting; Chapter 3: Site Background; Chapter 4: Field and Laboratory Methods; Chapter 5: Burial Descriptions; Chapter 6: Spatial and Artifact Discussion; Chapter 7: Bioarchaeological and the Montgomery Hill Population; and Chapter 8: Demographics, Health, and Cultural Expression. Two appendices are included with this report: Appendix A, by Jeremy Pye, summarizes analysis of burial container hardware; while Appendix B contains examples of the field and analysis forms used during the investigations.

Figure 1-3. The last excavated grave with a view of the rising water adjacent to it.

Chapter 2
Site Setting

by Rachel Feit

The Montgomery Hill Cemetery (41NV716) is located on the south side of Chambers Creek Island in the Richland-Chambers Reservoir, a man-made body of water filled in 1990. Prior to construction of the reservoir, this island formed a prominent hilltop overlooking Chambers Creek (**Figure 2-1**). The hilltop itself was something of an island even before the reservoir was constructed. It is surrounded by lowland floodplain or drainages on all sides. Cedar Creek runs in an easterly direction into Chambers Creek just north of the hilltop, while a smaller branch, Little Cedar Creek runs into Chambers Creeks just south of the hilltop. The cemetery was established in the center of a cluster of sharecropper houses, and was located between two small, unnamed tributaries of Little Cedar Creek (**Figure 2-2**).

Chambers Creek runs in a roughly north-south direction and eventually drains into Richland Creek, which in turn is part of the Trinity River Drainage System. Richland and Chambers Creeks are two of the largest natural watercourses in the county and are the main waterways contributing to the Richland-Chambers Reservoir. The underlying geology of the cemetery consists of Willis Point formation silty clays, sands and silts belonging to the Midway Group (Barnes 1988). This is a Paleocene Epoch formation group consisting of glauconitic mudstone interbedded with limestone and sand (**Figure 2-3**).

Individual soil mapping units within or near the cemetery include Heiden clay, three percent slopes (HaC) and Wilson Clay loam (WnC) that belong to the Crockett Wilson association. Heiden clay is typically found along ridgetops and has a sediment profile grayish brown to dark grayish brown very firm sticky clay overlaying olive to dark olive very hard and very firm sticky clay. Wilson Clay loam occupies gently sloping upland drainage-ways and consists of dark gray firm clay to a depth of about 32 inches overlaying grayish brown very firm very hard clay that is moderately alkaline (Meade et al. 1974, **Figure 2-4**).

The elevation of Navarro County ranges from 293 feet above mean sea level (amsl) in the southeast corner to 536 feet in the northwest corner. The elevation of the Montgomery Hill Cemetery is about 320 feet amsl. The temperature of Navarro County ranges from an average low of 36° F during winter months to an average high of 96° in July and August. Precipitation averages 37.74 inches per year, with a nearly year round growing season (Miller 2012).

Navarro County falls within the Blackland Prairie ecoregion of Texas. The Blackland Prairie forms the innermost of the Gulf Coastal Plains. In this region, underlying chalks and marls weather to deep, black, fertile clay soils. This contrasts with the thin, red and tan sandy and clay soils found farther east. The Blackland Prairies have a gentle undulating surface which today is cleared of most natural vegetation and cultivated for crops. The major crop was historically cotton, but over the years stockraising and sorghum have replaced cotton as the principal agricultural products (Griffith and Omernik 2013).

Prior to European settlement uplands were dominated by grassland communities consisting of eastern gamagrass, switchgrass, Silveanus dropseed, Mead's sedge, bluestems, and long-spike tridens. Common forbs included asters, prairie bluet, prairie clovers, and black-eyed susan. Lowland areas were often quite wooded and included bur oak, Shumard oak, sugar hackberry, bois d'arc, mesquite, elm, ash, eastern cottonwood, and pecan (Griffith and Omernik 2013).

During the nineteenth century buffalo still roamed the prairies of Navarro County. A formerly enslaved African American described Navarro County as having prairies "full of prairie chickens and the woods just full of every kind of wild game…. Just three miles from the [plantation] place was Fifty Mile Thicket and it was full of every kind of varmint and panther. The prairies were full of wolves and varmints (Works Progress Administration [WPA] 1936–1938). Annie Carpenter Love quoted the following from an early resident of Navarro County:

> Deer, antelope, buffalo, wild horses, bears, panthers, wolves, Mexican hogs, wild turkeys, prairie chickens were in great abundance. The deer in herds were to be seen in any part of the country. The antelope were not so plentiful as on the plains. The buffalo came and went like a mighty torrent. They always traveled against the wind even though it carried sleet and snow. The wild horses were seen in droves of from two to fifty. There were a great many on the prairies but more to be found in the cross timbers. Bears prowled around the thickets and the panthers' wild screams and howling of the wolves made night thrilling. The wolves in those days were large and known as the loafer. They gradually disappeared and gave way to the little common prairie wolf of later years. The creeks and branches did not dry up then as they do now and fish were plentiful. Honey from wild bees was plentiful and about the only sweetening the settlers had. The lack of salt was a great trial as it was hard to obtain…. There were no roads and [people] traveled over the country by water course and by prominent objects such as lone trees, clusters of trees and points of timbers. (Love 1933:103–104)

It was within this same setting that the Montgomery Hill cemetery was established, likely sometime after about 1865.

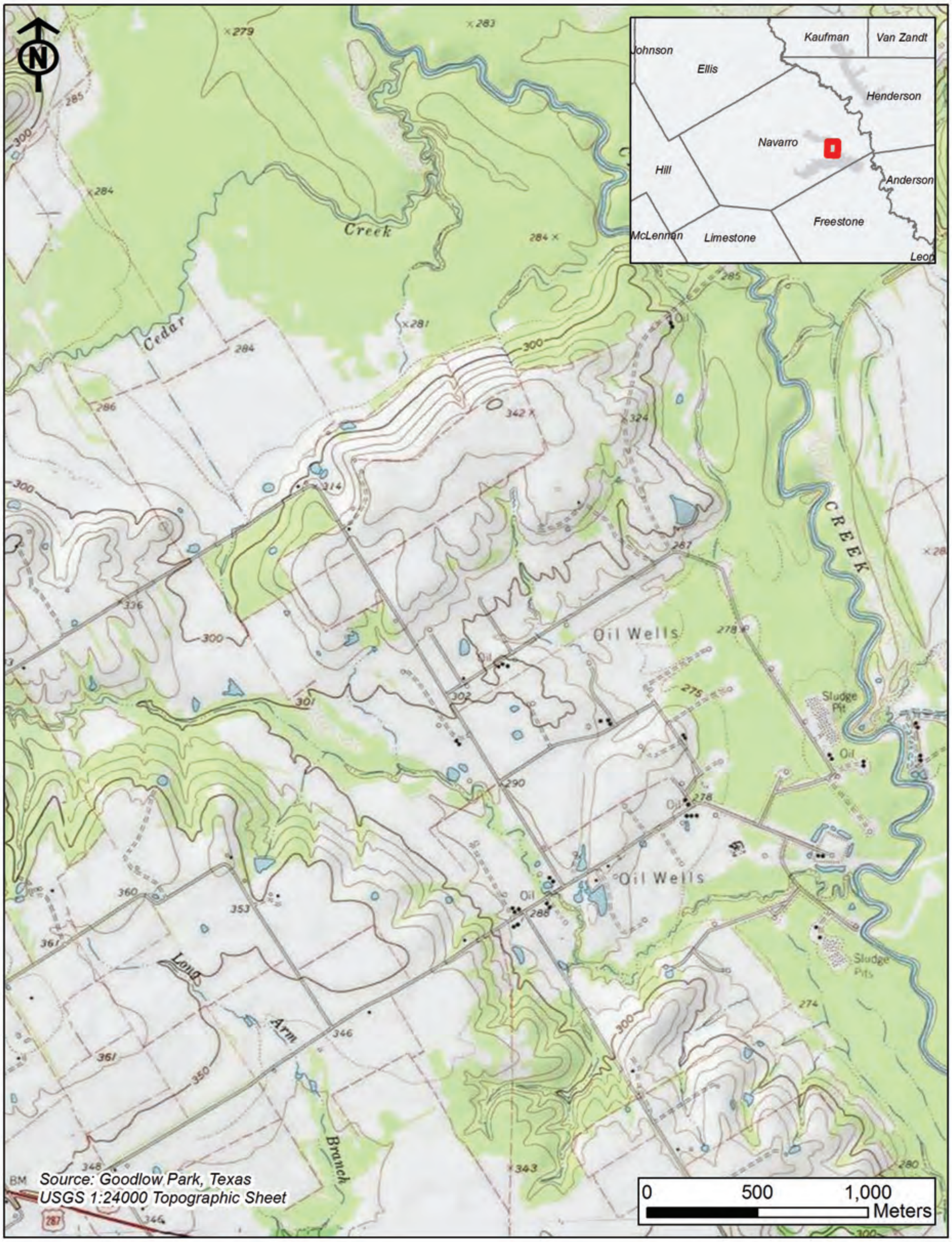

Figure 2-1. Montgomery Hill Cemetery on the 1978 Goodlow Park 7.5 minute USGS topographical map.

Figure redacted due to site-sensitive information.

Figure 2-2. 1970 aerial photograph showing the Montgomery Hill area and soil units from the USDA, SCS soil map, published in 1974.

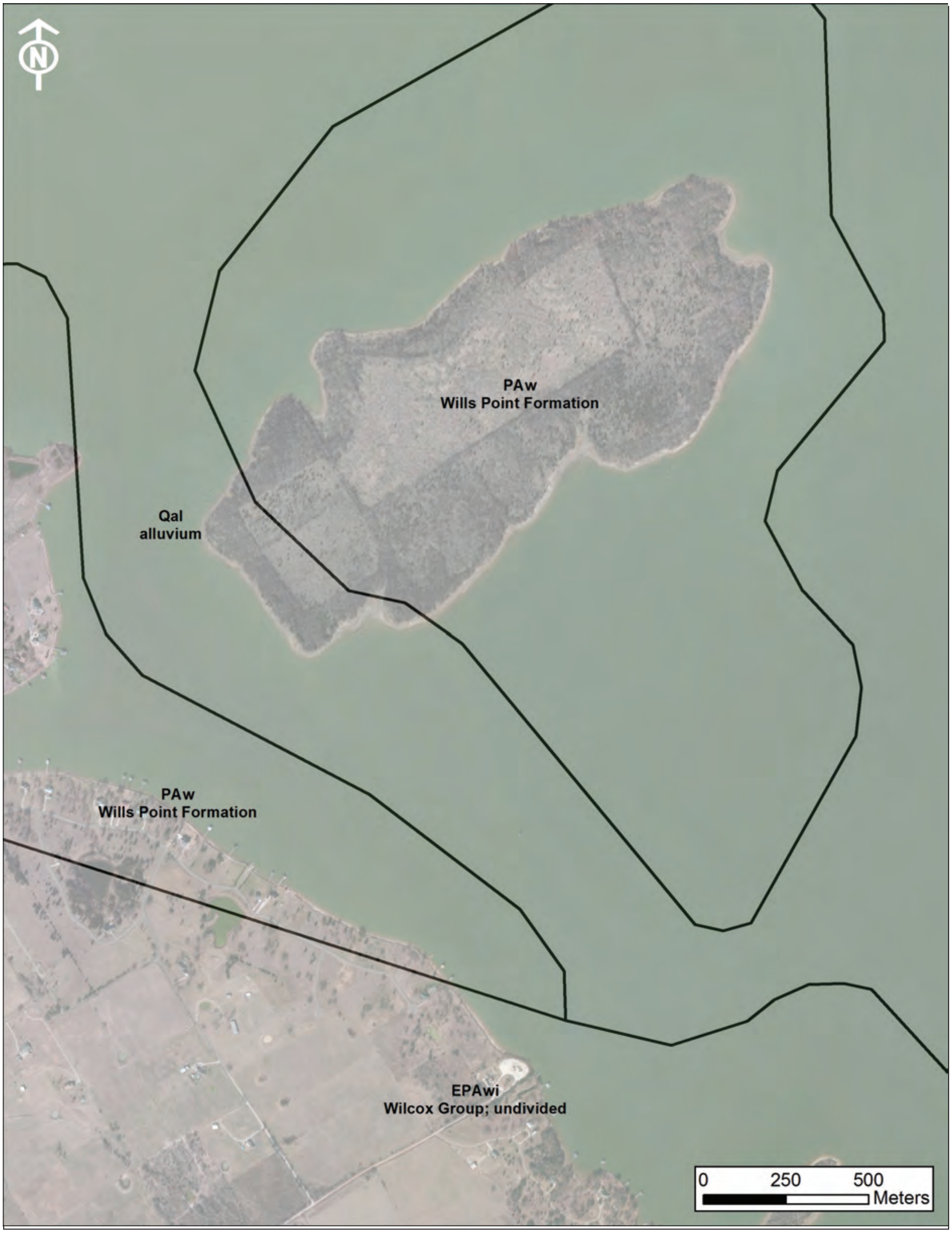

Figure 2-3. Underlying geologic formations near the cemetery.

Figure 2-4. Soil map units near the cemetery.

CHAPTER 3
SITE BACKGROUND

by Rachel Feit

HISTORICAL BACKGROUND

Prior to European settlement, the area now encompassing Navarro County served as the hunting grounds for Comanches, Kickapoo, and Ione Indians among others. Buffalo and small game were abundant at that time, particularly along Chambers and Richland Creek (Taylor 1965). The earliest settlement was Spring Hill in the western part of the county, established by Indian agent, Washington Hill, in 1836 as a trading post. This became a base-camp for surveying parties that began platting land in 1838. Among the early surveyors to visit the county, several eventually stayed, establishing farms and businesses. These included William Henderson, William M. Love, and Barzillai J. Chambers. Throughout the Republic of Texas period European settlement in the county was extremely sparse. Land west of Trinity River was considered Indian territory and the prairies domain of Indian tribes. Skirmishes between the plains tribes and European settlers and surveyors were frequent. Among these skirmishes was the famous Battle Creek Fight, which took place in October of 1838 when 25 surveyors were attacked by 300 Kickapoo tribesmen and women near the present town of Dawson. A year later William Love and 40 other men were involved in a running battle with Indians (Love 1933).

With statehood, the pressure to expand territory westward solidified. Navarro County was formally organized in 1846, when settlers of Porter's Bluff (then called Taos) and Dresden petitioned the state to form a new county from lands in what was then part of Robertson County. The petition was successful and the new county was named after Jose Antonio Navarro, who was instrumental in convincing the legislature to create it. Two years later, a permanent county seat was established midway between Porter's Bluff and Dresden and named Corsicana, after the island of Corsica, where Navarro's father was born. The city was platted and the first town lots were sold in 1848. Navarro County originally occupied a much larger area than it does presently, and between 1846 and 1866 Limestone, Ellis, Tarrant, part of McLennan, Hill, Johnson, Parker, Palo Pinto, and Hood counties were formed from it (Miller 2012).

The earliest settlements within the present-day limits of the county were trading posts such as the ones at Spring Hill and Dresden in the western part of the county, or occurred mainly along the Trinity River. The Trinity River served as an important transportation corridor and some of the earliest towns, such Taos and Bazette were built along its banks. Steamboats landed at these ports, bringing goods from Houston or Galveston to the remote western communities of Navarro County. The earliest settlers built their homes close to the creek and river bottoms, to take advantage of reliable water and the rich alluvial soils. The higher elevations and prairies were unoccupied. Instead these were used exclusively as grazing lands for cattle. By the 1850s, rural communities included Richland Creek, Pisgah, Chatfield, Springhill, Dresden, Wadeville, Taos, Bazette, and Rural Shade among others (Love 1933). In 1850, Navarro County had a population of 2,190 people, 247 of which were enslaved blacks. By 1860, the white population of the county more than doubled to 4,105. The enslaved black population, meanwhile, had risen nearly ten-fold, to 1,920, accounting for more than a third of the population (Miller 2012).

The town of Eureka, close to Site 41NV716, emerged around the time of the Civil War and was among a number of Texas communities whose population increased as a result of families fleeing from the war and its aftermath. One of the earliest families to settle in Eureka was the family of James Dunn. Dunn built a small schoolhouse on his property, known as the Dunn schoolhouse, and a farming community coalesced around it beginning in the 1850s. Other families that formed the Eureka community included the Andersons, the Johnsons, and the Davidsons, all of whom are listed in the 1860 census for this general area of Navarro County. A number of families arrived during the Civil War and its aftermath to escape the destruction and economic collapse that occurred in other parts of the south. Prosper K. Montgomery and his family were among these Civil War refugees to begin their new lives in the Eureka area. Like all rural communities at the time, houses were spread out and relatively isolated from urban centers. The trip to Corsicana and back took two or three days in a horse-drawn cart. Economic activity centered on growing cotton and corn. Walker Davidson built the first cotton gin run by horse and mule power (Montgomery 1961). Grange meetings were held in the Dunn schoolhouse, and at one of those meetings in 1870 residents decided to apply for a community post-office, naming the town "Eureka (Love 1933)."

The new post office was located south of the present day townsite and mail came once a week (Love 1933, Montgomery 1961). The town never grew to any significant size though by 1885 it did have two gristmills and cotton gins, two churches, a school and a post office. Though small, Eureka was a fairly typical dispersed rural community for that time.

People entertained themselves with picnics, square dances and tournaments. These latter events were patterned after Medieval jousting tournaments in which participants got the chance to show off their horsemanship skills. Whitney Montgomery described them as such:

> The tournaments that we knew were conducted by having the participants ride down a straight line of tall posts, spaced about twenty yards apart, and attempt to snatch a ring, which was suspended from the arm (extending from the post) by a clothespin. The young men came from far and near to participate in the sport. The participants were called "knights," and bore names which in some way represented the community or county from which he came. Each knight was garbed in fancy costume (Montgomery 1961).

History of the Property Encompassing the Montgomery Hill Cemetery (41NV716)

The property encompassing the Montgomery Hill Cemetery (Site 41NV716) was part of a tract of land the remained in one family—the Montgomery family—from the 1860s to the early 1980s, when it was finally sold to construct Richland-Chambers Reservoir. The land was originally patented by Iredell Redding in 1845, then granted to William M. Love by a special act of the Legislature on February 8, 1860 (**Figure 3-1**).

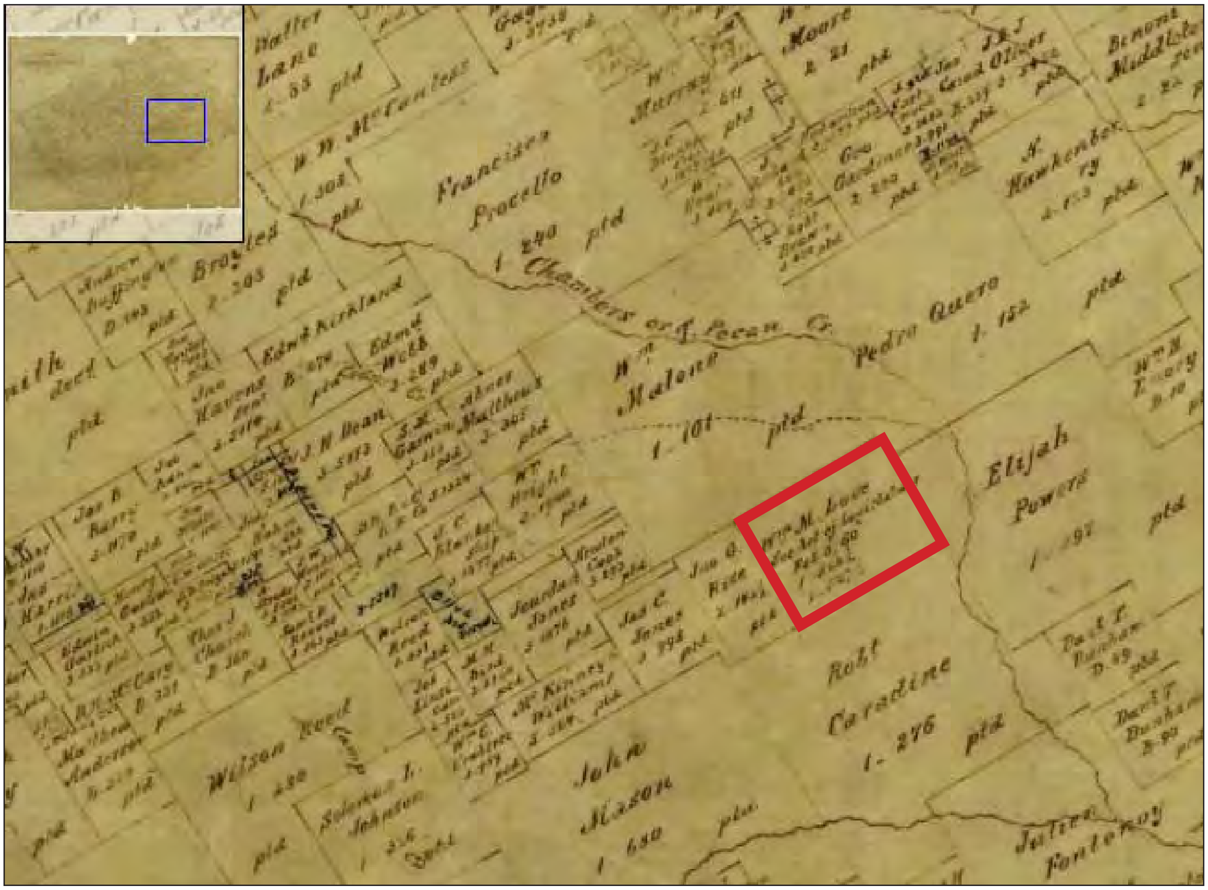

Figure 3-1. Detail from general land office patent map showing the Love survey, outlined in red. (Screenshot from General Land Office website)

Love was a surveyor and an early settler of Navarro County who also participated in a number of early Indian battles, including the Battle Creek fight of 1838 near Dawson (though technically he left to retrieve a surveying instrument before it started). He was well-known in Navarro County and was a member of the committee that petitioned to formally create the county from Robertson County in 1846. He was one of its wealthiest residents in 1860, owning land valued at $60,000 (US Census 1860). He was also a controversial figure. In 1855, Love was arrested and charged with the murder of a physician, Dr. William Anderson; but eventually he was acquitted due to lack of evidence (Dixson 2012). He resided on Richland Creek, southwest of Site 41NV716. He died in 1873 in Navarro County.

It is not entirely clear when Love disposed of the Redding patent, nor how he used the land during his period of ownership. Deed records do not document when he sold the land. However, sometime prior to 1865 he sold land on Pecan Creek (now known as Chambers Creek) within the Redding patent to Samuel Chambliss and his wife Jane, then of Ellis County. Chambliss had recently come to Texas from Louisiana following a stint in the confederate army (Miller and Hamilton 2013) . In 1865, The Chamblisses sold the same 635 acres on Pecan Creek to their son-in-law, Prosper King Montgomery (Jr.) and C. P. Brigham (Navarro County Deed Records [NCDR] Q/183). The following year, Montgomery acquired more land adjacent to this tract known as the "Croft Place (NCDR Q/372)."

Both Prosper K. Montgomery and his wife's parents, Samuel and Jane Chambliss, came from the Mississippi-Louisiana border where their family connections ran deep. The Montgomery and Chambliss families were close neighbors, relatives by marriage, and business associates along the Mississippi-Louisiana border for many years prior to Prosper's marriage to Ruth Chambliss. The Montgomerys, headed by Prosper King Montgomery Sr., were large plantation owners who lived in Jefferson County, Mississippi; while Samuel J. Chambliss, also a plantation owner lived across the border in Carroll Parish Louisiana. Both families had married into the Darden family, wealthy planters in Mississippi. Meanwhile, Prosper Montgomery Sr. and S. L. Chambliss' brother, John S. Chambliss, were co-executors of the Estate of Hiram Baldwin, who died in 1851, leaving a will stipulating that his enslaved laborers should be freed, each given $150, and sent to Liberia. Their joint 1852 petition to the probate court of Jefferson County, Mississippi requesting that they be allowed to manumit Baldwin's enslaved laborers was denied (Schweninger 2008). Good intentions regarding the Baldwin estate aside, both the Montgomerys and the Chamblisses were owners of large plantations in Louisiana and MIssissippi worked by enslaved laborers. Montgomery Sr. had 139 enslaved persons working for him in 1860, while Samuel Chambliss had 116 enslaved persons working for him (Rudd 2012 and Blake 2001). The John S. Chambliss plantation in Jefferson County Mississippi had 107 enslaved persons. In fact, according to the 1860 slave censuses, the two families were among the largest slave holders in the area.

Prosper K Montgomery Jr. was born in 1836 as the fourth son of Prosper Montgomery Sr. and his wife Maria Lanier Darden. The couple had 12 children in all, 11 of whom survived to adulthood. In November of 1856, the 20-year old Prosper Montgomery Jr. married Ruth Chambliss, who was just 16 years old at the time. Their marriage was recorded in Claiborne County, Mississippi, an adjacent county from where the Montgomerys lived, suggesting that the marriage may have been something of a hasty elopement. In 1860, Prosper K. Montgomery Jr. and his wife, Ruth lived in Carroll Parish Louisiana with their three-year old daughter, Mary. Mary's age at the time of the 1860 census also suggests Ruth may already have been pregnant at the time of her wedding. Prosper listed his profession in the 1860 census as "Planter" with real estate holdings valued at $10,000 and personal property valued at $18,000, making him well-off, though by no means among the richest planters in the neighborhood.

According to the 1860 census, Montgomery Jr. owned no enslaved blacks at the time, though it is not clear how he managed to run his Carroll Parish plantation without them. In 1862, Montgomery joined the Confederate army, where he was wounded in the Battle of Vicksburg and then paroled. Shortly after his parole Prosper King Montgomery arrived in Navarro County with his wife Ruth and their young daughter. In November of 1865, Ruth's parents sold 635 acres near Pecan Creek to Prosper Montgomery Jr and C. P. Brigham.

Other than deed records, the first mention of Prosper Montgomery in Navarro County records occurs in tax receipts for 1865 (Navarro County Tax Roll 1865). Tax records for that year show that the value of Montgomery's land was $1,694. Montgomery owned two horses, and had personal property valued at $2,934. The difference between the value of his Carroll Parish property in 1860 and his Navarro County property in 1865 is striking. Over the next several years Montgomery was able to acquire additional tracts of land on adjoining parcels. For instance, in 1866, William Croft sold 825 acres of land to Montgomery's wife Ruth (NCDR Q/372). This property encompassed land to the north and east of the original 635 acres. No further mention is made of Montgomery's partner C. P. Brigham in any subsequent real estate transactions, nor is his name listed in any of the censuses for Navarro County, so it can be assumed that Brigham was a silent and absent business partner.

Ruth Chambliss died on March 9, 1867. She was buried in the Dunn cemetery near the Montgomery farm, about a mile south of the present day town of Eureka. Prosper remarried in 1868. His new wife, Margaret Cook, was 33 years old and had recently come to Navarro County with her father. The couple had three children: Walter, Whitney, and Naomi. By 1872, Montgomery's land holdings encompassed 950 acres. However, the taxable value of his possessions had not significantly increased. Real estate value for that year was only $390 and his personal property was worth just $1,095 (Navarro County Tax Roll 1872). He owned three horses, three cows, and nine mules. The low value of his property probably reflected the economic depression much of the state suffered during the post-bellum Reconstruction years. By 1880 the value of his property (the same property described in 1872) had risen again to more than $3,000 and personal property was valued at $4,000 (Navarro County Tax Roll 1880).

Despite large landholdings, Prosper K. Montgomery never became a wealthy man, and the family remained anchored in the Eureka farming community throughout the nineteenth and twentieth centuries. His son, Whitney Montgomery, recalled of his childhood that, "there was very little cash money in those days, and if we managed to pay our grocery bill at the end of the year we felt that we had done well (Montgomery 1961)." Most of their food was grown or raised on their farm. They supplemented their domestic meat consumption with wild game and fish (Montgomery 1961).

Prosper King Montgomery Jr. died in 1896 and was buried in the Eureka Cemetery. His land was divided among his four living children, Mary Montgomery Blair, Naomi Montgomery Davidson, Whitney, and Walter, all of whom still lived in the community or close by. His children and grandchildren grew up on the Montgomery farm. The land encompassing Site 41NV716 became the property of Walter Montgomery and ultimately the TRWD acquired the land in 1981 (NCDR 972/821).

Although population and development steadily increased during the late nineteenth century, the area around Eureka and the Montgomery farm, known as Montgomery Hill, remained remote well into the mid-twentieth century. The railroad, which first arrived in 1871 to connect towns in Navarro County to other parts of the state bypassed Eureka. As late as 1940, US 287 linking Eureka with Corsicana was the only improved road in the Eureka community (**Figure 3-2**).

Figure 3-2. 1940 County Highway map detail showing the area around Eureka and the Montgomery farm.

All other roads around Eureka were unimproved dirt roads. The 1920 census referred to the road running across the Montgomery farm to Chambers Creek as "Camp Lookout Road," suggesting isolation. In fact, the area was so secluded that legendary gangsters Bonnie Parker and Clyde Barrow frequently used the Montgomery land as a hideout. Clyde's uncle, Frank Barrow, owned land adjacent to the Montgomery farm and the two lovers would rendezvous at the Eureka cemetery (TxGenWeb 2012b).

The biggest change to the community came at the end of the nineteenth century when oil was discovered in Navarro County near Corsicana when workers attempted to drill a new water well. The 1894 discovery of oil was the first major discovery in Texas. It brought new prosperity to many of the old landowners, eventually including the Montgomery family. New oil wells around Corsicana followed rapidly and by 1898 there were 342 additional wells in the Corsicana field (Smith 2012). This attracted significant economic investment in the county, and population swelled as a result. In 1923, an even larger oil deposit in the Powell Oil field, six miles southeast of Corsicana, was discovered. The oil boom created new communities where only farmland previously existing and propelled the county economy well into the twentieth century (Batton and Putman 1987). Oil exploration extended into the Eureka area as well. The 1958 USGS topographical map indicates that the valley at the confluence of Little Cedar and Chambers Creeks, just south of Site 41NV716, was dotted with oil wells (**Figure 3-3**).

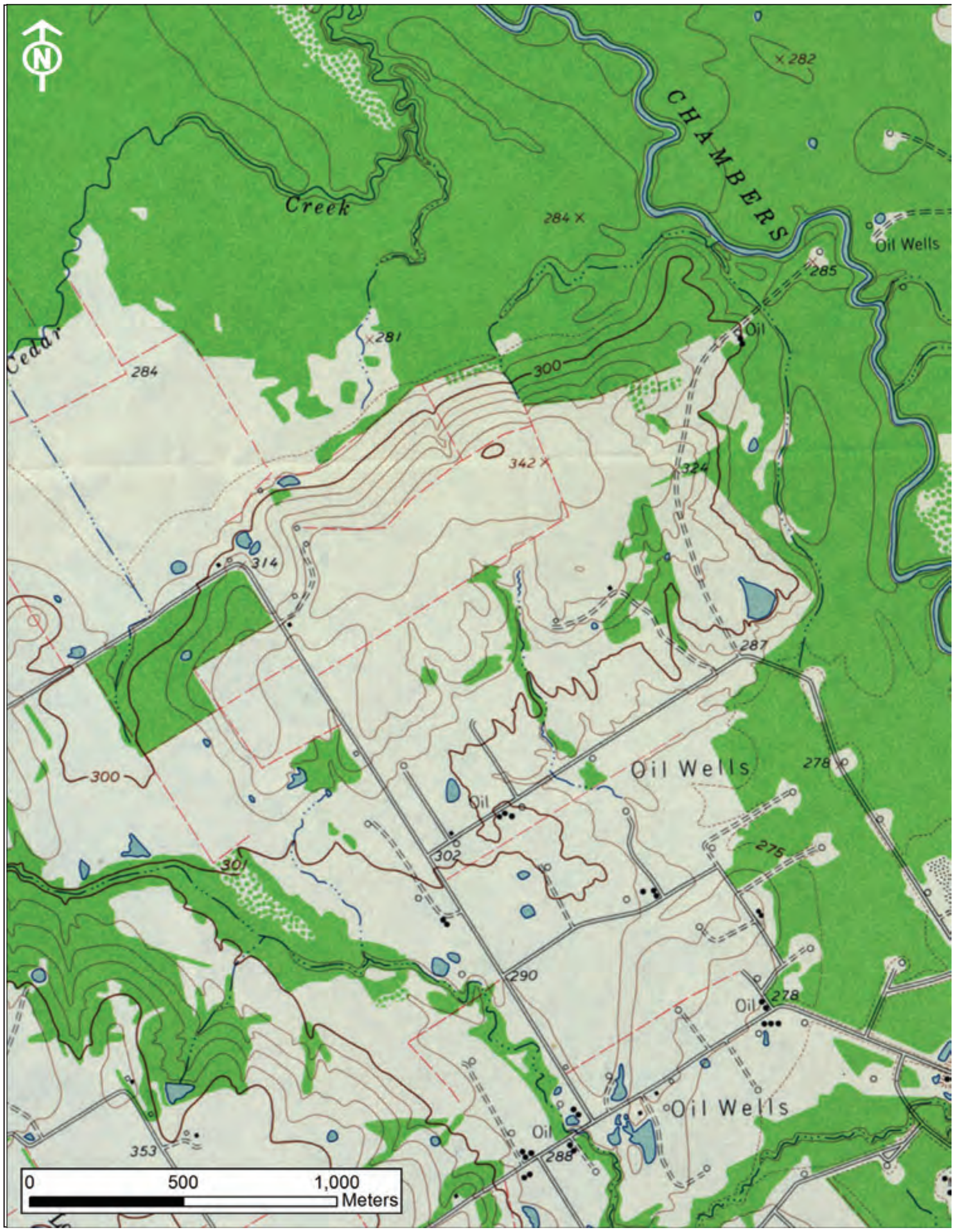

Figure 3-3. Detail of the 1958 Goodlow Park USGS 7.5-minute topographical map showing the hilltop around the Montgomery Hill Cemetery and oil wells to the south.

The African American Community

On the eve of the Civil War, the Navarro County economy was almost entirely agricultural and relied heavily on enslaved labor. About 90 percent of the black population resided on farms and plantations outside the county seat in Corsicana. In 1860, enslaved blacks accounted for a little more than a third of the total county population. However, the race-based bondage labor system in Navarro County was only about a decade old at that time. In 1850, enslaved blacks accounted for only 11 percent of the total population, but in the decade before the Civil War, the system of slavery became critical to the growth and development of the county. Not surprisingly, all but three of the county's eligible voters chose to secede from the Union in 1861 and join the Confederate States.

It is unclear whether an enslaved population lived around Site 41NV716 prior to 1865, when Prosper K. Montgomery Jr. purchased the land. Certainly, by 1860 many of the county's enslaved blacks lived and worked on farms near Montgomery Hill. For instance, the Ingram family, headed by four brothers Washington, Hugh, James and Anderson, collectively owned more than 250 enslaved blacks, were the largest slaveholders the county, and among the largest slave holders in the state (US Slave Census 1860, Campbell 1989). They lived a few miles southeast of Montgomery Hill, on the east side of Chambers Creek, in the Rural Shade community. Many of Eureka's early settlers were also slave owners, including James Dunn, who owned 14 enslaved laborers in 1860, and the Davidson family, who had 34 enslaved laborers in 1860 (US Slave Census 1860). William Love, who owned the Iredell Redding tract prior to Montgomery, had 10 enslaved laborers working for him in 1860, but likely those enslaved blacks lived and worked near Love's residence along Richland Creek.

What is certain is that based on Montgomery's 1865 purchase date of the Iredell Redding survey, Montgomery could not have had any enslaved laborers working on his property during his period of ownership. Nonetheless, the fact that he and his wife both came from large slave-owning plantation families, suggests that they probably did bring some enslaved laborers to Texas with them if they arrived before 1865. Certainly, Ruth Montgomery's parents, the Chamblisses, in their flight from Louisiana to Texas during the Civil War, must have brought some enslaved laborers. Census records from 1870 indicate a number of black residents over 10 years in age living around Prosper Montgomery, including two families whose surnames are Montgomery, and whose birthplace is given as either Mississippi or Louisiana (US Census 1870). It is likely that some of these individuals were connected through slavery to the white Montgomery and Chambliss families at one time.

Following the Civil War, enslaved blacks were theoretically free to live and move about at their own will. However, the reality for blacks in the post-war south was often quite another matter. In some cases, enslaved laborers were not aware that the Civil War ended until months later. In Texas, there were a number of instances where white landowners managed to coerce or forcibly hold black laborers on their farms well after emancipation. This was the case for a young boy in Hunt County, who was held in bondage until 1866 by Robert Lee (Smallwood, Crouch, and Peacock 2003). Another enslaved black laborer, Wash Ingram, of Carthage, Texas reported that he and the other 350 enslaved blacks on his plantation were not emancipated until a year after the war ended (WPA 1936–1938).

However, in most instances, whites found legal means of keeping black laborers on their plantations. Post Civil War governments moved swiftly to enact "black codes" intended not just to restrict freedom of movement, association and employment, but also to support a new system of political and economic disenfranchisement based on racial segregation. Miscegenation laws made interracial marriages illegal, vagrancy laws ensnared landless and newly homeless blacks in county jails, while contract labor laws forced blacks into employment on unfair terms. Although Texas enacted legislation in 1866 that reaffirmed the basic freedom and rights of blacks in Texas, older statutes deliberately left in place prevented blacks from holding office and testifying against whites in a court of law. Other legislation passed in 1866 included a law requiring blacks and whites to sit in separate rail cars. An education law prohibited distribution of funds to black schools, while a homestead law guaranteed 160 acres of public land for whites, but excluded blacks (Moneyhon 2011, Sitton and Conrad 2005).

While slavery legally ended a system of forced race-based bondage, a system of structural racism was created in its place. This wrought deep divides and social imbalances throughout the south, resulting in disenfranchisement and outright terror for many families. Like so many Texas counties that were heavily invested in the slave economy, black emancipation and the enforced military Reconstruction that followed was a bitter pill for white landowners, and whites often retaliated with fear and violence. Even before the war began, the Corsicana and Navarro county papers zealously reported incidents of armed slave uprisings, and cautioned readers to check their slave quarters for hidden weapons (*The Navarro Express* 1860). Vigilante terror groups like the Ku Klux Klan and others, killed hundreds of blacks and white Union sympathizers during the post-Civil War period (Crouch 1992). Between 1865 and 1868 alone, there were 1,500 documented acts of violence committed by whites against blacks across the state of Texas (Glasrud and Smallwood 2007).

Navarro County saw its share of race-based violence after the war. One white historian remarked that white vigilante-ism (and the Ku Klux Klan) in Navarro County “was relatively quiet and seems to have confined itself mostly to demonstrations that impressed the superstitious minds of the former slaves (Putnam 1974).” This may have been the perspective from white residents of the county. Nonetheless other records, such as newspaper accounts and Freedman’s Bureau notes suggest white vigilante groups managed to regularly intimidate and persecute blacks who they believed to be guilty of wrongdoing. In Pisgah in 1868, for instance, Federal Troops came to arrest John Wesley Hardin, Frank Polk and Simp Dixon for the murder of a black boy and for Ku Klux Klan activity. This resulted in a gun battle in which two officers were killed. Hardin and Dixon went on to become well-known anti-Unionist vigilantes and outlaws, killing a number of Union and Reconstruction sympathizers during the next decade before finally being captured. In the same year, James Haynes reported to a Freedmen’s Bureau agent that a black minister named Dick Crowder was hanged by three white men in Navarro County (TxGenWeb 2012a).

In an incident in 1869 in Navarro County, a black woman named Mary Flint was assaulted by a white man named Thomas McQueston (also spelled McQuiston). In retaliation, Frank Flint beat McQueston and injured his leg. Dr. William J. Love treated McQueston and testified to the injury. A group of white men then formed a search party to find and kill Flint. Along the way they interrogated a black couple, John and Mary Riggs, severely beating them with pistols. They then dragged another black man by the name of Sharper out if his bed in the middle of the night and dragged him to the courthouse where they questioned and also beat him in the effort to find Frank Flint. The incident was reported to the Freedmen’s Bureau headquarters in Waco. Meanwhile a cadre of white citizens attempted to have the Freedmen’s Bureau agent J. H. Lippard removed from the Chairman’s seat on the Board of Registers in Navarro County for his role in aiding the black victims. (Crouch Collection 2012).

The tumultuous post-bellum period eventually stabilized in the 1870s and labor coalesced around a system of sharecropping that ultimately became the dominant form of wage-earning among blacks in rural Texas. Navarro County was no exception. Under the sharecropping system a landowner would provide the tenant a house, furnishings, tools and all the seed and stock up front to farm on his land (or a portion of it). The farmer would then repay the landlord up to half of the cash value of the crop once it was harvested. Plantation owners benefitted from this system because it provided inexpensive labor and chronic indebtedness that kept black tenants tied to their land for lengthy periods (Sitton and Conrad 2005). But many freed blacks also liked this system because it did offer independence and hope for future gain. Indeed, through the sharecropping system many black families eventually earned enough to buy their own farms and inevitably these black-owned farms would evolve into African American enclaves sometimes referred to as Freedom Colonies (Sitton and Conrad 2005).

Pelham, in the northwest part of the county, was one such black community that became a focal point for African Americans in Navarro County. This post-bellum Freedom Colony located five miles west of Corsicana was carved from wilderness. Pelham was founded in 1866 by black freedmen on unclaimed creek bottom land around the confluence of Richland, Ash, and White Rock Creeks. Here freedmen cleared trees, pulled stumps and burned brush to create a new self-sustaining all-black farming community (Sitton and Conrad 2005). The Pelham community had its own churches, schools, and graveyards as well as an elaborate annual Juneteenth day celebration that was well known for its festivities (Swift 2012). Pelham also benefitted from the oil boom in nearby Corsicana. In fact, so many of Pelham's black men went to work in the Corsicana oil fields that they were able to sustain their own newspaper called the Oil City Afro American which ran from 1898 to 1901.

Other sharecropper communities sprang up around the plantations owned by former slaveholders, and, like Pelham, they evolved into self sustaining communities where blacks were able to own their own farms and live relatively free from white interference. Elm Flat, Rural Shade, and Chatfield, for instance, eventually became largely black communities with all-black churches, schools, and businesses. The Elm Flat and Rural Shade black communities grew out of the Ingram Plantation where black freedmen stayed on for nearly three years after emancipation (Interview with Calvin Moye, WPA 1936–1938). Mable Scott, who grew up in Elm Flat commented that "we didn't have to go outside the community for anything but clothing (Scott 2012)." And as children grew older they "stayed around and farmed the land." Chatfield grew out of the Hodges Plantation. According to Allen Swift, a descendant of the enslaved workers on the Hodges plantation who grew up near Chatfield, "there is so much [black] history that you will not ever find [in Navarro County]." He was referring to the fact that whites mainly lived along the main roads, while "black communities were always off the main roads, down a dirt road, around a bend.. you know… hidden (Swift 2012)." But his words also have a deeper meaning; black history in Navarro County is largely invisible. There are no books about it, and few primary records documenting their lives during and after slavery.

In the Eureka area black sharecroppers coalesced around the Montgomery farm and more specifically around the hilltop overlooking Chambers Creek, where 41NV716 is located (**Figure 3-4**).

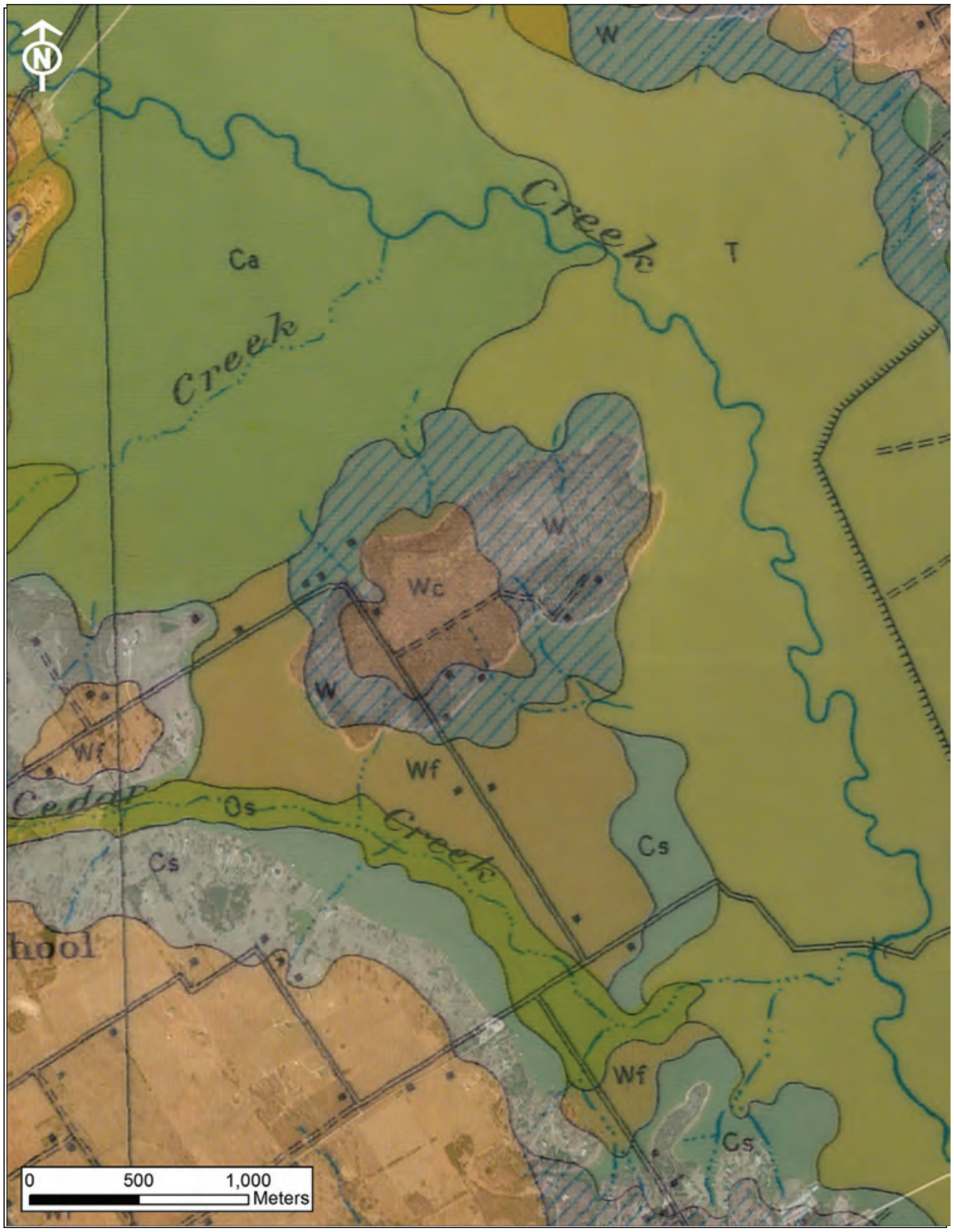

Figure 3-4. 1920 Soil Survey map overlay on a modern aerial photography. This map depicts what were sharecropper houses encircling the location of the cemetery.

Henry Jennings, born around 1940, was the son of one such sharecropper. His great-grandmother on his mother's side, Winnie Foreman (né Cole) was born on the Montgomery farm around 1865 (according to Jennings) and she remained there until her death in 1947. Winne's father, Samuel Cole, was 28 years in 1870 and came from Mississippi (US Census 1870). It is possible that he was at one time an enslaved laborer for Prosper Montgomery or the Chambliss family, as Montgomery too was from Mississippi. In fact, a descendant of Cole's, Ola Mae Calloway, claims that her great great grandmother (Sam's wife) was brought by Montgomery to Texas as an enslaved laborer (Calloway 2012). Between 1870 and 1940, the black community around the Montgomery Farm remained relatively stable. Some of the names of black families that appear in multiple census years forming the core of the community include Algood, Washington, Williams, Evans, Carter, Foreman, Davidson, Turner and Hawthorn. According to Henry Jennings, the Hawthorns and the Turners were related to his family through his mother's side (Winnie Foreman), suggesting a certain amount of matrilineal stability. Women, it seems, tended to remain within the community of their birth and married men from outside the community. He remembers the (African American) Davidson family as founding members of the community. These same Davidsons were likely formerly enslaved, or descendants of formerly enslaved blacks on the white Davidson farm, located slightly west of the Montgomery farm.

Though the community remained stable for many years, it was not without racial strife. Various historical accounts suggest a disparity between white perceptions about race relations and race relations as they were experienced by blacks. As a result, published narratives documenting Navarro County history rarely address the issue of racism, and certainly never address race-based acts and threats of violence. Whitney Montgomery wrote this about race relations in Eureka in 1961:

> In my boyhood days there were as many negroes as there were white people in the Eureka community. The whites and negroes lived amiably together, however the negroes fought amongst themselves, and sometimes killed each other. I doubt if there are more than ten negroes who now live in the Eureka community (Montgomery 1961).

Newspaper accounts and former slave narratives suggest another story. Lu Lee of Blooming Grove recalled:

> "The Ku Klux Klan and the Paddyrollers was all around doing meanness. They were just as ornery as the policemen are now. …they think they is smart big mens when ten of jump on a pore nigger and beat the life out of him. Negroes had to lay mighty low. Their life ain't worth a five cent piece (WPA 1936–1938)"

Mattie Gilmore's account of Corsicana shortly after the war is similar:

> "De Ku Klux Klan use ter be a dreadful thing right after de war. Dey would go roun in der long white robes and whip de niggers and sometimes rob dem of everything dat dey had. Der use ter be lots of dem but I aint heard so much of dem in de las few years (WPA 1936–1938)".

In 1895, a Eureka native, Nelson Calhoun was lynched and murdered (without a trial) by a mob of white men for allegedly attacking a white woman (*Austin Daily Statesman* 1895). Calhoun grew up not far from 41NV716 and was the fifth son of black sharecroppers who probably worked on the nearby Davidson farm. Members of his family are buried (and it is possible he himself is buried) in the Friendship Baptist Cemetery near Eureka. The truth of the incident may now never be known. However, it has been well-documented that blacks were falsely arrested and disproportionately incarcerated in state prisons for minor infractions during the Reconstruction and Jim Crow eras (McDavid et al. 2012). One has only to look at the rolls of the Navarro county jail in 1900 to see that every single inmate was black (US Census 1900). One would be hard-pressed to imagine that only African Americans were guilty of wrongdoing at that time, and it is not difficult to conclude that many of those inmates were serving unjust sentences.

In an even more gruesome episode than the Calhoun incident, in 1901 a black man, John Henderson, was snatched from police custody in Waco by a white vigilante group from Navarro County, and then oiled and burned at the stake in front of the courthouse in Corsicana after he confessed to the murder of the wife of Conway Younger (*Dallas Daily Times Herald* 1901). The incident was witnessed by a mob of angry white citizens. When the coroner held an inquest into the lynching of Henderson, the presiding white judge found that the "punishment was fully merited and commendable." In a less violent, but equally threatening incident in 1921, when black cotton pickers of Blooming Grove threatened to strike over wages, the Klan posted a public notice effectively warning that anyone refusing to work for the wages offered would be murdered. Would-be strikers returned to work without receiving any increase in wages (*Corsicana Daily Sun* 1921).

To whites, such violent incidents may have seemed relatively forgettable, but for blacks in Eureka and Navarro County these and other undocumented violent acts engendered an atmosphere of deep fear and distrust. Most blacks in Navarro County simply learned to avoid all confrontation in matters of race, and limit interaction with whites. Through black codes and Jim Crow laws, Navarro County, like so many southern communities, became entrenched in a system of segregation that persists today. In fact, during the interviews conducted for this project, when asked specifically about racism, most black informants simply changed the subject. Though people acknowledged that racism was a problem for them at one time or another, most black informants were unwilling to go into any detail and none were willing to talk about specific incidents, though some hinted that they knew about them. "It should be that when you live in a place you should be able to talk to anyone you want to. This isn't always the case in Corsicana," commented Mable Scott, the owner of the Scott Funeral Home in Corsicana (Scott 2012). Scott was also quick to note that as a successful business owner she was comfortable in both the black and white community.

It is worth pointing out that material conditions for most blacks in the Montgomery Hill community remained largely unchanged from Emancipation to well into the twentieth century. As late as 1950, families in the Montgomery Hill area resided in two and three room wood-frame houses with no running water. Heat came from coal stoves. "I never knew how poor we really were until I went to college," remarked Henry Jennings (2012). Like the generations before him, his family survived off the food they grew and the animals they raised. They killed a hog in the winter, salted it down to preserve it, and canned food after the harvest. They supplemented their food supply with wild animals such as squirrel, raccoon, opossum, and fish. Jennings grandmother made all their clothing: "my grandmother could make anything, all she would have to do was to see it in a shop window and she could copy it." He remembers that his father could fix anything (Jennings 2012).

As a child, when not in school, Jennings and his brothers and sisters would play with the children from neighboring families while their parents worked in the fields. Great Grandmother Foreman, would look after them. Occasionally they would play with the white Montgomery children, Margaret and Carolyn, who lived out there, though by the time the children hit puberty, friendships between blacks and whites typically faded. The Jennings and their peers attended an all-black school about five miles west of their home (Jennings 2012).

Jennings and his sister Ola Mae Calloway both remembered an old cemetery (Site 41NV716) located about 50 yards from their home (Jennings 2012, Calloway 2012). Their grandmother and great grandmother referred to it as an old slave cemetery, but never told them who was buried there. Calloway believes that neither her grandmother nor great grandmother knew who was buried there. If they had any family buried there, they never knew about it. If that was indeed the case, the cemetery was likely already out of use by the time Winnie Foreman, who was born around 1865, was old enough to remember folks being buried there. This would imply that the cemetery was already inactive by about 1875. According to all who remember Montgomery Hill as it was before the reservoir was built, the cemetery never had headstones but everyone knew it was there, and just plowed around it. This is supported by an aerial photograph from 1940, which shows the Montgomery Farm hilltop as mostly plowed. The cemetery location is a wooded island surrounded by houses and plowed fields (**Figure 3-5**). BJ Perry, a white resident of Eureka also recalled seeing an old cemetery out at Montgomery Hill in the 1960s. “There wasn’t any tombstones but they [black folks] used to mark it with rocks. One time I found a buried metal bucket filled with bullets out there (Perry 2011).” No one interviewed for this project knew of anyone buried in the cemetery.

By the 1890s, most of the black members of Montgomery Hill and the surrounding Eureka community worshipped at the Friendship Baptist Church and buried family in the dedicated adjacent cemetery. This church was located along the Jones Branch portion of Richland Creek, a few miles west of Montgomery Hill. The earliest marked grave in the Friendship Baptist Cemetery dates to 1897 and is that of 17-year-old Minnie Williams, and there are 67 graves marked with headstones. However, there are more than 50 unmarked graves or headstones whose inscriptions are now completely illegible and many of these likely pre-date 1897. Worshippers tended the unmarked graves by mounding soil around them and marking the heads and feet with metal pipes, and this practice continued through the 1980s (Jurney 1987).

Today, no African Americans remain in Eureka. The black sharecropper community that Henry Jennings and others grew up in now live in places such as Corsicana, Waco, and Fort Worth. In fact, when white Eureka residents were questioned about whether they knew any black folks who might remember the Montgomery Hill Cemetery, they almost universally responded that they knew none. Carolyn Taylor, great granddaughter of Prosper K. Montgomery, was among the few whites who even remembered the names of the black sharecroppers who lived near the Montgomery Farm. As Allen Sharp pointed out, black history in Navarro County is mostly hidden. In fact, during the course of the interviews with African Americans conducted for this project, many interviewees actually thanked this author (who is white) for being interested in black history of the county.

Figure 3-5. A 1940 aerial photograph shows the Montgomery farm with plowed fields surrounding the cemetery.

Given these circumstances, it is easy to understand how cultural memory of the cemetery could have faded by the 1980s. Although many people, including Carolyn Taylor, Henry Jennings and his sister Ola Mae Calloway knew about the cemetery's existence, none of the former black residents came forward about it during the planning phases of the reservoir project. When Jennings was asked why he or his father (who was still alive at the time) did not speak up about the cemetery, he responded that he guessed it was because neither of them knew anyone buried there. In effect, the fractious Jim Crow era, coupled with geographic dispersal and other social processes, obscured memory of the cemetery and its people. The cemetery's rediscovery offers a chance to explore an aspect of history that deserves greater focus.

Previous Investigations in the Project Area

In 1980, the Tarrant Regional Water District hired the Archaeology Research Program at Southern Methodist University to investigate the area of effect for the then proposed Richland-Chambers Reservoir. Survey documented more than 200 sites, including nine archaeological sites in the vicinity of the Montgomery Hill Cemetery. The project took a holistic approach to site documentation and evaluation, developing a context-based cultural geography model for understanding the role each site played within the larger system. One hundred and six sites warranted National Register eligibility testing. In the end, 15 prehistoric sites and 38 historic period sites were excavated though a data recovery program. Two cemeteries were relocated and an additional 26 standing structures were documented in detail. The resulting five volume report series developed from the 1981–1984 data recovery program documented human use of the landscape from the Paleoindian period (ca. 10,000 BP–8000 BP) through the modern day time (Bruseth and Moir 1987, McGregor and Bruseth 1987, Bruseth and Martin 1987, Moir and Jurney 1987, and Jurney and Moir 1987). One of the major contributions of the work focusing on prehistoric sites was to develop a thorough chronology for the Middle Trinity River drainage basin that could be identified archaeologically through diagnostic point types, differential use of local versus exotic lithic materials, and unique feature sets (Bruseth and Martin 1987, McGregor and Bruseth 1987). In particular, data recovery at the Bird Point Island (41FT201) and Adams Ranch (41NV177) demonstrated that distinctive feature types known as Wylie Pits reflect the Late Archaic, not the Late Prehistoric period as originally postulated by Crook and Harris (viz. Crook and Harris 1952, Bruseth and Martin 1987). Ultimately, excavations of the prehistoric sites yielded a clearer picture of indigenous lifeways and changing environmental conditions spanning nearly 10,000 years of history.

Data recovery for historic period archaeological sites focused on farmstead sites and structures from the 1850s through 1950s. The sites represented both owner and tenant farmsteads occupied by black and white families. Research questions were oriented mainly around patterns of material culture consumption and differentiation between households. The project found that historic settlement patterns changed over time. Early settlement of Navarro County began along the river and creek bottoms, while later period settlement utilized the upland fringes for habitation as well. Lifeways of the nineteenth century drew heavily on southern traditions and these traditions began to break down in the beginning of the twentieth century. The strongest material culture differentiation correlated with socio-economic status, rather than race (Bruseth and Moir 1987, Moir and Jurney 1987, and Jurney and Moir 1987).

The survey for the Richland-Chambers Reservoir documented nine sites in close proximity to the Montgomery Hill Cemetery (41NV716), but the cemetery itself was not among the sites recorded at that time. The sites recorded in 1980 were 41NV131, 41NV132, 41NV133, 41NV135, 41NV136, 41NV301, 41NV302, 41NV303, and 41NV313 (**Table 3-1, Figure 3-6**).

With the exception of Sites 41NV131 and 41NV132, all of the sites represent historic period homesteads of the late nineteenth and early twentieth centuries. These residences generally correspond to houses depicted on a 1920 soil map of Navarro County (see Figure 3-4) and oral narratives gathered for this project confirm that all of the houses were occupied by black sharecroppers throughout the nineteenth and into the twentieth centuries. Research for the Richland-Chambers Reservoir project indicates that all the residences were part of a relatively stable community whose members were unified through kinship or close family ties.

Table 3-1. Summary of Sites Around the Montgomery Hill Cemetery.

Site number	Site Type	Description
41NV131	Unknown Prehistoric	Lithic scatter consisting of flakes and debitage exposed on surface of a road bed.
41NV132	Late Prehistoric	Possible burned rock midden located on a slough leading to Chambers Creek. Artifacts consist of lithics, bone, pitted stone, shell, and one arrow point.
41NV133	Historic period farmstead	Standing barn, collapsed board and batten house with cedar shingles, no visible cistern. Artifacts included clear, green, manganese purple glass, canning glass, horseshoe, plough share.
41NV135	Historic period farmstead	House built approx. 1910, cistern plastered 1928, brick foundation for an outbuilding. Artifacts found include ceramics, decalcomania ceramics, clear, purple, aqua, and pale green glass, wagon and plough parts, iron scraps, sole from children's shoes.
41NV136	Historic period farmstead	Cistern, remains of house and outbuilding foundations on piers. Artifacts included whiteware, ironstone, stoneware ceramics, porcelain, bottle glass of all colors, wire nails, bricks, shoe parts, one glass bead, corrugated iron. Wires indicate house had electricity.
41NV301	Historic period farmstead	The 1920 soil map depicts a house at this location. No structural remains found, however a scatter of window glass, whiteware, porcelain, aqua bottle glass, and handmade brick is evident at this locale. Shed ruin is also at this location.
41NV302	Historic period farmstead	Site consists of a barn ruin and an associated scatter of domestic debris representing the early through mid twentieth century. 1920 soil map depicts a house at this location.
41NV303	Historic period farmstead	1920 soil map depicts a house at this location. Features observed consist of a dwelling or barn remain, a shed ruin, possible privy, a brick well, with associated scatter of domestic debris. Wire nails, ceramics, and bottle glass represent the early twentieth century.
41NV313	Historic period farmstead	1920 soil map depicts a house at this location. No structural remains observed, but a scatter of twentieth century domestic debris was recorded that included canning jars and shoe parts.

Figure redacted due to site-sensitive information.

Figure 3-6. Previously recorded archaeological sites around the Montgomery Hill Cemetery.

The original site forms for these residences include sparse information about quantity and type of materials recovered from the sites, and it appears as though little archival research was conducted for these properties, largely due to the fact that most of the sites recorded were above the normal pool level of the lake. As a result, none of the sites around the Montgomery Hill Cemetery was selected for testing or data recovery, and no mention of the cemetery was documented in subsequent reports. Instead most of the intensive archaeological research focused on communities along the Richland Creek arm of the proposed reservoir where sites would have been completely inundated.

No additional work was ever carried out near Montgomery Hill until 2009, when a recreational lake user discovered a skull and other human bones lying on the shore of Chambers Creek Island. At that time, a severe drought had lowered the lake levels by six feet, exposing large portions of formerly submerged shoreline along the island. The Navarro County Sheriff's department was notified and with the help of an avocational archaeologist, Bill Young, and Alan Skinner of AR consultants, they contacted Dr. Christina Banks-Whitley to examine photographs of the find. She concluded the bones were not part of a crime scene, but likely part of an unmarked nineteenth century cemetery. However, before archaeologists could take any further action, the lake levels rose again and re-submerged the site. In 2011, AR consultants conducted a survey of the area where the bones were collected. The survey involved surface scraping, hand-trenching and using leaf blowers to remove loose soil and expose the outlines of grave shafts (Whitley and Skinner 2012). That survey found 25 oval-shaped soil stains that were interpreted (correctly) to be grave shafts. The area was recorded as Site 41NV716, a probable African American cemetery associated with bondsmen or former bondsmen of Prosper K. Montgomery who owned the land encompassing the island from 1865 until his death in 1896.

The Making and Unmaking of a Cemetery- Previous Excavations in Texas and Beyond

This section is intended to briefly situate the archaeological work at the Montgomery Hill Cemetery in the context of other mortuary excavations. It explores the processes by which cemeteries, which are considered by most people to be consecrated spaces, can become archaeological sites; and offers a comparative framework for inquiry into the practice of mortuary archaeology in Texas and beyond. As the final resting place of ancestors, cemeteries have a spiritual significance to many communities, and hence, mortuary archaeology can be politically fraught at times. This is especially true when descendant communities feel powerless to effect control over the places where kin are buried. As a result, the practice of mortuary archaeology has evolved over the years to take these social dimensions into consideration.

Not all cemeteries are physically marked or documented through legal records, and this makes them prone to destruction or disturbance when new land use occurs. Unmarked or forgotten cemeteries are encountered with surprising regularity in Texas. This is particularly true for Native American, African American cemeteries, Hispanic cemeteries, or small, family cemeteries, many of which were originally marked only with fieldstones or wooden crosses if at all. Over time, as families move away from those places, and community memory fades, those original grave markers become displaced or lost. This was the case for the Montgomery Hill Cemetery, which was inadvertently missed during the 1980 survey conducted in advance of lake construction. At the time of the survey, there were no headstones or obvious indicators that a cemetery was at that location. Though a number of local families knew about the cemetery's existence, no one came forward to alert the project proponent, the TRWD, of its existence at the time. As one local resident remarked in an interview, his family did not come forward to mention the cemetery because none of them knew of any family members buried in it (Jennings 2012). As a result, it was unintentionally submerged during the construction of the Richland-Chambers Reservoir.

There are also cases where marked cemeteries become unmarked through development. Although this did not happen at Montgomery Hill Cemetery, it occurred fairly often during the middle-twentieth century in urbanizing areas in particular, when developers and municipalities would claim cemetery land for other purposes. Headstones would be moved and relocated, but often not the bodies themselves. This occurred with a number of mainly minority cemeteries in Texas cities, including one at Allen Parkway Village in Houston (41HR886), in Dallas (41DL316) and in Waco (1st Street Cemetery) among others. Additionally, quite a few historic period cemeteries have been inadvertently discovered under roadways that were constructed atop nineteenth century graves. This occurred along SH 332 in Brazoria County (Site 41BO202), along SH 3 in Galveston County (41GV125), and along FM 1464 in Fort Bend County (41FB334). Regrettably, early twentieth century development practices turned cemeteries into archaeological sites that were immediately imperiled through further urbanization and development. In many cases these cemeteries were then rediscovered through subsequent development efforts. In recent decades, it has become common for archaeologists to step in and disinter unanticipated human remains prior to new development.

Since the late 1990s a fairly substantial body of cemetery excavation literature has been generated not just in Texas, but nationwide as a consequence of these efforts. The African Burial Ground project in New York City is one of the best known cemetery excavations, and helped set a standard for archaeology and community involvement for cemetery investigations to come. During construction of a new federal building in 1991, human remains from the city's seventeenth and eighteenth century enslaved and free black population were uncovered. This discovery launched a massive mitigation project in which 419 sets of human remains were disinterred and analyzed by archaeologists and biological anthropologists. However, the initial plan for disinterment sparked intense controversy between the project proponent, the General Services Administration (GSA), and members of the African American community in New York. New York's African American community criticized the GSA not only for developing an inadequate plan for treatment of human remains, but for their failure to consult with the black community at all over the proposed new building and the burial excavations. The concerns raised by New York's black community resulted in a growing mainstream awareness of the need to involve descendant communities in the decision-making process surrounding cemetery excavations and to accord long-forgotten cemeteries new respect (Skipper 2007). Today, the site is listed on the National Register of Historic Places, as a National Historic Landmark, and is commemorated with the African Burial Ground National Monument that includes a visitor center and permanent exhibit.

In Texas, the most comprehensive work to date is still the Freedman's Cemetery excavations in Dallas. This project took place roughly concurrent with the African Burial Ground project between 1991 and 1994 to mitigate the effects of the expansion of the North Central Expressway in Dallas. Over a three and a half-year period, 1,157 individuals were disinterred from the proposed new right-of-way for the North Central Expressway which crossed over a public park then named Freemen's Memorial Park. At the time, no headstones were present in the park, though research revealed that it had previously been a dedicated cemetery for African Americans from 1869 through 1907 (Peter el al. 2000). Freedman's Cemetery at one time covered four acres and was the final resting place for more than 5,000 African Americans. Geo-Marine Inc. was hired to conduct the archaeological disinterment of the bodies within the North Central Expressway right-of-way. Like the African American Burial Ground project in New York, the Freedman's Cemetery project initially encountered hostility and resistance from the Dallas' black community who perceived the North Central Expressway planning process as a symbol of systematic disregard for black history. A coalition of African Americans formed Black Dallas Remembered to raise awareness of and preserve black history, and this organization took an active role in guiding removal of the burials and ultimately enhanced interpretation of findings.

Analysis of the skeletal material, caskets, hardware and grave inclusions for the Freedman's Town cemetery project was comprehensive. Work found that grave placement over time evolved in a patterned manner from north to south and then from west to east. From a health perspective, skeletal analysis indicated that the black population was under considerable pathogenic stress, mortality rates among children were very high, particularly prior to 1900 (52.6 percent), and few adults lived past the age 40 (Peter et al. 2000:vi–vii). Nonetheless, the urban black population in Dallas was considerably healthier than a comparably aged rural black population in Arkansas. One of the more informative aspects of the excavations showed that the black population in Dallas combined elements of both Christian and African spiritual practices during interment. For instance, many of the coffins/caskets bore plaques and hardware bearing Christian symbols and phrases. Meanwhile burials also included personal items that were important to the individual during life, or that would presumably help them on their journey into the afterlife. Broken pottery, shells and even a shoe were all items with African antecedents that symbolize the body's spiritual progression from life to death (Peter et al. 2000, Davidson 2010).

Another major cemetery excavation was undertaken in 1998 in Houston. The project occurred when the Houston Housing Authority began plans to demolish a 1940's housing project, Allen Parkway Village, and build new low to moderate-income housing in its place. Allen Parkway Village had been built on a 36-acre tract that was known as Freedmenstown in the nineteenth century. This area was at the heart of post-bellum African American residential, commercial, and cultural life in Houston into the twentieth century. The project also covered the site of the Third New City Cemetery (TNCC) which operated from around 1880 to 1904, though burials probably continued for a few years after that time. City records indicated that the majority of people buried within the TNCC were black. Records also documented that the City of Houston had encountered and moved more than 900 sets of human remains prior to construction of Allen Parkway Village (Foster and Nance 2002). Nonetheless, in 1998 human remains were encountered during monitoring of utility trenches for the new development, and eventually machine scraping revealed the outlines of 355 intact graves. PBS&J (now Atkins Global) was hired to conduct the investigations.

Excavation of the remains at the TNCC was also quite revealing. Like the remains at Dallas's Freedmanstown, the TNCC remains represent African Americans interred in the late nineteenth century and grave hardware and personal items reflect a hybridized Christian-African belief system. In addition to expressions of Christianity such as coffin plaques and hardware, many burials contained pottery, pierced coins, medicine bottles, a button cache, lead pencils and even lead bullets (not cause of death or injury) which were likely imbued with symbolic meaning during burial rituals. The overall health of the TNCC population was good compared to other African American cemeteries of the same time period, with good overall dental health, low rate of traumatic injury, and fewer degenerative diseases among the TNCC population. Men tended to live longer than women, though overall males outnumbered females among the burial population. One of the more curious aspects of the TNCC population was the low frequency of children, particularly infants among the burial population and the causes of this were explained in several ways. First, it may be that many of the children were buried in another part of the cemetery; or it is also possible that many black families in Freedmanstown buried their children at home (Foster and Nance 2002). Alternatively, some of the more fragile infant bones may not have persevered at these sites.

Other cemetery excavations that have taken place throughout Texas include the Pioneer Cemetery (41BO202) in Brazoria County (Tiné and Boyd 2003), at the Matagorda Cemetery (Crow et al. 2001), at the Phillips Memorial Cemetery in Galveston (41GV125, Dockall et al. 1996), at Choke Canyon Reservoir (Fox 1984) and at the Sinclair Cemetery in the Cooper Reservoir (41DT105, Winchell at al. 1995). Reports from these and others form a coherent database for burial practices, health, and demographic data for various racial, ethnic, and regional communities throughout the state and country. This chapter will not discuss findings from these projects in any detail. However, these projects and others will be used to draw comparisons for the Montgomery Hill population in later chapters of this report. Suffice to say, that from the mid 1990s to the present time a number of archaeological projects involving cemetery excavations have occurred, and through these investigations archaeologists, bioarchaeologists, and historians alike have built a substantial foundation to explore how various ethnic groups and communities lived and died in America. The excavations at the Montgomery Hill Cemetery will contribute not only to this ongoing dialog, but also further illuminate the lost stories of nineteenth century African Americans along the Texas frontier.

Chapter 4
Field and Laboratory Methods

by Jon J. Dowling and Willa Trask

This chapter summarizes the methodology employed to archaeologically exhume and analyze human remains at the Montgomery Cemetery prior to their analysis and eventual reinterment. The cemetery is located on the southern shore of Chambers Creek Island within the Richland-Chambers Reservoir. To get to the site the field crew took a flat-bottom watercraft provided by TRWD. Throughout the investigation of the Montgomery Cemetery all personnel, excavation equipment, mapping instruments, cultural material packaging, and safety equipment were shuttled to and from the site via watercraft deployed from the Oak Cove Marina. Boating safety was practiced at all times. Life jackets and safety equipment were used, and potential for inclement weather affecting boating conditions was constantly monitored. Wind conditions over 15 mph in some instances created adverse wave action preventing access to the site.

Mapping

Preliminary identification of the grave outlines had been carried out by AR Consultants, and that served as a point of departure for AmaTerra's investigation. Before exhumation and analysis of the Montgomery Cemetery graves commenced, archaeologists carried out reconnaissance efforts to correlate the spatial layout of the grave shafts mapped by AR Consultants with existing landscape conditions. The positions of the 25 burials, erosion channels, and tree stumps plotted by AR Consultants with a Total Data Station (TDS) were all identified on the landscape and marked with pin-flags. The sub-datums established by AR Consultants could not be relocated. This is not surprising giving the continuous fluctuations in water level and malleable clay surface. However, the tree stumps that had been previously mapped, labeled Stump 1 and Stump 2, were found to still be in place. Stump 1 exhibited still anchored roots and was situated in close proximity to the densest concentration of grave shafts, resting west of the grave shaft concentration and an erosional rill on the beach surface. Therefore, AmaTerra established the site datum for 41NV716 with a mag-nail permanently embedded in an exposed root of Stump 1 so that if needed, future investigators can utilize it for site orientation purposes.

Once all grave shafts were identified on the ground surface and a site datum was established, a grid was created based on the existing spatial distribution of the grave outlines. In order to maintain vertical and horizontal control during excavation, AmaTerra grouped grave shafts into individual excavation cells and established a series of sub-datums associated with these cells. In total, 15 excavation cells were established which between them shared eight sub-datums (**Figure 4-1**). To assist excavators in mapping the horizontal space dimension, the excavation cells were established in a series of 1x1, 1x2, 2x2, 2x3, and 2x4 meter cells surrounding the grave shafts. This allowed excavators to maintain proveniences of excavated materials when needed using northing and easting coordinates from the southern and western cell walls.

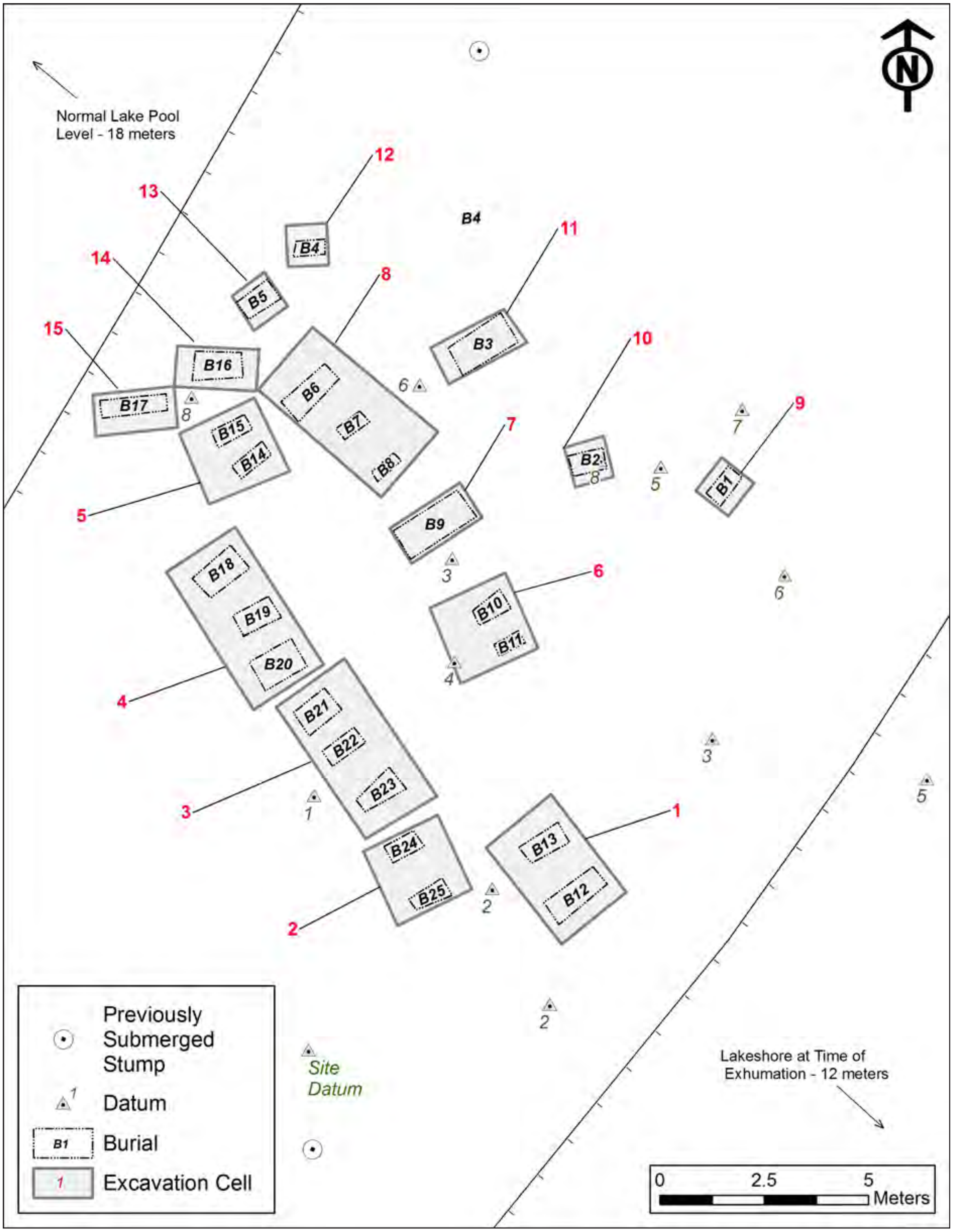

Figure 4-1. Map of excavation cells, burials and datums at the Montgomery Hill Cemetery.

Although some excavation cells contained more than one grave, each grave was treated as an individual archaeological feature.

A TDS was used to map grave shaft outlines, topographic features, sub-datums, excavation cell corners, and surface artifact scatters. The TDS was set up on the site datum for all angle and distance measurements. A back-sight control point was set due north of the site between the terrace and the edge of the tidal zone. With the use of TDS applications, all eight sub-datums were set at the same elevation as the site datum in order to maintain consistent vertical control during excavation. Base elevation was set at 100.00 meters.

Archaeological Exhumation

Once mapping of the site was complete and vertical and horizontal control was established, opening elevations were recorded and the process of shovel skimming matrix within the excavation cells began. Excavation cells in closer proximity to the shoreline were prioritized in case rain caused water levels to rise. Based on the initial investigations of AR Consultants in 2011, it was believed that the burials would be situated at shallow elevations below the surface, but many of the burials actually were quite deep and required a significant amount of sediment removal surrounding the grave shafts to be excavated in order to access the burials.

The sterile, undisturbed sediment around the grave shaft was excavated using hand tools, but generally not screened. However, matrix within each grave shaft was screened through ¼ inch wire cloth for possible grave goods associated with the burials. As excavation continued, burials were gradually pedestalled to allow investigators access to the graves from multiple angles. Verticality of the southern and western walls of each cell was maintained during excavation so that northing and easting coordinates could be obtained if point plotting materials within the grave. The grave fill was excavated in vertical increments of 10 cm, down to the coffin or vault lid. Using trowels, spades, hand-brooms, and dustpans, the fill was removed to either a) the level of a coffin, b) any remains or grave goods encountered, and c) 30 cm above the terminus of the shaft. When caskets were encountered, the fill around the outside was carefully removed in the same manner as the upper grave fill, with the exception of the lowest ten centimeters due to the possibility of offerings placed around/on top of the coffin that would require more careful excavation. Measurements were taken of the coffin depth, as well as dimension. If unstable, the coffin was photographed and appropriately recorded before the top and side panels were removed.

Plan-view sketching of each burial was carried out twice. A small-scale sketch was generated once the coffin lid was exposed to indicate the provenience of each coffin within the excavation cell, and a large-scale sketch was generated to precisely depict the spatial layout of the human remains and other materials within each grave. Digital photography was carried out continuously at regular intervals during the excavation of each grave. In addition to plan view drawings and digital photography, a standardized Burial Recording Form was also completed in the field for each burial. Information recorded on these forms included basic data consisting of skeletal length and width, head orientation, body position, body orientation, hand and ankle orientation, coffin shape, coffin hardware, grave goods, general notes, etc. The Burial Recording

Figure 4-2. Willa Trask, project bioarchaeologist exposes and records the lid of a burial.

Forms and large-scale sketches were typically completed after skeletons were completely exposed.

In some cases, coffin lumber was too warped, degraded, or collapsed to determine the coffin shape with exact certainty. Typically, once the top of each grave was exposed, mapped, and photographed, the top lid component of the coffin was removed (**Figure 4-2**). Being a perishable material, lumber components of the coffin were typically removed carefully in portions and collected. Coffin nails were plotted in during both the small-scale and large-scale plan view sketching processes and then collected separately.

Excavation of human remains typically began at the western-most end of each grave, following the assumption that interments of this period would conform to the Judeo-Christian tradition of east/west burial orientation, with heads placed west and feet placed east. When excavating the interior of coffins, fine excavation tools such as trowels, bamboo probes, soft-bristled brushes, or wax cutting tools were employed. All remains were pedestalled to the extent that their integrity allowed, leaving soil in sensitive areas such as the orbits, nasal aperture, and thoracic cavity. All elements of the skeletons were left in place while the excavation of surrounding matrix away from bone material was carried out. All fill surrounding the burials was screened through ¼- or ⅛-inch mesh. When possible, morphological assessments and measurements for stature were made with the bones still in situ. In several instances, coffins were found to have collapsed into the contents within, and separating the lumber from the crushed remains required care. Caution was taken during the exposure of smaller skeletal elements such as vertebrae and teeth when exposing skeletons in their entirety.

Once human remains were satisfactorily pedestalled and recorded, they were either removed and carefully packaged individually (i.e. non-friable long bones) or in portions (i.e. fragile and interlocking elements of the axial skeleton) onto flat screened trays to then be wrapped in protective materials. Removed elements were labeled by name of the bone element (if possible) or region to aid in laboratory analysis. In some cases, small infant burials were crushed and significant intermixing between soil, coffin lumber, and delicate skeletal remains had occurred. In these cases, burials were typically small enough to extract from their grave shaft in their entirety using metal trays that excavators slid under the base of the coffin (**Figure 4-3**). This maintained the contextual integrity of the skeletal elements and associated artifacts for a more controlled analysis in the laboratory. The provenience of any associated artifacts (buttons, beads, coins, etc.) interred within the burials was recorded, these materials were photographed in situ, and collected separately. Once the burials and all personal effects were appropriately removed and secured, field technicians excavated 10-20 cm below the terminus of the grave

Figure 4-3. Field crew lifting fragile remains of an infant onto a tray for more careful excavation and identification in the laboratory.

shaft into sterile soil in an effort to locate any remains or artifacts or burial elements which could have been displaced either during excavation or through natural processes.

Analysis

Human remains were carefully enveloped in cellophane and protective materials for transportation across the reservoir to the field laboratory established at the Oak Cove Marina. All grave materials were kept stable and dry during the boat trip from 41NV716 to AmaTerra's laboratory, which consisted of a locked and secured trailer-facility.

Care was taken to maintain provenience of recovered artifacts and human remains from the time of excavation through the documentation and data collection phases of analysis. As defined by the contract and burial agreement, all burials and associated artifacts had to be analyzed within 24 hours of excavation, resulting in a relatively expedient pace for skeletal analysis and artifact documentation. However, in several instances the degree of trauma and pathology exhibited by a skeleton required greater time for analysis. In these instances, AmaTerra requested permission to keep the remains in the laboratory for a longer period. Remains and all associated artifacts (grave goods, coffin hardware, and coffin wood) were carefully packaged by individual burial feature in archival quality boxes. All excavated materials were subsequently turned over to the Corsicana Police Chief to be placed in secure storage within one day of their exhumation to await their eventual reburial.

Artifact Documentation Procedures

Non-skeletal artifacts were carefully cleaned using brushes or wooden tools and water when necessary and appropriate. All artifacts were inventoried, documented, and photographed by a laboratory technician or the project osteologist. Basic information about artifacts was collected including material, shape, and counts to aid in later artifact analysis by a specialist. Unique artifacts were described and drawn on a separate recording form (Appendix B). A photograph of a representative sample of coffin wood was also taken for each burial. Further analysis of artifacts from photographs was conducted after fieldwork was completed.

Osteological Documentation and Data Collection Procedures

Human remains were carefully cleaned prior to analysis. Typically, bone condition and soil consistency permitted most bones to be cleaned by carefully removing any adhering soil using a dry paint brush. In instances where bones had become muddy from rain, soft brushes and water were used to clean the bones so that they could be properly observed. Care was taken to preserve the bone surface as much as possible so that any abnormal boney conditions could be properly observed and documented. After cleaning, a thorough skeletal and dental inventory and analysis was completed. Skeletal or dental remains exhibiting any kind of notable abnormalities were further documented photographically using a high resolution Canon Rebel to aid in future analyses. When possible, a general overall photograph of the skeleton and/or dentition was also taken. Once laboratory analysis was completed, all soil matrix which accompanied skeletal remains to the laboratory was packaged and included with remains for reburial.

The bioarchaeological research design was constructed in order to collect the maximum amount of biological data that time and resources allowed. Skeletal and dental analysis largely followed the guidelines and protocol established in *Standards for Data Collection from Human Skeletal Remains* (Buikstra and Ubelaker 1994). Alterations or expansions from the methods outlined in Buikstra and Ubelaker (1994) will be detailed below. Information on basic taphonomy, preservation, detailed inventory, age, sex, cranial and post cranial measurements, nonmetric and epigenetic skeletal observations, skeletal pathology dental disease, dental metrics, and dental morphology were recorded using a set of forms in part adapted from those provided in *Standards for Data Collection from Human Skeletal Remains* (Buikstra and Ubelaker 1994) (See Appendix B).

To ensure data consistency, efforts were made to limit the number of analysts to just the Project Osteologist, Willa Trask; however, time did not permit this in all cases. All craniometrics, cranial non-metrics/morphoscopics, dental observations, and most pathology, postcranial metrics, and nonmetric age and sex observations were made by the Project Osteologist. As necessary, assistance with inventory, collection of age and sex data, and basic pathology was provided by laboratory assistants with graduate level training in osteology.

Inventory

A detailed skeletal inventory was completed for each individual (Appendix B, Form 1a, 1b). For each individual skeletal element, completeness was rated on an ordinal scale of "fragmentary" (1–25 percent of element present), "partial" (26–75 percent of element present), or "complete" (76–100 percent of element present). For long bones, a check-mark system was used to further document the portions of each long bone present to aid in identifying patterns in portions of missing elements.

Laboratory analysis also generated a general assessment of overall completeness of the entire skeleton and dentition for each individual. This was an approximate estimation of completeness solely for use in the burial descriptions. Again, an ordinal scale of "fragmentary" (1–25 percent), "partial" (26–75 percent), or "complete" (76–100 percent) was used as a means to gauge the overall completeness of each individual.

Age

Age related data was collected as a means for providing an estimation of the approximate biological age at death for each individual. Sub-adult individuals display an array of developmental traits that progress in a relatively regular manner and permit researchers to estimate biological age of death with a relatively minimal degree of error. Biological age estimation for subadult individuals was based on degree of dental development and eruption (Moorees et al. 1963, Ubelaker 1989, Gustafson and Koch 1974, Smith 1991, and AlQahtani et al. 2010), appearance of primary and secondary ossification centers (Scheuer and Black 2000, Fazekas and Kosa 1978), patterns of skeletal development and fusion (Scheuer and Black 2000, Fazekas and Kosa 1978), and cranial and postcranial metrics (Fazekas and Kosa 1978, Scheuer and Black 2000). As dental development is commonly believed to be one of the more reliable methods for estimating age, when available and complete, more analytical attention was given to dental development over other methods.

Adult biological age was estimated by collecting data on a standard set of skeletal structures which display relatively predictable senescent age-related skeletal changes (Buikstra and Ubelaker 1994) in addition to several developmental observations which tend to occur in young adulthood (Scheuer and Black 2000). Data was collected on cranial suture closure (Baker 1984; Mann et al. 1987; Meindl and Lovejoy 1985; Todd and Lyon 1924, 1925a, 1925b, 1925c), pubic symphysis morphology (Todd 1921a, 1921b; Brooks and Suchey 1990; Suchey and Katz 1986), auricular surface morphology (Lovejoy et al. 1985; Meindl and Lovejoy 1989), morphology of the sternal ends of the 3rd, 4th, and 5th ribs (İşcan et al. 1985, 1984; Loth and İşcan 1989; Dudar 1993) and epiphyseal fusion (Scheuer and Black 2000; Black and Scheuer 1996; Webb and Suchey 1985).

Sex

Sexually dimorphic characteristics are not observable in human skeletons until after puberty when the development of secondary sex characteristics occurs. As of present, there are no generally accepted and reliable methods for sexing sub-adult skeletal remains (those less than approximately 15 years of age) (Saunders 1992). Thus, determination of biological sex was only possible for adult individuals. Sex was primarily estimated on the basis of cranial and pelvic macroscopic morphology (Buikstra and Ubelaker 1994; Buikstra and Meilke 1985; Phenice 1969; Acsadi and Nemeskeri 1970). Robusticity of cranial and postcranial remains were used as a secondary means to confirm sex estimations, however the general robusticty of the population deemed this method less reliable. Sex estimates obtained from pelvic and cranial morphology were also confirmed with craniometric data (Moore-Jansen et al. 1994, Ousley and Jantz 2005).

Craniometrics and Postcranial Metrics

Cranial and postcranial measurements have been shown to be a very useful tool in describing individual size and shape variation within or between groups. These data may be used in estimation of biological group affinity or ancestry, stature, sex, or activity patterns.

All adult skeletons were measured according to a series of 24 cranial, 10 mandibular, and 44 postcranial measurements defined by Moore-Jansen et al. (1994). Crania and mandibles were measured using sliding calipers and digital spreading calipers. Postcranial measurements were taken on both right and left bones and were taken with an osteometric board, digital sliding calipers, spreading calipers, and a cloth tape measure. Only intact, unfragmented bones were measured. In instances where fragmented bone could be reconstructed with a high degree of reliability, measurements were taken with an "*" modifier, indicating that the measurement was estimated or based on a reconstruction. In instances where bilateral observations could be made (e.g. orbital height), preference was given for the left side unless the right was more intact whereas a "(R)" would be designated next to the measurement.

Juvenile craniometrics and postcranial metrics were measured according to methods described in Fazekas and Kosa (1978) and Buikstra and Ubelaker (1994). As with adults, only intact, unfragmented bones were measured. In instances where fragmented bone could be reconstructed with a high degree of reliability, these measurements also given with an "*" modifier. For several instances, a minimum measurement was taken for long bone "maximum diaphyseal length." This was done to aid in age estimates for individuals with poor bone preservation, only as a crude means for aiding with obtaining a minimum age.

Morphoscopic and Epigenetic Observations

Morphoscopic observations have been shown to be useful tools to aid in investigation biological group affiliation (Hefner 2007, 2009; Gill and Rhine 1990), while epigenetics are believed to be useful general markers of biological distance in a population. Morphoscopic traits were scored based on methods and descriptions outlined by Gill and Rhine (1990) and Hefner (2007, 2009). A series of 64 epigenetic and morphoscopic traits were scored based on definitions provided in Buikstra and Ubelaker (1994), Hauser and De Stefano (1989), and Gill and Rhine 1990. An additional 11 traits were scored based on methodology outlined by Hefner (2009). Morphoscopic observations and epigenetic traits were scored on adult individuals and juvenile individuals over 5 years of age.

Dental Observations

Dental analysis was guided by criteria outlined in Dental Anthropology (Hillson 1996) and *Standards for Data Collection from Human Skeletal Remains* (Buikstra and Ubelaker 1994). Crown and root traits were largely recorded following the Arizona State University Dental Anthropology System (Turner et al. 1991) for both adult and select deciduous dentition, and Hanahara (1961) for deciduous dentition. Dental documentation included tooth presence, eruption status, loss of a tooth before death (antemortem) or after death (postmortem), degree of dental development, crown measurements, and occlusal surface wear. Unique attributes of wear related to behavioral activity were also described, as was crowding and occlusion form, when observable. Teeth and associated alveolar bone were closely inspected for the presence of caries, enamel defects, calculus, chipping, periodontal disease, and abscessing.

Pathology

Documentation of pathologic and other abnormal bony features was conducted utilizing a descriptive approach, guided by criteria outlined by Buikstra and Ubelaker (1994), Ortner (2003), and Mann and Hunt (2005). Each bone was carefully examined for any evidence of abnormal bone destruction or growth. A hand lens (10x power) was used when additional magnification was needed. Attributes such as the type of lesion, appearance and location of the affected area, evidence of remodeling/healing, presence and extent of porosity, etc., were noted, and drawings and measurements were taken as appropriate. Photographs were taken of all abnormal bony lesions.

Taphonomy/Bone Preservation

Remains were examined to identify any evidence of taphonomic changes (natural or anthropogenic) including evidence of staining from metals, soil humus, and other surrounding organic materials, adherent materials, any evidence of fragmentation or friability, or damage from roots and animals. A statement on the general preservation of the remains was provided using ordinal designations of “excellent,” “good,” “fair,” and “poor.” Postmortem taphonomic factors such as periosteal erosion, diaphyseal and metaphyseal breakage, and general ability to observe elements contributed to placement within each category. Additionally, qualitative descriptions of the nature, location, and extent of any observed taphonomic changes were recorded.

Curation and Reinterment of Human Remains

As stipulated by the contract and burial agreement, all burials were analyzed within 24 hours of excavation except in cases where permission was requested to keep burials for a longer period to continue analysis. All human remains and all associated artifacts (grave goods, coffin hardware, and coffin lumber) were carefully packaged by individual burial feature in archival quality boxes. All excavated materials were subsequently turned over to the Corsicana Police Chief to be placed in police storage within one day of their exhumation to await their eventual reinterment at an approved, dedicated cemetery.

Chapter 5

Burial Descriptions

by Rachel Feit and Willa Trask

BURIAL 1

Mortuary Characteristics

Casket/Coffin Shape: unknown

Casket/Coffin Measurements: 83 cm in length; 16 cm in width

Burial Measurements: 60 cm in length

Elevation of Top of Casket: 99.53 m

Depth of Bottom of Casket: 99.37 m

Body Position: Extended, lying on back with hands to side. Head at west.

Casket Hardware: 28 cut nails (8d); two of them broken

Personal Items: 15 glass beads, 1 white glass bead, 1 1866 pierced nickel, 1 1853 twenty-five cent piece,

Figure 5-1. Sketch of exposed Burial 1 remains within Cell 9.

Notes and Field Observations: Remains were highly compressed with skeletal elements not easily discernible in the field. Skull was crushed and fragmentary. A root running through the eastern portion of the casket destroyed and displaced the lower leg and feet elements (**Figure 5-1**). Nonetheless, preservation of existing elements was good. Cloth was found stuck to the 1866 nickel, and the remains of cotton twine were still tied in the piercing. Both coins were found near upper right humerus. Beads were found around vertebrae suggesting a necklace around the child's neck. Some metal staining around beads suggest a thin metal wire stringing them together.

Osteological Summary

Age: 9 months to 1 year

Sex: Indeterminate

Biological affiliation: Indeterminate

Stature: Indeterminate

Preservation/Taphonomy: Bone preservation was poor. Fairly extensive root activity was noted throughout most of the skeleton. As a result, many of the skeletal elements, especially the long bones, were highly friable and difficulty in recording observations increased. Many skeletal elements were stained dark brown, likely from surrounding organic compounds (i.e. coffin wood and soil). Copper staining was noted on several neural arches and may be attributed to beads recovered in association with these elements [**Figure 5-2**]. One thoracic neural arch had trace amounts of green material adhered to it, possibly from a cupreous chain or clasp of a beaded necklace, or from patina from a glass bead.

Figure 5-2. Thoractic neural arch with bead and cupreous material stuck to it.

Skeletal and Dental Inventory: This individual was partially complete. Elements unidentified during lab analysis include cranial elements, the left ulna, most of the left radius, the left scapula, right clavicle, left and right pubis and ischium, and most of the hands and feet. The absence of these elements is most probably attributed to the poor bone preservation and the friable nature of the remains. The deciduous dentition is complete. The permanent dentition is mostly complete given the young age of this individual.

Figure 5-3. Criba orbitalia on the orbital aperture of Burial 1.

Skeletal Pathology: Minor cribra orbitalia was observed on the superior-lateral surfaces of the orbital apertures [**Figure 5-3**]. Possible porotic hyperostosis was observed on the external surface of the parietals, on either side of the sagittal suture. The internal vault features an active proliferative periosteal reaction with a woven appearance covering most of the internal vault and extending into sinus cavities of select preserved facial elements (including the frontal (**Figure 5-4**), parietals, occipital, body and greater wing of the sphenoid.

Figure 5-4. Woven bone on the internal cranial vault indicating periosteal reaction on, a.) frontal facial elements, and b.) occipital.

Woven bone and porosity was also noted on the ectocranial surface of the posterior squama of the temporalis. Active proliferative periostosis with evidence of vascularization also surrounds a possible lytic reaction observed on the endocranial surface of the frontal near the metopic suture. No notable thickening or expansion into the diploë was observed.

Dental Pathology: Enamel hypoplastic defects were noted on many of the deciduous dental elements. For the most part these hypoplasias appeared to be generally (but not always) bilateral; however variation in the severity was noted between right and left elements. The enamel of several teeth has an array of hypoplastic defects resulting in uneven areas of little or no enamel formation giving the crown a distinct mottled appearance (#'s 53, 55, 58, 59, 60, 61, and 70) (**Figure 5-5**). Single or multiple pit defects were noted on #s 52, 58, 60, 70, 68 and 61, and in many occasions these pits seem to be associated with cusp tips and other occlusal features, or are located along mesial/ distant marginal ridges, with bilateral variation is present. The mandibular second molars and maxillary first and second molars display a marked absence of enamel formation on the cusp tip (**Figure 5-6**). In addition to a significant reduction in enamel on the occlusal surface of

Figure 5-5. Hypoplastic defects resulting in little to no enamel on dental crown.

#61, the lingual surface of the protocone has a planar, shelf like defect starting 4.69 mm from the CEJ and extending to the cusp tip. Localized enamel hypoplasias of the primary canine were noted on all deciduous canines, and for all deciduous canines these defects accompanied other, additional enamel hypoplasias. Complete enamel loss on the hypocone of the deciduous maxillary 2nd molar (#60) resulted in a plane defect. One linear enamel hypoplasia was noted on #55.

Figure 5-6. Absence of enamel on the on maxillary molars.

An array of enamel discolorations in the form of brown, yellow, orange, cream, and grey opacities were observed on nearly all elements in the deciduous dental arcade. Some of these appear to also be found in conjunction with enamel hypoplasias. Although it is probable that many of these represent hypocalcification, the incomplete state of dental development makes it difficult to distinguish between discolorations which may have arose as a result of taphonomic factors and those which are true hypocalcification opacities.

Marked oblique wear of labial surface of maxillary central incisors and lingual surface of mandibular central incisors is suggestive of an underbite or some kind of food processing or habitual activity. Also, occlusal wear appears heavy given the age of the individual (less than a year) and recent eruption of the anterior dentition.

Degree of development of permanent dentition precluded the observation of dental pathology in the permanent dentition.

BURIAL 2

Mortuary Characteristics

Casket/Coffin Shape: Hexagonal or tapered to feet

Casket/Coffin Measurements: 63 cm in length; 15 cm in width at head and 10 cm in width at foot

Burial Measurements: 55 cm in length by 15 cm in width

Elevation of Top of Casket: 99.77 m

Depth of Bottom of Casket: 99.74 m

Body Position: Extended and lying on back with head at west. Arms crossed over chest, legs slightly bent.

Figure 5-7. Burial 2 exposed in situ.

Casket Hardware: 23 cut nails (8d)

Personal Items: 1 small white porcelain button

Notes and Field Observations: The coffin was poorly preserved in this burial and no intact coffin wood was recovered, making it difficult to discern the exact shape of the coffin. This burial was one of the most poorly preserved. The cranium was completely crushed and the arm and leg bones were disarticulated in place (**Figure 5-7**). The right humerus was found adjacent to the right femur. A button was recovered near the left clavicle.

Osteological Summary

Age: 32 weeks in utero to 36 weeks in utero

Sex: Indeterminate

Biological affiliation: Indeterminate

Stature: Indeterminate

Preservation/Taphonomy: Bone preservation was fair. Deterioration of the outer surface of bone was observed on approximately 90 percent of skeletal elements, and many skeletal elements were friable and fragmentary. Reddish-orange staining was observed on most cranial and postcranial elements.

Skeletal and Dental Inventory: This individual is mostly complete. Several elements of the vertebral column, pelvis, feet, several teeth, and portions of the right and left fibulae were not present or too fragmentary to identify during lab analysis. Approximately half of the dentition was either unobservable or unable to be identified. This is likely a consequence of the very young age of the individual.

Skeletal Pathology: None observed.

Dental Pathology: None observed, however early stage of dental development precluded most observations from being made.

BURIAL 3

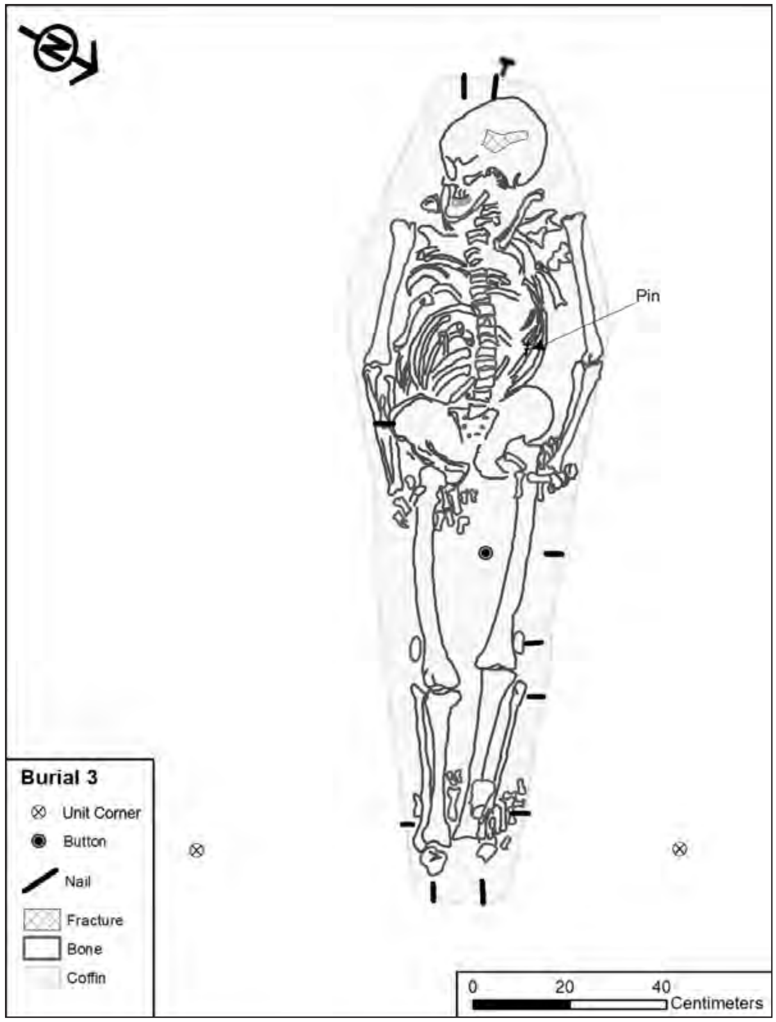

Figure 5-8. Sketch of exposed Burial 3, an adult male.

Mortuary Characteristics

Casket/Coffin Shape: Heaxgonal

Casket/Coffin Measurements: 170 cm in length; 25 cm in width at head, 23 cm at feet.

Burial Measurements: 162 cm in length; 50 cm in max. width at shoulders

Elevation of Top of Casket: 99.35 m

Depth of Bottom of Casket: 99.22 m

Body Position: Extended on back, head at west with arms at sides and legs parallel.

Casket Hardware: Four coffin screws, 20 cut nails (8d); 2 cut nails (10 d), 10 cut nails (4d or 6d), 3 upholstery tacks

Personal Items: 8 wooden buttons, 3 large white porcelain buttons, 4 small white porcelain buttons, 1 straight pin.

Notes and Field Observations: One of the deeper burials, but also one of the best preserved. Traces of red paint were observed on the inside of the coffin wood that seemed to flake off bone and coffin base as soil was removed. This individual was wearing clothing that buttoned in the back, as a number of buttons and a straight pin were found under the spinal column. This suggests the body may have been professionally prepared by a mortician prior to interment. There were also buttons found mixed in with hand and finger bones, suggesting cuff buttons. Skeleton was very well-articulated, especially at the articular ends of the long bones, and along the spinal column (**Figure 5-8 and Figure 5-9**). However, the head had turned completely around and face was facing into the dirt. The mandible was found upside-down.

Osteological Summary

Age: 35 to 55 years

Sex: Male

Biological affiliation: African American

Craniometrics obtained from this individual were compared to nineteenth century black males and nineteenth century white males in the computer program FORDISC Version 3.0. A discriminant function obtained from 15 log transformed variables classified this individual as being most consistent with other nineteenth century black males (posterior probability = 0.949, typicality F = 0.719, typicality Chi = 0.434).

As a secondary means for identifying group affiliation, cranial macromorphoscopics collected on this individual were compared to trait frequencies for African, Native American, European, and Asian populations obtained from Hefner (2009). Based on a preliminary comparison of the traits observed on Burial 3 to the frequencies seen in other populations, Burial 3 is most consistent with an African ancestry, with the potential for some degree of Native American admixture.

Stature: 159–170.94 cm (5’2.6”–5’7.3”) Stature was calculated using formulas obtained from nineteenth century black males in the computer program FORDISC Version 3.0. Stature was calculated using the maximum length of the clavicle (CLAXLN), maximum length of the femur (FEMXLM) and maximum length of the fibula (FIBXLN), as this formula had the highest R Square value (R Square = 0.834). Values shown are at a 95 percent confidence level.

Preservation/Taphonomy: Bone preservation was good, with the vertebrae being the most friable elements present. Most elements were stained dark brown from coffin wood or other organic compounds from the surrounding environment. Minimal taphonomic deterioration of the bone was observed. No taphonomic deformation of cranial elements was present, allowing for the cranium to be reliably reconstructed.

Figure 5-9. Photo of exposed Burial 3 within Cell 11.

Skeletal and Dental Inventory: The skeleton was essentially complete, with only four tarsal phalanges missing at the time of lab analysis. The dentition was complete.

Skeletal Pathology: Indicators of musculoskeletal stress were noted throughout the skeleton. Extremely robust muscle attachments were observed on the humeri, scapulae, clavicles, radii and ulnae, indicating hypertrophy of muscle attachments in the pectoral region, arm, and forearm (**Figure 5-10**). Furthermore, many leg and thigh muscle attachments were also very robust (femora, tibiae, and fibulae). Hypertrophic muscle attachments were observed on the dorsal left and right metacarpal surfaces, and palmer enthesopathies were observed on the left and right hand phalanges. Enthesopathies were noted on the left and right clavicle coracoclavicular attachment site, with the left being markedly more developed than the right (**Figure 5-11**). Os acromiale was present on the right scapula, likely the result of repeated or habitual stress to the pectoral girdle during development. A bilateral shallow concavity is present on the anterior surface of the femora, running lateral-proximal to medial-distal. The clavicle enthesopathies and os acromiale may indicate the left pectoral girdle may have been the dominant side, potentially the result of trauma or other habitual activities.

Figure 5-10. Burial 3 femura demonstrating robust muscle attachments.

Evidence of healed fractures were observed on several right and left forearm elements. A healed comminuted fracture of the right radius distal epiphysis resulted in significant post-traumatic alteration of the ulna, wrist joint and carpal bones (**Figure 5-12**). Although healing, the distal radius appears to have been shattered into several pieces. Post-traumatic alteration of the wrist joint included a pseudo-articulation which developed between the ulna and triquetral. Furthermore, luxation between the radius, lunate, and potentially the scaphoid (although the scaphoid was not present for observation) may have occurred around the time of the right radius fracture and as a result several neoarthroses developed between the forearm and carpal bones. Some evidence of minor subchondral joint destruction of wrist elements (articular facet pitting) and minor marginal lipping was also observed.

Figure 5-11. Left and right clavicles of Burial 3, note left coracoclavicular attachment is more robust than right.

The right ulna featured extensive remodeling of the distal diaphysis via deposition of dense undulating lamellar bone and a significant change in the morphology of the distal head and styloid process, likely result of the trauma to right wrist (**Figure 5-13**). It is possible that the ulna may have also been fractured, however the extent of the remodeling prevents this from being observed without the aid of a radiograph. A healed fracture of the right intermediate 3rd carpal phalanx proximal articular surface was noted; significant marginal lipping and porosity on the proximal articular surface of the right distal third phalanx was present as a result of the trauma. Degenerative joint changes noted in the arm, forearm, and hand included marginal lipping and pitting of the articular surfaces, and may in part be a result of the trauma.

The left radius had a healed reverse Colle's or Smith's fracture of the distal diaphysis, and possible evidence of a mostly healed cloaca is present on anterior surface of the fracture callus. It is possible that this may have been a comminuted or greenstick fracture; however the extent of remodeling precludes definitive statement. The left ulna also displayed dense bony deposits and marginal lipping of the distal articular facet and hypertrophy of the interosseous crest, both which may be a reaction to the left radius fracture. Marginal lipping and subchondral destruction observed in arm and forearm elements may also be a result of the trauma.

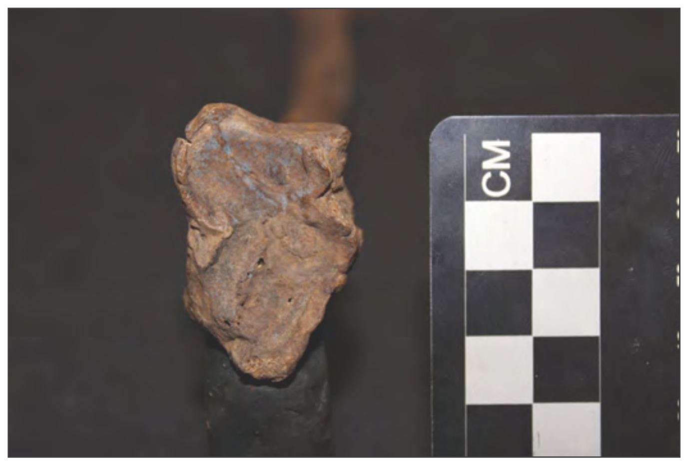

Figure 5-12. Healed comminuted fracture of the right radius distal epiphysis.

The right humerus displayed minor marginal lipping of the proximal and distal articular surfaces and dense spicule growth between the radial and coronoid fossa. The left humerus displays marginal lipping and pitting of the head and minor to marked marginal lipping around the distal articular facet (marked lipping limited to distal lateral border); furthermore, spicule growth was present between the radial and coronoid fossa, and porosity was present in the olecranon fossa.

Figure 5-13. Extensive remodeling of the distal diaphysis of the right ulna likely result of the trauma to right wrist.

The right second, fourth, and fifth metacarpals, and first proximal phalanx had well-circumscribed juxta-articular lytic lesions with sclerotic margins on the medial, lateral, or dorsal surfaces of the distal head (3.6–6.92 mm in diameter). On the left hand, similar juxta-articular lytic lesions were also noted on the proximal end of the left first proximal hand phalanx and the distal end of the third and fourth intermediate hand phalanges. Some minor to moderate evidence of marginal subchondral destruction, marginal lipping, and remodeling of left and right articular surfaces was noted. Dense, sclerotic bony deposits were noted on the distal palmar surface of the left and right metacarpal diaphyses.

In addition to the trauma described above, the left radius features pitting on the radial tuberosity and marginal lipping on the proximal and distal articular surfaces. The left ulna features evidence of subchondral destruction in the form of a well circumscribed lytic lesion/ subchondral cyst (2.3 mm in diameter) on proximal articular surface (coronoid aspect) and marginal lipping, pitting, and porosity of the facet for articulation with the right radius. Degenerative joint changes noted in the arm, forearm, and hand may partially be a result of the antemortem fracture of the left radius.

The left scapula features marginal lipping of the glenoid surface. The right scapula shows evidence of marginal lipping and subchondral destruction (pitting and remodeling of joint surface) of the glenoid fossa surface (significantly more severe than left). The left clavicle features pitting of acromial (lateral) end, pitting and macroporosity on sternal end, significant inferio-lateral extension of the sternal articular facet, and an enthesopathy present at the location of the coracoclavicular muscle attachment (left more developed than right). The right clavicle features microporosity and bone deposition on acromial (lateral) end, significant inferior-lateral extension of the sternal articular facet, and an enthesopathy of coracoclavicular attachment with a lytic pit on surface and significant posterior projection of the lesion.

The right and left os coxa feature dense bony growth (possible ossified ligaments) on the antero-lateral aspect of the auricular surface, lateral/dorsal aspect of iliac crest, and pubic tubercle. The right os coxa features pitting and minor subchondral destruction most evident on the superior aspect of acetabulum. The left os coxa features moderate evidence of subchondral destruction and articular surface remodeling in the form of microporosity and lipping of superior aspect and pitting and remodeling of inferior acetabular surface (more severe than right).

Healed and healing periostosis covered essentially the entirety of the left and right femora, tibiae, and fibulae diaphyses, with some regions displaying a more sclerotic appearance than others (**Figure 5-14**)

The right and left femora display remodeling of the anterior/anterior-superior femoral neck with significant dense bone deposition, significant lipping of the superior aspect of the head articular surface margin, enthesophytic growth medial of the lesser trochanter, and what appears to be a bilateral wide and shallow concavity on the anterior surface running lateral (proximal) to medial (distal), likely of musculoskeletal origin. The right femur displays an irregularity of the greater trochanter with macroporosity, a dense bony nodule on the linea aspera approximately at midshaft, and a lytic lesion on posterior distal metaphyseal surface characterized by woven bone with some evidence of densification (possible enthesopathy). The distal articular surface of the right femur (patellar surface) displays a concave lesion with two distinct pits indicative of subchondral destruction (total diameter 11 mm x 7.5 mm) while the right patella has a bony nodule which has developed or fused to the articular surface. Combined these provide evidence of possible osteochondritis dissecans. The left femoral head displays a superior-anterior extension of the articular surface (Poirier's facet). The left femoral diaphysis displays

Figure 5-14. Healed lesions on the right femur.

a region of sclerotic bone deposition with venous markings on the medial aspect of the proximal half of the diaphysis.

Healed periostitis was present on the entirety of the tibiae diaphyses with the exception of the distal and medial diaphysis of the left tibia, which featured healing proliferative periostosis. The left and right tibia exhibit minor marginal lipping around the proximal and distal articular facets, with a region of bilateral subchondral destruction on the lateral aspect of the medial condyles. The left and right tibiae also feature a region of sclerotic bony deposits and porosity approximately midshaft along the anterior crest. The left and right tibiae exhibit squatting facets manifested as an anterior extension of the distal articular surface. The right tibia has spicule growth along the popliteal line. The left tibia has a subchondral cyst (6 mm in diameter) on the posterior aspect of the distal articular facet.

The right fibula exhibits marginal lipping of the proximal articular surface and osteophytes or entheses are present on the proximal diaphysis. Hypertrophy of muscle attachments was observed for both the right and left fibulae.

Degenerative joint changes were noted in the right and left foot primarily in the form of marginal lipping of most elements, with the left being more severe than the right. Furthermore, the distal head of the left and right first metacarpal had pitting (small to 2.6 mm in diameter), with the left more severe than the right. The left navicular featured moderate to extensive osteophyte growth around the distal articular facet. Healed and/or healing periostosis was present on the dorsal surface of the left metatarsals. Microporosity was noted on several left tarsal elements. A possibly partially fused os trigonum was present on the left talus.

The vertebral column featured extensive pathology including trauma, Schmorl's nodes, vertebral compression fractures, vertebral osteophytosis and degenerative joint changes. Taphonomic breakage in the lower thoracic, lumbar, and sacrum prevented these pathologies from being fully observed.

The second cervical vertebrae featured a healed complete antemortem fracture of the dens, with significant remodeling of the superior surface (the dens was not recovered, **Figure 5-15**). A facet was present for the dens on the first cervical vertebrae, indicating the absence of the dens is traumatic rather than congenital in origin. Furthermore, the first cervical vertebrae had significant ossification and remodeling of the alar ligament sites and significant remodeling of the articular facet for the dens, likely a result of the trauma. Schmorl's nodes were present on T1, T2, T10, and T11. An anterior compression fracture was present on the anterior aspect of T12. A posterior compression fracture was present on L5 resulting in a significant loss of vertebral height.

In the axial skeleton, osteophytosis and degenerative joint changes are concentrated in three regions of increasing severity; the mid to upper cervical spine, T11 and T12, and L3 through S1. Significant changes were noted on the articular facets of T11 through S1 including significant marginal bone deposition, pitting of the articular surface, and moderate to significant remodeling of the articular facet shape and size, in some cases resulting in a significant increase in the overall size of the lamina (**Figure 5-16**). Eburnation was noted on L4 articular facets. Osteophytosis was most severe in T11, T12, and L3 through S1 (increasing in severity caudally). Osteoclastic activity was noted on the anterior aspect of the inferior body surface of T11 and T12, with the more severe activity on T12 almost looking lytic in appearance with woven bone.

Figure 5-15. Significant remodeling of the superior surface of the second cervical vertebrae indicating a healed antemortem fracture.

The articular facets of most ribs featured marginal lipping and pitting. Congenital anomalies were present in the form of sagittal clefting of the inferior vertebral body of the second cervical vertebrae. Porosity on the maxillary palate and in the maxillary sinuses is indicative of maxillary sinusitis.

Figure 5-16. Significant remodeling of articular facets of T11 through S1 vertebrae.

Dental Pathology: Overall, dental occlusal wear appeared to be relatively moderate and even. Periodontal disease is present throughout the maxillary and mandibular dental arcade (**Figure 5-17**). Porosity ranges from minor to severe, while alveolar resorption is evident throughout ranging from minor to significant. Periodontal disease appears to be most significant in the anterior maxillae and mandible. Several pockets of periodontitis are present around MandLPM1, MandLPM2, and MandRC1 and are likely a result of irritation from calculus deposits.

Minor to significant calculus deposits were present throughout the dentition. Significant calculus deposits were present on the anterior mandibular dentition and the posterior left maxillary dentition. Calculus present in occlusal crenulations on MaxLPM2, MaxLM1, and

MaxLM2 suggest these teeth either did not serve a major role in chewing or the diet may have been partially limited to softer foods.

Figure 5-17. Periodontal disease in the maxillary dental arcade.

Numerous carious lesions and several alveolar abscesses were present throughout the dentition. Occlusal surface caries were located on the MandLM3, and MaxLM3. Cervical caries were present on the MandRPM2, MandRC, MandLC, MandLPM1, and MandLM3. Interproximal cares were located on the MaxRC, MaxRI2, and MaxLI2. Large caries with pulp chamber exposure was noted on several teeth including the MandRPM1 and MaxLM3. Furthermore, the MaxLM3 is represented by only by carious roots. A possible supernumerary left maxillary fourth molar was present and is represented by a carious root. Abscesses are associated with the large carious lesions on the MandRPM1 and MaxLM3. An open healing abscess is present in the region of either MaxRPM2 or MaxRM1 (both lost antemortem) with evidence of partial perforation of the abscess to the maxillary sinus.

Possible use wear was noted on the anterior dentition (maxillary and mandibular) in the form of oblique lingual wear resulting in the loss of most lingual crown features. Dental use wear was also noted in the form of antemortem chipping of numerous dental elements (MaxRI2, MaxRI1, MaxLI1, MaxLI2, MaxLC, MaxLPM1, MaxLPM2, MandLM3, MandLI1, MandRI1). These chips were both blocky and conical in morphology, and ranged in size from small to large. The chips were primarily focused in the anterior and left side of the dental arcade, potentially indicating some sort of left side preference for the activity creating the enamel chips. Furthermore, the enamel chipping on the anterior dentition was limited to the labial aspect of the incisive surface and was primarily conical in nature. The combination of the lingual oblique wear and incisive chipping of anterior dentition may indicate some sort of habitual food or other activity involving the front teeth.

A suite of observations on the left mandibular premolars indicate possible trauma to the dentition. A large portion of the distal crown and root of the mandibular first premolar (MandLPM1) and a large portion (around 1/3) of the mesial crown of the mandibular left second premolar (MandLPM2) were broken antemortem with notable polishing and wear on the broken surfaces (**Figure 5-18**). Furthermore, the MandLPM2 was displaced a significant distance distally on the mandible and repositioned on the mandible so that it was laying horizontal just mesial of MandLM3 (MandLM1 and MandLM2 were lost antemortem) with the crown projecting into the oral cavity. The MandLPM2 would have been minimally held into place with soft tissues, however substantial polishing on the mesial tooth surface suggests the tooth and left dental arcade continued to be employed in mastication. Alternatively, the polishing on the

Figure 5-18. Antemortem polishing and wear on broken surfaces of the mesial crown of the mandibular left second premolar.

tooth could have been the result of habitual polishing or rubbing by the individual with some sort of tool as a result of irritation or discomfort to the area. Similarities in occlusal wear between the first and second left mandibular premolars suggest the breakage event occurred around roughly the same period of time, while minimal differences in occlusal wear between the right and left mandibular premolars suggests that it is unlikely that this trauma occurred more than a few years prior to death. The large degree of crown and root breakage of the left mandibular molars, coupled with the significant posterior displacement of the MandLPM2 is suggestive of some sort of traumatic event.

Black pigmentation or extrinsic staining was present on several left maxillary and mandibular molars. This may indicate the use of a topical ointment in the area to relieve discomfort from the trauma discussed above, or alternatively if combined with the high prevalence of cervical dental caries this may indicate the habitual use of a product like chewing tobacco.

No evidence of enamel hypoplasias or hypocalcification was observed.

BURIAL 4

Mortuary Characteristics

Casket/Coffin Shape: Unknown, probably hexagonal

Casket/Coffin Measurements: 83 cm in length; 25 cm in width

Burial Measurements: 63 cm in length; 17 cm in width

Elevation of Top of Casket: 99.73 m

Depth of Bottom of Casket: 99.65 m

Body Position: Extended on back, head at west, with arms pelvis and legs crossed with ankles right over left

Casket Hardware: 8 ferrous gimlet screws, 6 cut nails (8d), 21 cut nails (4d–6d)

Personal Items: None except for possible wooden cross which may just be degraded casket lumber

Notes and Field Observations: Two lead birdshot bullets were found directly over the coffin of this burial. This could have some spiritual significance though it is unclear what that would be. Alternately, the bird shot may occur circumstantially. The skull partially crushed and ribs and vertebrae were very fragmentary. This was one of the shallower burials, and the casket for the burial was almost completely eroded away (**Figure 5-19**).

Figure 5-19. Burial 4 exposed in situ.

Osteological Summary

Age: 1 to 1.5 years

Sex: Indeterminate

Biological affiliation: Indeterminate

Stature: Indeterminate

Preservation/Taphonomy: Bone preservation was fair and many bones were friable. As a result, not all observations were able to be taken. Most elements were stained dark brown from coffin wood or other organic compounds from the surrounding environment.

Skeletal and Dental Inventory: The individual was mostly complete. The pubis and many of the hand and foot elements were missing or unable to be identified in the lab. Most of the hand and foot elements not distinctly identifiable in the lab were likely present in situ but bone preservation prevented their identification by time of lab analysis. The deciduous dentition was mostly complete. The deciduous mandibular left central incisor and deciduous mandibular right lateral incisor and canine were missing postmortem. The observable permanent dentition developed by the time of death was mostly complete.

Skeletal Pathology: Cribra orbitalia was observed on the left and right superior orbital surfaces, with a greater expression observed on the left orbit. Minor periostosis was observed on the right and left temporal bones, superior to the external auditory meatus.

Dental Pathology: Enamel hypoplasias were noted on several teeth. A localized enamel hypoplasia of the primary canine was noted on #63, 3.97 mm from the cementoenamel junction. The deciduous maxillary right second molar features regions of reduced or absent enamel on the occlusal surface and several pits associated with cusp or ridge tips (**Figure 5-20**) Furthermore, a nonlinear array of pits was present on the buccal and lingual surface and shelf like planar defects were present on the mesio-buccal surface (protocone) and disto-lingual surface (**Figure 5-21**). Although the hypocalcifications observed on this tooth were mirrored on the antimere (deciduous maxillary left second molar) the enamel hypoplasias were not.

Figure 5-20. Reduced or absent enamel on the occlusal surface associated with the deciduous maxillary right second molar.

Hypocalcification was present in the form of discrete transverse yellow-brown and creamy-gray banded opacities on #s 52, 58, and 58. The labial surface of several maxillary teeth displayed staining.

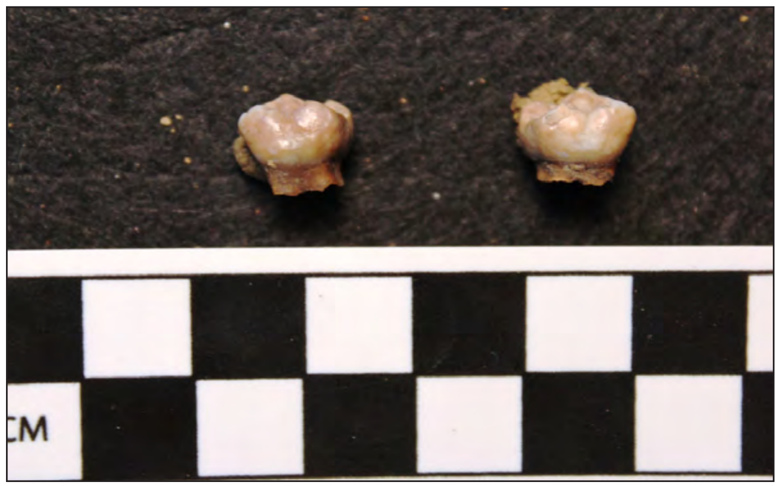

Figure 5-21. Pits and shelf like planar defects on the deciduous maxillary right molars.

Antemortem chipping was noted on the occlusal surfaces of #54 and #56. Wear facets on deciduous central incisors suggest the maxillary left 1st incisor was mesially rotated and a significant amount of anterior crowding of anterior dentition may have been present.

BURIAL 5

Mortuary Characteristics

Casket/Coffin Shape: Rectangular

Casket/Coffin Measurements: 65 cm in length; 23 cm in width

Burial Measurements: 58 cm in length; 17 cm in width

Elevation of Top of Casket: 99.70 m

Depth of Bottom of Casket: 99.63 m

Body Position: Half flexed with head at east; right hand is over stomach and left up at shoulder. The left leg is bent and splayed to left.

Casket Hardware: 25 cut nails (8d), 1 broken nail

Personal Items: 3 white porcelain buttons, 1 metal rivet (originally interpreted as a wooden button)

Notes and Field Observations: This burial is a very small infant and may have died before it was christened which would explain why it was buried with its head at the east rather than west. The body was placed in a semi-flexed/fetal position with one hand up at head and one leg bent. It is possible that the body was actually placed on its side. Three buttons were found extending from the base of the left elbow to the center of the pelvis. Traces of red paint were observed near the base of the coffin and floor of burial shaft (**Figure 2-22**).

Figure 5-22. Burial 5 exposed in situ.

Osteological Summary

Age: 36 weeks in utero to 1 month postpartum

Sex: Indeterminate

Biological affiliation: Indeterminate

Stature: Indeterminate

Preservation/Taphonomy: Bone preservation was fair; many bones were friable. To maximize observations, much of the individual was removed in bulk for lab analysis. The majority of the metric observations were taken while the bone was still imbedded in matrix. Most elements were stained dark brown, potentially from the coffin wood or organic compounds from the surrounding environment.

Skeletal and Dental Inventory: The individual was mostly complete. The right fibula, left clavicle, and elements of the hand or feet were either not present or only represented by small fragments. Dentition was mostly complete and only five teeth were missing or unobservable. At least three of these could be confirmed as being lost postmortem. The missing or unobservable dental elements are likely an artifact of the friable nature of the remains.

Skeletal Pathology: The basal, lateral, posterior-inferior cranium (including of the sphenoid, pars basilaris, left and right pars lateralis, pars squama, left and right zygomatics, and portions of the left and right temporals) feature regions of active proliferative periostosis presented in the form of new proliferative woven bone growth (**Figure 2-23**). This reaction is observed in varying degrees on both the ectocranial and endocranial surfaces, and surpasses bony reactions expected with normal bone development. The diaphysis of the left radius is curved medially. It is unknown if this is curvature is pathologic or taphonomic in origin.

Dental Pathology: Incomplete crown development and enamel mineralization of the teeth prevented most observations from being made. A small circular defect (1.41 mm in diameter) was present on the labial surface of the maxillary left first incisor.

Figure 5-23. Proliferative periostosis presented in the form of new proliferative woven bone growth on cranial elements.

BURIAL 6

Mortuary Characteristics

Casket/Coffin Shape: Rectangular, with possible vaulting

Casket/Coffin Measurements: 170 cm in length; 49 cm in width

Burial Measurements: 155 cm in length; 38 cm in width

Elevation of Top of Casket: 99.80–99.57 m

Depth of Bottom of Casket: 99.62–99.42 m

Body Position: Extended on back with head at west; hands over stomach and ankles parallel

Casket Hardware: 6 cut nails (8d), 6 cut nails (6d), 2 cut nails (4d), 1 broken cut nail

Personal Items: 2 cupreous hook and eye clasps, one button (swept away during cleaning and not recovered)

Notes and Field Observations: Casket lid not well preserved and the sides of the casket were slumped inward with bones partially embedded in wood on the left side of the body. The right ulna was displaced from its burial position over the stomach. Preservation of the skeleton was excellent (**Figure 5-24 and Figure 5-25**). A button was observed near the upper thoracic region but swept away during cleaning and was not recovered.

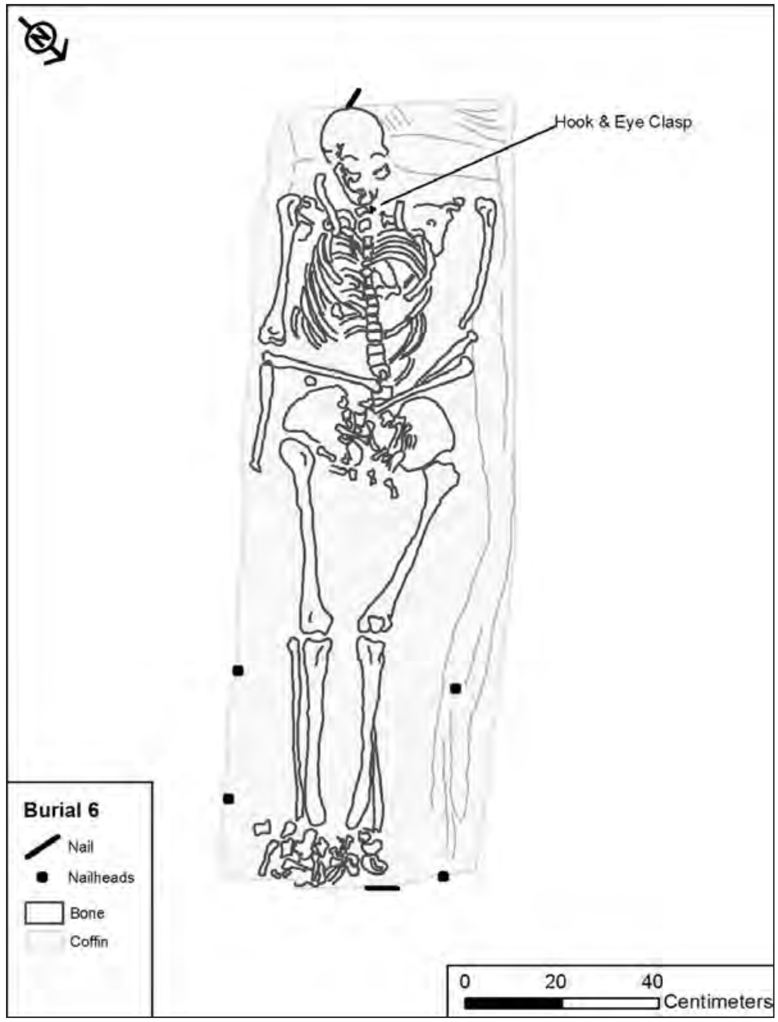

Figure 5-24. Sketch of Burial 6.

Osteological Summary

Age: 35 to 45 years

Sex: Female

Biological affiliation: Indeterminate. Pathology observed on the cranium and fragmentation of the face (one of the more ancestrally diagnostic regions of the cranium) made biological affiliation or ancestry determination difficult. Craniometrics obtained from this individual were compared to discriminant functions obtained from normal and log transformed variables from various iterations of nineteenth century black and white females, twentieth century black and white females, Hispanics, Native Americans (pooled), and groups from Europe, North America (Arikara and Santa Cruz Island Native Americans), and Africa in the computer program FORDISC Version 3.0. Typicalities were virtually nonexistent for most comparisons except Native American (pooled or Santa Cruz Island) or nineteenth Century black, and these typicalities were still very low. This indicates the individual was not significantly similar to any one group. At this time a definitive classification cannot be made for either group.

As a secondary means for identifying group affiliation, cranial macromorphoscopics collected on this individual were compared to trait frequencies for African, Native American, European, and Asian populations obtained from Hefner (2009). Based on a preliminary comparison of the traits observed on Burial 3 to the frequencies seen in other populations, Burial 6 is most consistent with an African ancestry; however several of the observed traits are also seen in high frequencies in Native American and Asian populations.

Although not nearly as reliable as craniometrics or cranial macromorphoscopics, postcranial metrics were employed to aid in group identification. Using discriminant functions obtained from 44 variables from modern samples of forensic whites and blacks, Burial 3 classified best with modern blacks (posterior probability =0.993, typicality F = 0.616, typicality chi = 0.280).

Due to the presence of conflicting results for available biological affiliation estimators and lack of data, a biological affiliation designation was not able to be assigned to this individual at this time.

Stature: 155.7–168.65 cm (5’1.3”–5’6.4”). Stature was calculated using formulas obtained from nineteenth century pooled females in the computer program FORDISC Version 3.0. Stature was calculated using the maximum length of the clavicle (CLAXLN), bicondylar length of the femur (FEMBLN) and the height of the sacrum (SACAHT), as this formula had the highest R Square value (R Square = 0.854). Values provided are at a 95 percent confidence level.

Figure 5-25. Photo of Burial 6 exposed in situ.

Preservation/Taphonomy: Bone preservation was very good. Black staining was noted on the ectocranial surface of the right frontal.

Skeletal and Dental Inventory: The skeleton was mostly complete with the exception of several carpal and tarsal phalanges and the right patella, which were missing at the time of lab analysis (postmortem). The dentition was mostly complete with the exception of two teeth lost postmortem.

Skeletal Pathology: Indicators of musculoskeletal stress were noted throughout the skeleton. Extremely robust muscle attachments were observed on the humeri, scapulae, clavicle, radii and ulnae, indicating hypertrophy of muscle attachments in the pectoral region, arm, and forearm. Hypertrophy of several muscle attachments in the thighs and legs were also observed.

The cranium displayed a variety of pathologic lesions. In general, the external cranial vault had an overall sclerotic appearance with an undulating, uneven surface. The superior parietals (portions right and left of the sagittal suture superior of temporal line), posterior frontal, and superior occipital (superior of superior nuchal line) displayed marked porosity with thickening of the diploë and an uneven undulating surface appearance. Within this area on the parietals, at least three smoothed circumscribed depressions with porosity were observed (3.8–8.8 mm in diameter) of unknown etiology. Maxillary sinusitis was present in the left and right maxillae. The midface features postmortem taphonomic breakage, preventing a full observation of the morphology and pathology in the area. Despite this, remodeling of the nasals was observed (**Figure 5-26**) indicating either a well healed antemortem fracture of the nasals or remodeling to the area due to a disease like tuberculosis or syphilis. Pitting and remodeling of the inferior nasal aperture surface was also observed (**Figure 5-27)**. Minor porosity was present around the left and right external auditory meatus. Premature complete obliteration of many sutures had occurred. A section of the sagittal suture at obelion was completely obliterated, however a complete perforation was still present possibly indicative of an obelionic foramen (**Figure 5-28**). Hypertrophy of the alar ligaments was present, potentially the result of compensation for the congenital malformation seen in the C1 neural arch.

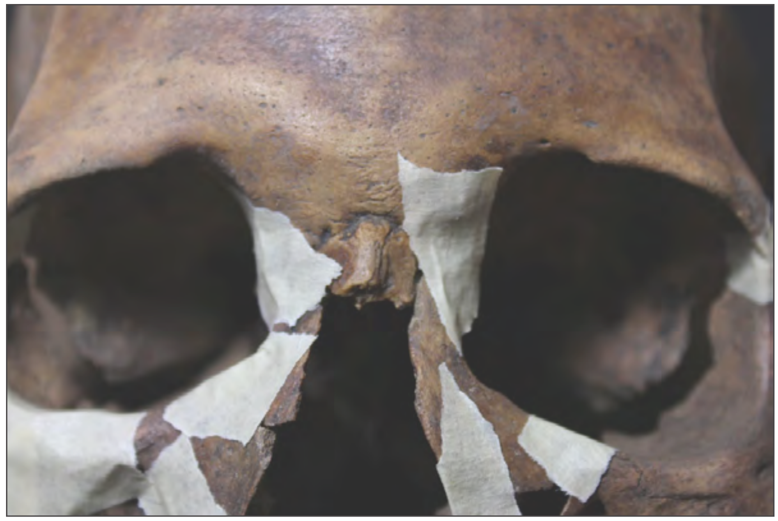

Figure 5-26. Remodeling of the nasals indicating either a well healed antemortem fracture or possible remodeling to the area due to a disease like tuberculosis or syphilis.

Figure 5-27. Pitting and remodeling of the inferior nasal aperture surface.

Both the right and left scapulae had very robust muscle attachments and appeared markedly narrowed or pinched medial-laterally. Degenerative joint changes were present in the form of minor lipping of the glenoid fossa. Os acromiale was present on the left scapula (**Figure 5-29**).

The muscle attachments for both the left and right clavicles were very robust, with the right more so than the left. Both clavicles had very well developed enthesopathies at the attachment sites for the costoclavicular ligament (right markedly more expressed than left), and a spine-like bony projection on the anterior aspect of the lateral diaphysis (**Figure 5-30**). The right clavicle featured macroporosity and pitting of the acromial end.

The left and right humerii feature very robust muscle attachments, as well as minor lipping of the distal articular surfaces and osteophyte deposition on the medial and lateral aspects of the distal diaphysis and metaphyseal region.

The left radius has robust muscle attachments, possible enthesophytic growths on the radial tuberosity and mid posterior diaphysis, and minor healed periostitis on the anterior distal diaphysis. The left ulna also has quite robust muscle attachments and a lytic enthesopathy at the brachialis insertion site and triceps brachii tendon insertion site (coronoid process) (**Figure 5-31**). Osteophytic growth or minor ossification of the triceps brachii tendon is also present. Furthermore, the left ulna has a smooth walled juxta-articular concavity or lytic lesion lateral of the trochlear notch.

Figure 5-28. A complete perforation of the sagittal suture indicating an obelionic foramen.

Figure 5-29. Os acromiale on the left scapula.

Figure 5-30. A spine-like bony projection on the anterior aspect of the lateral diaphysis of the clavicles.

Figure 5-31. Muscle attachments of the left ulna.

The right radius and ulna feature an assortment of trauma and pathology. The right ulna displays a well-healed fracture of the distal diaphysis, with the progression of healing suggesting this fracture occurred well before death. This fracture is malaligned with the distal segment being displaced distally and a marked medial curvature of the distal end, resulting in the right ulna being 11mm longer than the left. The right ulna also has minor periostitis of the distal 1/3 of the diaphysis. The distal right radius displays a notable thickening of the distal diaphysis and lamellar bone deposition (significantly more thick than the left) suggesting the presence of either a well-healed fracture of the distal end (possible evidence of a well-healed hairline fracture is present on the distal diaphysis, running mesial-proximal to lateral-distal); alternatively, this thickening may be due to the development of a bony callus as a side effect of the right ulna fracture. The right radius midshaft features healed, sclerotic periostitis increasing in severity posteriorly, resulting in dense lamellar bone deposition on the midshaft surface and a notably undulating surface. The right ulna and radius had very robust muscle attachments. Similar to the left ulna, the right ulna also has a lytic enthesopathy accompanied by ligament ossification at the triceps brachii insertion site.

The left and right hands displayed well developed muscle attachments with minor to moderate marginal lipping of the articular facets. Palmer enthesopathies were noted. No trauma was observed.

Several lesions were present on the right and left os coxa. Multifocal well-circumscribed lytic lesions were present on the superior aspect of the left and right acetabular articular surfaces (with a corresponding lytic lesion on the left femoral head), and on the posterior portion of the auricular surfaces. Both the left and right os coxa have a region of osteophytic and bony nodule growth on the ventral surface of the pubis, accompanied by sclerotic lamellar bone deposition, macro and micro porosity, and a thickened irregular appearance. Furthermore, ossification of several ligament attachment sites on both bones was noted. The left os coxa has an irregularly shaped acetabulum, an overall flattened appearance, and evidence of remodeling, potentially due to subluxation of the femoral head.

The left and right femora displayed well developed, robust muscle and ligament attachments, with the left more so than the right. The femora also displayed healed periostitis along the extent of the diaphysis, and the anterior aspect of the left distal metaphysis displays active periostosis accompanied by macroporosity and microporosity. The femoral necks of the right and left femora had areas of macro and microporosity, with the left more severe and accompanied by woven bone. The anterior femoral neck and head (articular surface) of the left femur also had several diffuse lytic lesions which appear to correspond to lesions on the acetabulum. The posterior left femur had elongation and deformation of the fovea capita, proliferative spicule growth on the posterior metaphyseal region, active periostitis on the anterior metaphyseal region, and moderate to severe lipping of the distal articular surface. The femora also displayed Poirier's facets manifested as lateral extensions of the anterior or antero-superior articular facets.

The left patella had moderate marginal lipping around the articular surfaces. Furthermore, the left patella displayed significant elongation of the apex accompanied by microporosity of the apex.

The extent of the diaphyses of the left and right tibiae and fibulae exhibited extreme proliferative ossifying periostosis with a dense, undulating, sharp and sclerotic appearance, with the left being significantly more severe than the right. The midshafts of the fibulae appear to exhibit the most severe extent of periostosis for those bones. The periostosis is most severe on the distal half of the anterior medial diaphysis of the right tibia, and is most severe for most of the extent of the anterior aspect of the left tibia. Spicule growth, macro, and microporosity was present at the location of the tibio-fibular syndesmosis of the left and right tibiae and fibulae, with the left much more severe than the right and possibly suggesting a sprain may have occurred. The right and left tibiae feature minor to moderate lipping of the articular facets, with minor eburnation present on the left proximal articular facet.

The feet display a variety of pathologic lesions and trauma. Periosteal reactions accompanied by macroporosity and proliferative spicule growth were present on the left 1st, 2nd, and 5th metatarsals, and left navicular. Lytic lesions were present on the talar facet of the left navicular and juxta-articular lesions were present on the superior right talus. A well healed fracture of the right third metatarsal at midshaft, resulting in a rotation of the shaft, and bony callus deposition on the right fourth metatarsal. Many right and left foot elements display marked muscle attachments. Ossification of the calcaneal tendons is observed, accompanied by macroporosity and microporosity. Marginal lipping is seen on many foot elements, with the left foot elements displaying markedly more severe marginal lipping than what is seen with the right.

The first cervical vertebra (C1) displayed several congenital defects or abnormalities. Bilateral aplasia or bilateral clefting of the left and right neural arch segments was observed (**Figure 5-32**). The posterior arch was present and the posterior synchondrosis was fused, however this segment was unfused to the condyles. The right posterior arch was significantly longer and pointier than the left. Variation in the anterior arch morphology was present (Scheuer and Black 2000:199). Significant remodeling of the superior/cranial articular facets was noted. Furthermore, the

Figure 5-32. Bilateral aplasia or bilateral clefting of the left and right neural arch segments.

anterior symphysis was also unfused with significant bony deposition and remodeling; no facet for the C2 dens was present. Hypertrophy of the occipital alar ligament attachments and hypertrophy and bony nodule deposits on the C2 dens are likely a result of soft tissue compensation for this defect. The C2 also featured a lytic lesion and hypertrophy (possibly an enthesopathy) at the site of insertion for the transverse ligament of the atlas. It is possible that, with the presence of the supernumerary vertebrae described below in mind, this represents some form of occipitalization of the atlas or a caudal boarder shifting of the vertebral column.

A supernumerary thoracic vertebra is present (13 total thoracic vertebrae). Based on general morphology alone, it is believed that the 1st thoracic is supernumerary. The ribs themselves were too fragmented to accurately count, however, facets for the rib articulations present on the vertebrae suggest this was likely.

Possible compression trauma was present on the cranial surface of the fourth lumbar body (**Figure 5-33a–b**). The compression is "V" shaped and angled backward, with the posterior-medial margin nearing a 90 degree angle. This compression does not appear consistent with a taphonomic cause as possible healing or remodeling is present at the apex of the indentation. If it was traumatic in origin, the trauma would have originated from the right lateral side and directed anterior and caudally. No easily identifiable corresponding trauma was noted on the caudal surface of L3, however a Schmorl's node was present on the L3 and L4 caudal surfaces, and the morphology of the L3 superior articular facet suggests there may have been a slipped or damaged disc.

Marginal lipping and remodeling of the lumbar articular facets was observed, and marked bilateral asymmetry in osteophytic growth and degenerative joint changes to the articular facets was noted in the lumbar vertebrae; it is unknown if this is related to the potential trauma described above. Minor osteophytosis was present on several upper thoracic vertebrae. Lamellar spurs are present in lower thoracic and lumbar vertebrae, with the severity increasing caudally.

Figure 5-33. Possible compression trauma present on the cranial surface of the fourth lumbar body, a.) front view, b.) side view.

The right and left lower ribs featured minor porosity on the lateral/ventral surface. No porosity was noted on the visceral surface. The ribs also appeared abnormally wide, however it is not suspected this is of a pathologic etiology.

Dental Pathology: All of the mandibular posterior dentition was lost antemortem with full resorption, indicating these teeth were lost at least several months prior to death. With the exception of the MaxLC (a carious root stump) and the LMaxI2 (lost postmortem), all of the maxillary dentition was lost antemortem with full resorption. A decrease in alveolar height due to resorption and general macroporosity is noted in both the anterior maxillae and mandible. Very little alveolar bone is remaining for teeth still in occlusion. All teeth present and observable had evidence of carious activity. Several large carious lesions were observed with pulp chamber exposure. Root carious lesions were also noted at or below the CEJ of several anterior mandibular teeth, with calculus deposits located apically (below) these caries (**Figure 5-34**), suggesting the roots were significantly exposed during life. Apical abscesses perforating the labial alveolar surface are located at the apex of the MandRI2, MandLI2, and MaxLI2. Minor calculus deposits were observed on all mandibular teeth present.

For those teeth present, wear was rather light with minimal dentine exposure. This lack of severe wear may have been affected by early loss of the remainder of the dentition.

Figure 5-34. Root carious lesions and calculus deposits noted on anterior mandibular teeth suggesting the roots were significantly exposed during life.

BURIAL 7

Mortuary Characteristics

Casket/Coffin Shape: Hexagonal or possibly trapezoidal with coffin wider at feet than head.

Casket/Coffin Measurements: 110 cm in length; 48 cm in width at shoulder, 30 cm wide at feet

Burial Measurements: 105 cm in length; 24 cm in width

Elevation of Top of Casket: 99.63 m

Depth of Bottom of Casket: 99.47 m

Body Position: Extended on back with head at west; right hand over pelvis and left hand at side; legs parallel though slightly bent and overlapping.

Casket Hardware: 1 cut nail (12d), 7 cut nails (8d), 5 cut nails (6d), 4 cut nails (2d or broken)

Personal Items: 1 mother-of-pearl, 4-hole button

Notes and Field Observations: The coffin lid and sides on were well preserved on this burial, though as with all burials the sides and lid has slumped after more than a century in the clay. Cross pieces suggesting vaulting were laid crosswise over the lid. Skeletal preservation on this burial was excellent and the bones were well articulated (**Figure 35a–b**). As with all juveniles in this population the skull was crushed. Coffin constructed of approx. 10 cm boards. A button was recovered by the feet of the child.

Osteological Summary

Age: 5 to 7 years

Sex: Indeterminate

Biological affiliation: Indeterminate

Stature: Indeterminate

Figure 5-35. Burial 7 exposed in situ, a.) lid of coffin and b.) exposed skeleton of Burial 7.

Preservation/Taphonomy: Bone preservation was very good. Minor erosion of the outer table of bone was noted on several elements, and several ribs and portions of the cranium show evidence of postmortem breakage. Black staining (potentially mold) was noted on several elements, most notably cranial elements.

Skeletal and Dental Inventory: The skeleton was mostly complete. Only a few small portions of the cranium and small hand and foot bones were either too fragmentary to identify or missing during lab analysis. The dentition was mostly complete. Elements missing postmortem from the deciduous dentition include the mandibular central incisors, mandibular left lateral incisor, and mandibular left canine. The permanent mandibular left second premolar was missing postmortem.

Skeletal Pathology: Porosity and proliferative periostosis was observed within the maxillary sinuses (**Figure 5-36**) and macro and micro porosity was observed on the palate. Periostosis was also noted on the medial surfaces of the right and left mandibular ramus. Both observations are suggestive of maxillary sinusitis.

Figure 5-36. Porosity and proliferative periostosis within the maxillary sinuses.

Dental Pathology: Two pit-type enamel hypoplastic defects were observed on the permanent dentition. A pit defect was located on the labial surface of #8, 1.61 mm from the CEJ. Another pit defect was located on the buccal surface of #20, 2.08 mm from the CEJ.

No enamel hypoplasias were noted on the deciduous dentition. A diffuse cream colored opacity was on the distal half of the crown of #67. Root caries were noted on the labial surface of #56.

Antemortem chipping was noted on several teeth. Small blocky chips were on the disto-lingual occlusal margin of #70, mesio-buccal occlusal margin of #51 and disto-buccal occlusal margin of #52. A large blocky chip with dentine exposure was noted on the disto-lingual occlusal surface of #62 (**Figure 5-37**). Oblique labial wear on deciduous maxillary incisors and lingual wear on the mandibular incisors suggest under-bite/under-jet or use wear.

Figure 5-37. A large blocky chip with dentine exposure noted on molar.

Skeletal Anomalies: Although not pathological, notable epigenetic observations consist of a septal aperture on the right humerus and venous markings on the frontal bone.

BURIAL 8

Mortuary Characteristics

Casket/Coffin Shape: Rectangular

Casket/Coffin Measurements: 60 cm in length; 24 cm in width

Burial Measurements: 47 cm in length; 27 cm in width

Elevation of Top of Casket: 99.94 m

Depth of Bottom of Casket: 99.77 m

Body Position: Partially flexed with head at west; hands over stomach; legs partially bent outward with ankles touching

Casket Hardware: 3 cut nails (8d), 2 cut nails (6d), 2 cut nails (4d or possibly broken)

Personal Items: 3 white porcelain buttons (4-hole)

Notes and Field Observations: This was the shallowest burial within the cemetery. The top of the coffin was visible from the surface and it was remarkably preserved and intact, with very little slumping. The partially flexed, fetal-like position of the burial was likely related to young age of the child (**Figure 5-38 and Figure 5-39**). Two buttons were found near the left shoulder and a larger button was found beneath the right ulna. Preservation of the skeletal elements was quite good. Bones were well articulated, with only the right radius slightly displaced.

Figure 5-38. Exposed casket of Burial 8. Top of coffin was near ground surface.

Figure 5-39. Exposed skeletal remains of Burial 8.

Osteological Summary

Age: 36 weeks in utero to 1 month postpartum

Sex: Indeterminate

Biological affiliation: Indeterminate

Stature: Indeterminate

Preservation/Taphonomy: Bone preservation was good, with cranial elements sustaining the highest degree of fragmentation. Most elements were stained dark brown, likely from coffin wood or other organic compounds. Red-orange staining was observed on several cranial elements. Damage from root disturbance was noted throughout and was most marked on the right tibia and metaphyses of long bones.

During lab analysis many hand bones were found mixed within the rib and vertebral material. This suggests that either the hand bones were displaced as a result of taphonomic processes or, more likely, that the hands were placed on the chest at the time of internment.

Skeletal and Dental Inventory: The skeleton was mostly complete. A few portions of the cranium, right ischium, and hand and foot bones were either too fragmentary to identify or missing during the lab analysis. The dentition was partially complete. Nine deciduous teeth were missing postmortem; most likely a result of preservation and the fragile nature of teeth of this age.

Skeletal Pathology: Though general porosity consistent with normal growth and development was noted on many skeletal elements, several skeletal elements exhibited greater than average porosity. The lesser and greater wings of the sphenoid, vertebral ends, and ribs, exhibited severe porosity and proliferative periostosis. To a lesser extent, porosity and proliferative periostosis was also observed on the pars basilaris, proximal ulnae, many fragments of the frontal and parietals, and both mandibular hemi-bodies (**Figure 5-40)**. Fragmentation and some postmortem erosion of the bone affected the ability to fully observe many of these lesions. Possible cribra orbitalia was observed on the superior surface of the left orbit (**Figure 5-41**). The region directly superior to the orbit also featured porosity similar to other cranial elements listed above.

Figure 5-40. Porosity and proliferative periostosis on cranial elements.

Dental Pathology: None observed. Lack of complete dental mineralization for many teeth, however, precludes a definite statement on absence of dental pathology from being made.

BURIAL 9

Figure 5-41. Possible cribra orbitalia on the superior surface of the left orbit.

Mortuary Characteristics

Casket/Coffin Shape: Hexagonal

Casket/Coffin Measurements: 188 cm in length; 80 cm in width at elbows; 24 cm in width at head; 28 cm in width at feet

Burial Measurements: 176 cm in length; 60 cm in width

Elevation of Top of Casket: 99.79–99.57 m

Depth of Bottom of Casket: 99.40 m

Body Position: Extended with head at west; right arm over pelvis; legs and ankles parallel

Casket Hardware: 4 cut nails (10d) 14 cut nails (8d), 26 cut nails (6d), 4 cut nails (2d or broken)

Personal Items: 3 bone, 4-hole buttons

Notes and Field Observations: This was the best preserved skeleton in the cemetery, with all skeletal elements present and well-articulated (**Figure 5-42**). Three bone buttons were found over the pelvis representing pants closures. The sides and top of the wooden casket were well preserved, though slumped inward. A large mass was observed around the left tibia was first thought to be a cast, but later determined to be a bone growth.

Figure 5-42. Burial 9 exposed in situ.

Osteological Summary

Age: 20 to 25 years

Sex: Male

Biological affiliation: African American

Craniometrics obtained from this individual were compared to nineteenth century black males, nineteenth century white males, and Native American individuals from Santa Cruz Island in the computer program FORDISC Version 3.0. A discriminant function obtained from 25 log transformed variables classified this individual as being most consistent with nineteenth century black males (posterior probability = 0.936, typicality F = 0.489, typicality Chi = 0.050)

As a secondary means for identifying group affiliation, cranial macromorphoscopics collected on this individual were compared to trait frequencies for African, Native American, European, and Asian populations obtained from Hefner (2009). Based on a preliminary comparison of Burial 9's observed traits to the frequencies seen in other populations, Burial 9 is most consistent with being of an African ancestry.

Stature: 170.43–182.88 cm (5'7.1"–6'0"). Stature was calculated using formulas obtained from nineteenth century black males in the computer program FORDISC Version 3.0. Stature was calculated using the maximum length of the clavicle (CLAXLN), bicondylar length of the femur (FEMBLN) and the height of the sacrum (SACAHT). This formula was selected because it had the highest R Square value (R Square = 0.820). Values shown are at a 95 percent confidence level.

Preservation/Taphonomy: Bone preservation was excellent. A portion of the zygomatic process was missing by the time of lab analysis, possibly a result of a taphonomic process or breakage during initial discovery of burial.

Skeletal and Dental Inventory: The skeleton was complete with the exception of several right tarsal phalanges. The dentition was complete.

Skeletal Pathology: Many arm, pectoral, and hand muscle attachments were very robust or exhibit prominent enthesopathies. Muscle hypertrophy was noted on the following elements: left and right scapula infraglenoid tubercle; several attachment sites on the clavicles; the left and right humeri at the insertion for the deltoid and brachialis, and the lesser tubercle (right humerus significantly more robust than the left); various attachments on the left and right radii (including the pronator teres) and ulnae (ulnar tuberosity/brachialis, and supinator); the left ulnae also had a very pronounced muscle attachment on the posterior lateral head (anconeus or flexor carpi ulnaris); hands (phalanges and metacarpals); the right and left ribs 1–2 (anterior scalene and serratus anterior muscles). The right clavicle had a large enthesopathy with active bone modeling and porosity at the costoclavicular ligament attachment site. The left clavicle had a small enthesopathy with active modeling at the costoclavicular ligament attachment site and at the deltoid attachment site. The right humerus had a small enthesopathy with porosity on the lesser tubercle. The right ulna had an enthesopathy at the brachialis insertion site, with minor porosity in the region. Os acromiale was present on the right and left scapulae.

The cranium featured an assortment of pathologic lesions, neoplasms, and congenital defects. Possible healed porotic hyperostosis was on the posterior aspect of frontal, the left and right parietals straddling the sagittal suture (68 mm in width), and upper surface of the superior nuchal line on the occipital. This area was characterized by macro and microporosity (>1 mm and 1–3 mm) with healed, rounded margins. Diploë expansion was not able to be observed. A well-defined area of marked parietal thinning was on the posterior parietals, centered at obelion (48 mm x 37 mm); there is a notable reduction of porosity in this region compared to surrounding areas. It is possible that this may represent a well-healed depression fracture. Four osteomas were on the posterior parietals (three on left and one on right) ranging in size from 2.42 mm to 7.68 mm in diameter. Minor porosity was on the maxillary palate. On the mandible, the mental foramina were enlarged with some woven bone was on the floor of the foramina. Significant projection of the superior medial aspect of the mandibular foramina (lingua) was noted, potentially due to an ossification of the sphenomandibular ligament. Congenital defects are discussed separately below.

The humeri displayed a region of periostitis on the anterior aspect of the anatomical neck, directly inferior to the head. The right is more severe and active, with the left showing evidence of densification and healing. Minor sclerotic spicule growth was on the lateral margin of the coronoid fossa for both humeri. The right humerus featured a sclerotic, smooth projecting bony nodule (24.22 mm proximal/distal x 4.4 mm medial/lateral) on the anterior medial shaft, approximately at the attachment site for the coracobrachiali (**Figure 5-43**). Though the etiology is unknown, this nodule is not inconsistent with myositis ossificans traumatica. The left humerus had a sharp ridge of anteriorly projecting enthesophytic growth along the lateral supracondylar ridge. The left humerus had a smooth-walled articular facet defect (16.23 mm in diameter) on the distal articular surface (trochlea) (**Figure 5-44**). The etiology is unknown, possibly the result of trauma to the epiphysis during development, or some form of trauma to the articular surface.

Figure 5-43. A sclerotic, smooth projecting bony nodule on the anterior medial shaft of right humerus.

Figure 5-44. A smooth-walled articular facet defect on the distal articular surface of the left humerus.

A variety of traumatic and periosteal lesions were located on the forearms and hands. The left and right radii had an area of undulating and sclerotic bone deposition and remodeling approximately at the level of the radial tuberosity and extending around the circumference of the diaphyses. The lesion on the right radius had numerous venous markings on the posterior lateral surface. The left radius also displayed a region of macroporosity and erosion of the periosteum on the lateral head. Sclerotic bony calluses and healed fracture lines indicate a well-healed Colles' fracture of the distal left radius (remote). Possibly related, the distal diaphysis of the left ulna features a region of healed periostosis, potentially related to the trauma in the left ulna or a well-healed hairline fracture. The trochlear notch of the right ulna had a subchondral cyst on the articular surface. An antemortem, well-healed fracture of the right 5th metatarsal was observed (**Figure 5-45**). This fracture was characterized by pronounced palmer angulation of the diaphysis slightly proximal of midshaft, with evidence of well-healed sclerotic callus formation and rotation of abnormal medial rotation of the distal end. Periostosis was on the distal palmar surfaces of the left and right 4th and 5th metacarpals. Minor articular marginal lipping was on many hand elements.

Figure 5-45. An antemortem, well-healed fracture of the right 5th metatarsal.

Figure 5-46. Bilateral asymmetry and pathologic changes in the clavicles.

Bilateral asymmetry was noted in the clavicles, as well as several pathologic changes (**Figure 5-46**). The acromial end of the right clavicle was characterized by moderate macro and microporosity; the sternal end had a circumscribed lytic lesion with sclerotic, smooth walls on the mid surface (~2.2 mm in diameter). The right clavicle was also morphologically different than the left. The right clavicle diaphysis was markedly widened when compared to the left, and is slightly longer. The antero-posterior widening begins at the sternal end and extends laterally approximately two-thirds of the extent of the diaphysis, while the entire diaphysis is markedly widened superio-inferiorly. The diaphysis is smooth, and no evidence of periostitis (active or healed) or fracture was noted. These changes may have something to do with an increased musculoskeletal response on the right side. The left clavicle featured narrowing and porosity on the acromial end.

The vertebral column displayed a wide assortment of pathologic lesions. Lytic lesions of varying sizes were noted on several vertebral bodies. Diffuse osteolytic activity accompanied by an apparent decrease in vertebral body bone density was located near the anterior border of the superior body surface of C4 and the superior and inferior surfaces of C5. A small juxta-articular lytic lesion was located on the right lateral aspect of C3, just inferior of the right superior articular facet. Unilateral pitting of the right inferior articular facet of C3 and right superior articular facet of C4 was present. Poorly defined small lytic lesions were located near the anterior border of the inferior body surface of T-3 and T-4. A large lytic lesion (29.3 mm wide) characterized by poorly defined margins, an irregular and porous floor, no evidence of sclerosis, and appearing to permeate diffusely into cancellous bone was located on the superior anterior aspect of L2 (**Figure 5-47**). This lesion resulted in a localized reduction in vertebral body height (approximately 10 mm) resulting in an almost folded or "squished" appearance on the anterior surface. Osteophytic bone deposition was noted on the right margin of the lesion, extending cranially. No evidence of sclerosis was noted in any of the previously described lesions. Small lytic lesions consistent with possible Schmorl's nodes were noted on the caudal body surface of T9 and T10. Beginning at T9 and progressing caudally through the lumbar vertebrae, an increase in porosity of vertebral bodies and an obvious decrease in bone density was observed. One large (11 mm x 8 mm) well-incorporated and rounded proliferative growth/body nodule (porous with no evidence of sclerosis) was on the anterior surface of L3, accompanied by several smaller foci of proliferative growth (no sclerosis) in the immediate vicinity. Many costal facets on thoracic vertebrae exhibit active juxta-articular remodeling and pitting of the articular surface.

Figure 5-47. A large lytic lesion permeating L2 vertebra.

A suite of traits observed between L-4 and L-5 are indicative of a possible vertebral disc herniation (slipped disc) with vertical-posterior vertebral body compression. L4 features extensive remodeling of the inferior articular facets (see DJD). The superior articular facets of L-5 are greatly enlarged and slightly flattened laterally, with eburnation on the superior facet aspect. L5 also features a posterior compression fracture (most prominently compressed on the inferior body surface, a spinous process twisted ~20 degrees counterclockwise (spinous process deformity may be congenital), and extensive remodeling on the anterior surface of the neural arch.

The ribs feature pitting and destruction of the articular surface of the tubercle and head of several left and rights ribs. Corresponding increase in size of the thoracic costal facets was observed. Minor periostitis was on the sternal ends of several right ribs. The right ribs 3–10 displayed osteophytic growth on the inferior border of the vertebral ends. Rib 9 featured the most prominent osteophytic growth, projecting 10 mm sharply inferiorly and ventrally. Possible well-healed fractures were observed on right ribs 10 and 12 near the rib angle, characterized by angulation of the rib body medially with callus formation and venous impressions evident on ventral and dorsal surfaces.

Multiple osteoblastic and osteoclastic lesions were noted in the pelvis. The sacrum featured a well-defined large lytic lesion (9.2 mm in dia. and ~6.4 mm deep) with woven bone and

Figure 5-48. Multifocal lytic lesions on the left and right auricular surfaces of the right os coxa.

no evidence of sclerosis located on the left posterior surface of S3 just posterior-medial of the retroauricular surface. The sacral auricular and retroauricular surfaces feature significant remodeling of the sacroiliac joint and more activity than expected for an individual of this age, including increased macro and microporosity, irregularly-shaped auricular surface, increase in spicule growth and bony nodule deposition. Marked remodeling and osteoblastic activity was observed on the auricular and retroauricular surfaces of the left and right os coxa. Multifocal lytic lesions (poorly defined margins with no evidence of sclerosis) were noted on the left and right auricular surfaces and ranged in size from small (~1–2 mm in diameter) to large (>=12 mm in diameter, **Figure 5-48**). Both auricular surfaces are also abnormally shaped, with a very marked mid constriction and characterized by significantly more porosity than would be expected for an individual of this age. The retroauricular surface shows a marked increase in uneven dense bony nodule deposition, mirroring the retroauricular surface on the sacrum. The left and right acetabula are irregularly shaped, with a marked narrowing of the anterio-medial articular surface. Furthermore, porosity with remodeling was noted on the antero-medial margin of the right acetabulum. A poorly-defined diffuse lytic lesion (16.3 mm x 3.3 mm) with no evidence of sclerotic bone was located at the apex of the superior articular surface.

The femora displayed bilateral healed and healing periostitis along the extent of the diaphyses. The proximal one-third of the left femoral diaphysis and proximal two-thirds of the right femoral diaphysis showed notable fusiform cortical expansion with the bone surface appearing uneven and undulating. Active proliferative periostitis with possible decrease in bone density was noted on the femoral neck of the left femur and around the distal metaphyseal area of the left and right femora. An additional area of cortical expansion with sclerotic remodeling was on the anterior distal surface of the right femur. A subchondral cyst with porosity was located on the articular surface of the head, near the fovea capitis.

The left tibia and fibula displayed a series of severe pathologic lesions. The left tibia had a large, mushroom shaped porous bony deposit on the anterio-medial distal 1/3 diaphysis with a total horizontal circumference (including lesion and diaphysis) equaling 208 mm (**Figure 5-49**). The surface of the lesion was porous, rough, and uneven, and the margins were roughened and uneven, with no evidence of truly sclerotic bone directly associated with the lesion. A narrow cavity or canal was located on the anterior aspect of the lesion, and may represent something like a cloaca (indicating the presence of osteomyelitis). This is most consistent with bony reaction to a chronic skin ulcer. Furthermore, severe chronic proliferative periostitis resulted in marked fusiform expansion and cortical thickening along the entire extent of both the tibia and fibula

Figure 5-49. A large, mushroom shaped porous bony deposit on the left tibia.

diaphyses. The periostitis appeared at least somewhat active with some evidence of healing, however the dense sclerotic appearance of the bone indicated the lesion was likely chronic. The surface of the diaphyses appeared rough and undulating with sharper, dense osteophyte projections occurring throughout, and deep venous markings running horizontally along the posterior aspect of the proximal 1/3 diaphyses of both bones. A ridge of sharp, dense osteophytic projections ran vertically along the lateral posterior surface of the tibia and may represent an ossification or reaction to soft tissue structures related to the tibia/fibula articulation. Maximum horizontal diameters of the fibula increase from 18 mm (proximal diaphysis) to 26 mm (distal diaphysis). The distal diaphysis of the fibula appeared light, indicating possible bone density loss. Unfortunately, x-rays were unable to be taken, so the extent of medullary involvement and cortical/trabecular changes are unknown.

The right tibia and fibula also displayed evidence of pathological condtions, albeit decreased in severity from the left side. Evidence of healed or healing periostosis is located along the extent of the right tibia and fibula diaphyses. The right fibula was characterized by fusiform expansion with an undulating, sclerotic appearance. Sharper, osteophytic growth was limited to the medial aspect of the right fibula diaphysis, and the distal fibular diaphysis displayed the most notable increase in maximum horizontal diameters of the fibula from 15 mm (proximal diaphysis) to 26 mm (distal diaphysis). The right tibia displayed sclerotic, undulating fusiform reactive cortical deposition (possible involucrum) on the distal half of the diaphysis, with a possible small cloaca on the distal aspect of the medial side, potentially indicating of osteomyelitis. Furthermore, the morphology and possible anterior angulation of the callus growth suggests this lesion may be the result of a well-healed fracture or other trauma.

The feet featured significant bone and joint remodeling, periostosis, joint destruction, and isolated instances of trauma. Significant marginal lipping, articular facet porosity, and reactive osteophytic marginal bone deposition was noted on most tarsals (left more severe than the right) with the calcaneus and talus appearing the most severe (dense marginal deposits were observed projecting 6 mm to 9 mm off the left tali and calcanei articular facets, **Figure 5-50**). Evidence of joint destruction includes pitting and porosity of the articular surfaces in addition

Figure 5-50. Significant marginal lipping, articular facet porosity, and reactive osteophytic marginal bone deposition on tarsals.

to marginal lipping. Multifocal active lytic lesions were noted on the following bones: large lesion (9.5 mm x 5.6 mm) on the superior margin of the proximal articular surface of the left intermediate cuneiform corresponding to a lytic lesion on the superior talus; large (7 mm x 3 mm) on the superior margin of the proximal articular surface of the left lateral cuneiform; superior surface of the left navicular; the distal talar articular facet of the right talus (7.6 mm x 4.3 mm) and a corresponding pinhole sized lesion on the articular surface of the navicular. Left tarsals also featured porosity and proliferative bone deposition/spicule growth near articular surfaces for the tibia and fibula, and several neoarthroses have developed as a result of the significant remodeling occurring. An assortment of active proliferative and remodeling periostosis was noted on the left metatarsals, with the more remodeled diaphyses displaying an undulated appearance. Subchondral cysts (one large ~2.25 mm in diameter and one small) were located on the proximal articular surface (metatarsal phalangeal joint) of the left 1st proximal phalanx. Minor to moderate marginal lipping was noted on left and right phalanges and metatarsals. Overall most left foot elements had an overall appearance of porosity, overall density loss, and active marginal and periosteal bone formation. An unknown intermediate left phalanx (#2-5) had a healing antemortem fracture on the plantar aspect of the proximal articular surface. A right intermediate tarsal phalanx had an antemortem tarsal fracture of the superior aspect of the distal articular surface, with corresponding significant lipping of the superior articular facet of the corresponding distal tarsal phalanx.

Evidence of minor to moderate degenerative joint disease was noted on several axial and appendicular elements. Marginal lipping was noted on the occipital condyles, lateral clavicle, distal humerus, proximal ulna, and many hand and foot elements. Pitting was noted on the articular surface of the right and left glenoid fossae. Marginal lipping and pitting was noted on several cervical, thoracic, and lumbar vertebral articular facets (both superior and inferior with no notable differentiation in side distribution). Small areas of eburnation are present on the left inferior articular facets of C4, left superior and inferior articular facets of C5–C6, left superior articular facet of C7, and right superior articular facet of L2. Large area of pitting and eburnation accompanied by proliferative marginal deposits was located on the right superior articular facet of L2, likely related to pathology noted in the area.

A series of congenital defects were observed in the axial skeleton. Several congenital defects were observed in the sternum. The sternum was an Ashley type 2 (Ashley 1956) with non-fusion of the manubrio-mesosternal joint and absence of caudal cohesion of the 1st and 2nd sternebrae. Additionally, delayed fusion of sternebra in 3rd and 4th sternal segments and hypoplasia of 4th sternebrae resulted in a sternal aperture and vertical clefting of the sternum. Unilateral elongation of left temporal styloid processes was observed, indicating ossification of stylohyoid ligament (26 mm in total length). The right styloid process is very small and barely protrudes from the cranial base (no evidence of antemortem or postmortem breakage). The foramen magnum is markedly asymmetrical in shape, and bilateral clefting of posterior rim of foramen magnum was present. This may be related to a fusion defect involving occipital squama and pars lateralis or incomplete fusion of sutra intraoccipitalis. Sagittal cleft defects (minor) of several thoracic vertebrae (T4–7 and T11–12) (butterfly vertebrae, **Figure 5-51**). Expression of butterfly vertebrae is most marked on T6, with expression decreasing cranially and caudally and all thoracic vertebrae displaying at least a slight expression. Minor sagittal cleft defects are also on the posterior aspect of L3–5 centra. A bilateral depression was on the posterior aspect of the caudal surface of L3 centrum, and the posterior aspect of the cranial and caudal surfaces of the L4–5 centrum. There is no evidence of osteoblastic or osteoclastic activity, and they may be either developmental or related to the other vertebral pathology. The os coxae both displayed fusion scars from the union of elements.

Figure 5-51. Sagittal cleft defects on thoracic vertebrae.

Dental Pathology: Overall occlusal wear is minimal to moderate (**Figure 5-52**). Grey staining was present on the occlusal surfaces of several molars and may be related to small surface caries. Three mandibular molars were lost antemortem (MandRM3, MandRM1, and MandLM1).

Figure 5-52. Maxillary dental arcade.

The occlusion was Angle Class 1 (N) (Hillson 1999:111), and the individual had a notable overbite. Diastemas (gaps) were present between the maxillary left and right central incisors, and the mandibular left and right central incisors (approximately 2.6 mm in width). Double winging of the maxillary left and right central incisors was noted. A slight mesial rotation of ManLI1 was noted. Antemortem chipping was present, was mostly limited to the left buccal surface of the maxillary dentition and was not mirrored on the mandibular dentition.

Minor to moderate periodontal disease is present throughout the dentition, however is most severe in the anterior regions of the maxillae and mandible. Moderate alveolar resorption was present throughout the dental arcade. Pockets of severe periodontal disease were present around the maxillary central incisors, with extensive porosity and woven bone in these areas. This increase in severity of periodontal disease was likely a response to the moderate to severe calculus deposits found, which were present throughout the dentition, and range in severity from minor to severe. Additionally, the location of the calculus deposits on the central maxillary incisors suggests minor root exposure (2.62 mm) in some areas during life. Carious lesions were present on the MandLM2 (with pulp chamber exposure), MandLM3, MaxRM3 (with pulp chamber exposure), MandLPM2, and MandLM3. Many of these caries appear to be cervical or located at the CEJ.

An apical abscess is associated with the MandLM2, most likely a result of the large caries and pulp chamber exposure noted on the tooth.

Linear enamel hypoplasias were noted on many of the maxillary and mandibular anterior dental elements including the MandRC, MandRI2, MandRI1, MandLI1, MandLI2, MandLC, MaxRM1, MaxRC, MaxRI2, and MaxLI2.

BURIAL 10

Mortuary Characteristics

Casket/Coffin Shape: Hexagonal possible vaulting

Casket/Coffin Measurements: 85 cm in length; 42 cm in width at head; 19.5 cm in width at feet

Burial Measurements: 57 cm in length; 20 cm in width

Elevation of Top of Casket: 99.84–99.66

Depth of Bottom of Casket: 99.63 m

Body Position: Extended supine with head at west; right arm at sides and left arm slightly bent with hand over stomach region. Legs were parallel.

Casket Hardware: 25 cut nails (8d), 1 cut nail (4d)

Personal Items: None

Notes and Field Observations: The casket lid of this burial was previously exposed during the survey work, covered in plastic and reburied. This coffin lid was constructed using short horizontal boards nailed over longer batten boards. This was probably a vaulted shaft burial. Like many of the burials, the lid had collapsed inward, giving the casket at boat-like look. The bones were very delicate and friable, with skull and ribs crushed, and typical displacement of the vertebrae (**Figure 5-53 and Figure 5-54**). The thoracic cavity and pelvic region could not be clearly identified. The coffin base was delineated through in-situ nails, which were spaced regularly 15–17 cm apart.

Osteological Summary

Age: 6 months to 1 year

Sex: Indeterminate

Biological affiliation: Indeterminate

Stature: Indeterminate

Preservation/Taphonomy: Bone preservation was good. Postmortem breakage of the metaphyseal ends of several long bones prevented metric measurements from being taken. Most elements were stained dark brown, likely from coffin wood or other organic compounds. The right pubis was recovered from the right knee region, suggesting displacement via an unknown taphonomic process.

Skeletal and Dental Inventory: The skeleton was mostly complete, with the exception of several hand and foot elements. The dentition was complete. Many permanent teeth were unerupted and embedded in crypts, therefore preventing many observations from being made.

Skeletal Pathology: Many elements were friable making observation of pathologic lesions difficult. A probable fracture was observed on the left femur. The femoral diaphysis has a marked medio-lateral broadening, (with the

Figure 5-53. Exposed possibly vaulted lid of Burial 10.

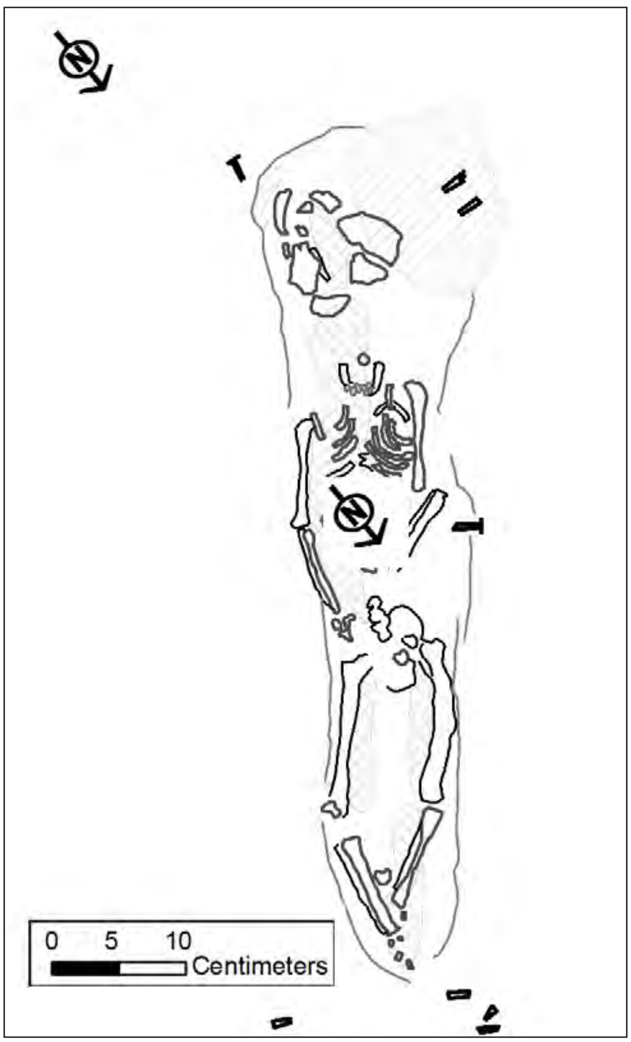

Figure 5-54. Sketch showing excavated remains of Burial 10.

greatest expression on the proximal diaphysis), and a sharp lateral inclination of the proximal one-third of the diaphysis (**Figure 5-55**). The diaphyseal bone is dense and lamellar. Evidence of sclerotic, healed periostitis was observed at the point of lateral inclination, indicating a probable fracture point. This abnormality appears most consistent with a well-healed misaligned fracture (possible spiral fracture). Based on the age of the individual and the progressed state of the remodeling process, this trauma was likely sustained during the birthing process or shortly after. The tibiae, fibulae, and other long bones appear normal.

Dental Pathology: Insufficient development and mineralization precluded observation of pathology in the permanent dentition. A variety of enamel hypoplastic pit defects (linear, pseudo-linear, isolated, and larger areas of decreased enamel thickness) as well as enamel hypocalcification was observed throughout the deciduous dental arcade. For the most part these defects appear to be bilateral, however some variation in degree of expression is noted (**Figure 5-56**).

Enamel hypoplastic defects were noted on many of the deciduous dental elements. For the most part, these hypoplasias appeared to be generally bilateral; however variation in the severity was noted between right and left elements. Teeth #s 51, 60, and 61 featured multiple pit defects on the occlusal surface, primarily associated with the tips of cusps and occasionally accompanied by a notable reduction in enamel surrounding the cusp tip. #52 featured a linear array of pits directly above the CEJ (0.76–1.0 mm). A single pit was on the labial surface of #53 approximately 1.84 mm above the CEJ. Pits were on the cusp tips of #59, with the hypocone being the most prominent. A pseudo-linear band of pitting is located around the circumference of the crowns for #62 (0.75–2.97 mm) and #69 (1.12–2.76 mm), and appears to be directly associated with a discrete banded cream-yellow

Figure 5-55. A marked medio-lateral broadening and sharp lateral inclination of the femoral diaphysis.

Figure 5-56. Example of enamel hypoplastic pit defects and enamel hypocalcification in the deciduous dental arcade.

opacity. Large localized enamel hypoplasias of the primary canine were observed on the labial surfaces of #63 (3.82 mm from CEJ and 1.08 mm in diameter) and # 68 (2.94–4.35 mm from the CEJ). A pseudo-linear array of pits were around the crown circumference (lingual, mesial, labial, and distal surfaces) of #64 (0.62 –1.87 mm from CEJ) and appear to be associated with a yellow-orange opacity which spans 0.2–2.89 mm from the CEJ. Localized, pseudo-linear array of pits were on the labial surface of #67 (0.34–2.31 mm from the CEJ), with several areas of significant enamel reduction.

An array of enamel discolorations in the form of brown, yellow, cream, and grey opacities (both discrete and banded) are observed on nearly all elements in the deciduous dental arcade. Some of these appear to also be found in conjunction with enamel hypoplasias. Although it is probable that many of these represent hypocalcification, the incomplete state of dental development makes it difficult to distinguish between discolorations resulting from taphonomic factors and those which are true hypocalcification opacities.

BURIAL 11

Mortuary Characteristics

Casket/Coffin Shape: Rectangular

Casket/Coffin Measurements: 70 cm in length; 25 cm in width

Burial Measurements: 63 cm in length; 19 cm in width

Elevation of Top of Casket: 99.81–99.80 m

Depth of Bottom of Casket: 99.65 m

Body Position: Extended supine with head at west; arms over abdomen and legs seemingly parallel. The left arm was slightly more flexed than the right arm.

Casket Hardware: 23 cut nails (8d) and 2 cut nail (4d or broken)

Personal Items: 1 porcelain 4-hole button, 1 mother of pearl 4-hole button, 1 straight pin.

Notes and Field Observations: Poor preservation overall in this burial with ribs, vertebrae and much of skull crushed and indistinguishable. It was also not possible to identify hands and feet. Nails were still in-situ in the clay matrix, though much of the coffin lumber had disintegrated and these were spaced about 15–17 cm apart. The straight pin was found in the clavicle region, the porcelain button was found at the right side of the pelvic region, and the mother of pearl button was found under the proximal end of the of the right humerus (**Figure 5-57**).

Osteological Summary

Age: 6 months to 9 months

Sex: Indeterminate

Biological affiliation: Indeterminate

Stature: Indeterminate

Preservation/Taphonomy: Bone preservation was fair. Many elements were very friable and as a result many metric observations were unable to be made in the lab. Furthermore, the poor preservation prevented observation of all standard, scorable epiphyseal union sites or ossification centers. Most elements were stained dark brown, likely from coffin wood or other organic compounds.

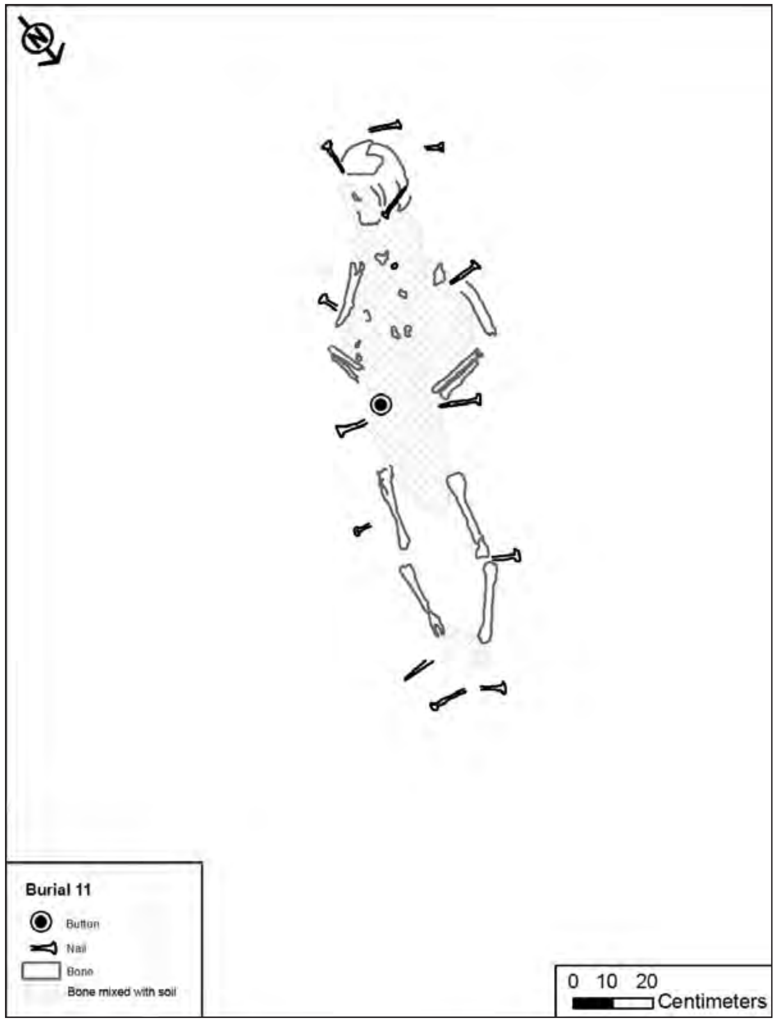

Figure 5-57. Plan drawing of exposed Burial 11.

Skeletal and Dental Inventory: This individual was partially complete due to poor preservation and taphonomic breakage.. Many bones were fragmented in some degree. Portions of the cranium and mandible, vertebral column, segments of various long bones, the left and right scapulae, right clavicle, all elements of the left and right os coxae, and all hand and foot elements with the exception of an un-sided talus and calcaneus were missing postmortem. The missing skeletal elements are likely a result of taphonomic factors, fragmentation, and poor bone preservation as opposed to excavation factors.

The dentition was only partially complete, and most elements were missing with no associated alveolar bone. Deciduous dental elements include: the deciduous mandibular left first molar, the deciduous maxillary right canine, the deciduous maxillary right central incisor, the deciduous maxillary left lateral incisor, and the deciduous maxillary left canine. No permanent dentition was present.

Skeletal Pathology: With the exception of midshaft fragments of the right tibia, left femur, and left humerus, the bone surfaces on the majority of long bones were unobservable due to preservation and exfoliation of the periosteal layer of bone. A possible lytic lesion was observed on the left femur, located on the distal-posterior midshaft, medial of the lateral supracondylar line (**Figure 5-58**). The bone surface surrounding the lesion is porotic and eroded and likely influenced by taphonomic processes, preventing the lesion from being fully observed.

Dental Pathology: All observable teeth displayed some form of hypoplasia and/or possible hypocalicification (**Figure 5-59**). Localized enamel hypoplasias of the primary canine were observed on the labial surfaces of #53 and 58. An array of pit-like defects (some representing significant areas of enamel reduction or loss) were also observed on the lingual and labial surfaces of #s 53 and 58 (bilaterally expressed), extending from the CEJ to approximately the cingulum. A pit defect was noted on a cusp tip of #62.

An array of enamel discolorations in the form of yellow and cream opacities (both discrete banded and diffuse) are observed on #s 55, 57, 58, and 62. Although it is possible that some of these represent hypocalcification, the incomplete state of dental development makes it difficult to distinguish between discolorations which may have arose as a result of taphonomic factors and those which are true hypocalcification opacities.

Figure 5-58. A lytic lesion on the left femur.

Figure 5-59. Hypoplasia and/or possible hypocalicification of teeth.

BURIAL 12

Mortuary Characteristics

Casket/Coffin Shape: Rectangular with possible vaulting

Casket/Coffin Measurements: 152 cm in length; 50 cm in width

Burial Measurements: 137 cm in length; 20 cm in width

Elevation of Top of Casket: 99.29–98.99 m

Depth of Bottom of Casket: 98.94 m

Body Position: Extended supine with head at west; arms at sides and legs parallel.

Casket Hardware: 12 cut nails (8d), 13 cut nails (6d), 10 cut nail fragments

Personal Items: boots (heels on remain), 1 black glass chain, 1 bone button

Notes and Field Observations: This was the deepest burial in the cemetery with the bottom of the grave shaft more than one meter below the surface. As a result the burial and casket were extremely well preserved, though like other caskets in the cemetery, this one was slumped inward and compressed . The coffin lid was constructed using a long central plank measuring ca. 25 cm wide (ca. 10 in.) with thinner cross pieces placed over the outside. Some of these cross pieces appear to have disintegrated. These cross pieces extended wider than the actual casket and could be evidence of vaulting (**Figure 5-60 and 5-61**). Excavators observed some gray (10 YR 4/1) gritty, almost limey soil scattered over the top of the casket and this may have been lime sprinkled over the burial. The body was directly under the casket lid and in some places almost embedded in it. The bones were well-preserved, but some of them had become displaced. The right hip was found intact but had migrated down to the knees. Both patellae were found at the thighs. The ribs and some of the vertebrae in the thoracic region were crushed, and the skull was

Figure 5-60. Exposed lid of Burial 12. Note: Vaulted cross pieces extending over lid of coffin.

Figure 5-61. Exposed Burial 12.

partially crushed in place. After removing the skull and mandible, excavators observed some fine blue thread fragments in the collar region. Links from a black glass chain were found under the right humerus and shoulder. The child was wearing boots at the time of burial, evidenced by heels of compressed rawhide found by the feet. One of the heels had a small amount of leather still attached to it. The bones left an impression in the clay at the base of the casket. After cleaning off the base of the casket, a bone button was found pressed into the clay, which appeared to originate from below the coffin. Given that all burial elements were found within the walls of the casket, it does not appear to be from clothing from the burial itself, but could have been a button lost by the grave-digger, or part of an offering.

Osteological Summary

Age: 7–10 years

Sex: Indeterminate

Biological affiliation: Indeterminate. Given the young age of the individual, most available metric methods for determining group affiliation were unable to be applied. As a means for identifying group affiliation, cranial macromorphoscopics collected on this individual were compared to trait frequencies for African, Native American, European, and Asian populations obtained from Hefner 2009.Based on frequency data provided by Hefner 2009, this individual displays a suite of cranial traits consistent with both European American and African American ancestry. Given the available data, an assessment of biological affiliation cannot be given with confidence at this time, however it is possible that some degree of admixture may have been present.

Stature: Indeterminate

Preservation/Taphonomy: Bone preservation was very good. Most elements were complete or able to be reconstructed in order to make necessary observations during lab analysis. Black staining (from an unknown subsistence) was observed on many cranial elements and the anterior mandible, and a small fragment of material was adhering to a permanent mandibular incisor (**Figure 5-62**) The cranium was also emitting a noticeable metallic odor. The cause of this odor is unknown, and it is unknown if it is significant or simply a result of taphonomic processes.

Figure 5-62. Black staining and a small fragment of material adhering to a permanent mandibular incisor.

Skeletal and Dental Inventory: This individual was complete. Only several small hand and foot bones were either not present or unable to be identified during lab. The dentition was complete with the exception of the mandibular right canine which appears to have been lost postmortem. Several permanent dental elements were unerupted and thus embedded in their crypts and unable to observe.

Skeletal Pathology: Proliferative periostitis (active) was located on the lateral surface of the right and left maxillae, posterior of the first deciduous molar. The degree of porosity and periostosis increases in severity posteriorly. The maxillary sinuses and palate also feature extensive porosity. Porosity was also observed on the anterior maxillae, with slight amounts of woven bone noted around the inferior nasal aperture. Combined, this may suggest the presence of maxillary sinusitis or other respiratory ailment.

Active porosity and alveolar resorption were noted across the maxillary dental arcade, increasing in severity posteriorly. Furthermore, active porosity was also observed along the alveolar margin of the mandible, with the most severe region (in terms of resorption and porosity) being the anterior mandible where moderate exposure of permanent incisor roots has occurred. Although it is possible that some of this porosity is due to eruption stress, it appears to be beyond what is expected with an individual of this age.

Active cribra orbitalia was observed on the left and right superior surfaces of the orbital apertures (**Figure 5-63**). Evidence of possible healed porotic hyperostosis was located on the frontal, in the region directly superior of glabella and orbits (~45 mm medial lateral x ~35 mm superior/inferior). The right and left temporals feature porosity (sclerotic in appearance), as well as an undulating appearance to the ectocranial bone surface. Furthermore, abnormal venous markings are also associated with this region and are located superior of the mastoid process, with the right being significantly deeper than the left (**Figure 5-64**).

The anterior surface of the right and left femoral necks appeared to have significant evidence of osteoclastic activity characterized by macropososity and woven bone (**Figure 5-65**). This osteoclastic activity gave the region an almost lytic appearance.

Healed periostosis was noted on many postcranial skeletal elements, including much of the diaphyses of the left and right femora, the lateral diaphyses of the fibulae, the proximal diaphyses of the right humerus, the proximal end and the entirety of the posterior aspect of the left humerus , the extent of the radii, and the ulnae (most prevalent on the lateral aspects, with the left still in the process of healing).

Active periostosis was also observed on a number or postcranial elements. The right femur displays a large area of active/healing periostosis on the anterior surface of the distal diaphysis (**Figure 5-66**). The left and right tibiae display active periostosis over much of the anterior surface

Figure 5-63. Cribra orbitalia on the surfaces of the orbital apertures.

Figure 5-64. Abnormal venous markings on the mastoid process.

Figure 5-65. Macropososity and woven bone on the femoral necks.

(both medial and lateral of the anterior crest, **Figure 5-67**). The posterior aspect of the right and left scapular spines feature active periostosis accompanied by macro and microporosity along the entire extent, with the right being significantly more severe than the left. Additionally, on the right scapula, a region of proliferative periostitis was noted on the posterior surface of the lateral border, inferior and medial of the gleniod fossa (10 mm superior/inferior x 7 mm medial/lateral). Periostosis was also observed on the lateral surface of the right ribs, beginning approximately at the angle of the rib and extending toward the sternal ends. This periostosis is most active and readily observable on ribs 2–4. Periostosis was on the medial and lateral non-articular surfaces of the calcanei, while the metatarsals feature macroporosity and microporosity on the diaphyses.

Figure 5-66. The distal diaphysis of the right femur.

Figure 6-67. Active periostosis on the anterior surface of the tibia.

Many of the long bones featured very developed and robust muscle attachments, especially given the younger age of the individual. The femora displayed very developed gluteal tuberosities (right more so than the left, **Figure 5-68**). The humeri displayed hypertrophy of the deltoid tuberosities while the radii and ulna displayed hypertrophy of the muscle attachments located on the proximal diaphyses. An enthesopathy was on the inferior surface of the left clavicle, located at the site of the attachment for the coracoclavicular ligament. This region was eroded due to taphonomic processes on the right clavicle and thus was not able to be observed, (**Figure 5-69**). Some porosity is associated with these muscle attachments. It is unknown if the hypertrophic nature of these muscle and ligament attachments are related to musculoskeletal stresses related to an activity or if they have a pathologic etiology.

Dental Pathology: Alveolar porosity and resorption accompanied by apparent root exposure was observed in anterior mandible and posterior maxillae (**Figure 5-70**). It is possible that some of this porosity may be attributed to dental eruption related stress (particularly in the posterior maxilla), however the amount and degree of porosity exceeds what would be expected with eruption stress.

Several hypoplastic defects were observed on the deciduous canines. A large localized enamel hypoplasia of the primary canine was on the labial surface of #63 (2.65–5.10 mm from CEJ). A non-linear array of pits was on the labial surface of #53 (0.74–1.89 mm from the CEJ) and # 58 (0.89–2.22 mm from the CEJ). No evidence of hypocalcification was noted in the deciduous dentition. Linear enamel hypoplasias were on several permanent teeth in the anterior dentation including #8 (6.69 mm from CEJ), #9 (6.65 mm from CEJ), #23 (5.39 mm from CEJ), #24 (4.09 mm from CEJ), and #26 (5.34 mm from CEJ). Pit defects are on the tips of the cusps of #15. Hypocalcification was on several permanent teeth. Discrete brown banded opacities were on #s 3 (3.17–5.65 mm), #14 (3.99–5.67 mm), #19 (3.8 mm from CEJ and 5.3 mm from CEJ), #30 (3.44 – 3.57 mm). Yellow-brown banded opacities were on #7 (4.96–6.76 mm) and #10 (5.72 –7.19 mm).

Minor calculus deposits (score 1) were on most of the deciduous

Figure 6-68. Very developed gluteal tuberosities of the femora.

Figure 5-69. An enthesopathy on the inferior surface of the left clavicle.

Figure 5-70. Alveolar porosity, resorption and root exposure in posterior maxillae.

dentition and the permanent 1st molars. Use wear was in the form of a blocky antemortem chip on the mesio-lingual occlusal surface of # 52 and several small chips on the distal occlusal edge of #51. Very small antemortem chips were on the labial surface of the permanent mandibular incisors. Overall light wear was on the deciduous dentition, with only minor to moderate dentine exposure. Wear appears relatively light on the permanent anterior dentition however the 1st permanent molars appear to be rapidly accumulating wear.

Skeletal abnormalities: Several large sutural bones are in the occipital suture.

BURIAL 13

Mortuary Characteristics

Coffin/Casket Shape: Hexagonal or boat shaped

Coffin/Casket Measurements: 60 cm in length; 18 cm in width

Burial Measurements: 53 cm in length; 15 cm in width

Elevation of Top of Casket: 99.26–99.37 m

Depth of Bottom of Casket: 99.24 m

Body Position: Extended supine with head at west; hands at side and legs parallel

Coffin/Casket Hardware: 3 cut nails (8d), 13 cut nails (6d), 4 broken cut nails

Personal Items: 39 shell seed beads, 3 tubular, semi-faceted clear glass beads, 2 small porcelain 4-hole buttons, 4 larger porcelain 4-hole buttons, 1 straight pin.

Notes and Field Observations: This burial is a very small infant. The top of the coffin was intact near head and feet, but eroded away in the center of the body (see Figure 5-61). Nails were observed in all the usual places embedded in matrix and what remained of the coffin. The three 8d nails were found at the head, while the shorter nails were used at the sides of the coffin. The skull was crushed completely, but the longer bones and rib bones were very intact, though very delicate, as this was a very small infant (**Figure 5-71**). The bones were so tiny in fact, that it was difficult work to expose them all without displacing them or breaking them.

Figure 5-71. Exposed Burial 13.

As a result, we exposed as much of the skeleton as was feasible, mapped it, and removed the bones in bulk, in two halves. The baby was wearing a bead necklace, evidenced by many tiny beads found around the neck region. Some were visible during the exposure of the bones but others had to be picked from matrix in the lab. Evidence of blue iridescent staining was seen on some of the surrounding matrix, suggesting that they were once more pearlescent, but the exterior surfaces have eroded away. The two smaller buttons were found near the proximal ends of each humerus, while the smaller buttons were found around the chest and pelvis region. We observed some black staining on the front face of the two smaller buttons that washed off in the lab.

Osteological Summary

Age: 36 weeks in utero to 1 month postpartum

Sex: Indeterminate

Biological affiliation: Indeterminate

Stature: Indeterminate

Preservation/Taphonomy: Bone preservation was good. The diaphyseal ends of some long bones were eroded and a few bones were fragmented. Grey metallic staining was on many cranial elements, possibly from associated beads.

Skeletal and Dental Inventory: This individual was mostly complete. Skeletal elements missing include several thoracic vertebrae, the left and right pubis, right ischium, and several hand and foot elements. The dentition was partially complete, and most missing elements appear to have been lost postmortem or did not have any identifiable associated alveolar bone. Dentition includes the deciduous mandibular right canine, deciduous mandibular right first molar, deciduous mandibular right second molar, deciduous right maxillary first molar, deciduous maxillary right lateral incisor and deciduous right maxillary central incisor.

Skeletal Pathology: Minor active cribra orbitalia was observed on the superior surface of the orbits, with no evidence of remodeling. Periostosis was observed on the pars basilaris (occipital) and lesser wings of the sphenoid (**Figure 5-72**). The Squamous portions of the temporal feature possible periostosis with minimal bone density, however it is possible that this is development related or within the range of what would be expected with normal development, as opposed to being the result of a pathologic condition.

Dental Pathology: Incomplete enamel mineralization precludes observation of dental defects.

Figure 5-72. Periostosis on the sphenoid of Burial 13.

BURIAL 14

Mortuary Characteristics

Coffin/Casket Shape: Rectangular, possible vaulting

Coffin/Casket Measurements: ca. 65 cm in length; 23 cm in width

Burial Measurements: 45 cm in length;

Elevation of Top of Casket: 99.74 m

Depth of Bottom of Casket: 99.70 m

Body Position: Extended supine with head at west; left hand over pelvis and right hand over abdomen; ankles crossed left over right

Casket Hardware: 13 cut nails (2d–6d)

Personal Items: 2 cupreous hook and eye clasps, 2 black glass 3-hole buttons, irregularly shaped

Notes and Field Observations: The grave was disturbed by a long root running along the south line of the casket The lid of the casket was well defined and constructed of one long plank (**Figure 5-73**). The skull of this small infant was completely fragmented and crushed in place, though other bones were reasonably well articulated. Portions of the hand bones were found near the stomach region (**Figure 5-74**). The metal hook and eye fasteners were found at the pelvic region on top of the bones. The buttons were found under the body.

Osteological Summary

Age: Birth to 3 months

Figure 5-73. Fully exposed well-preserved casket of Burial 14.

Figure 5-74. Exposed skeletal remains of Burial 14.

Sex: Indeterminate

Biological affiliation: Indeterminate

Stature: Indeterminate

Preservation/Taphonomy: Bone preservation was good. Evidence of taphonomic erosion of the outer table of bone was evident on the diaphyseal and metaphyseal ends of most long bones. Insect activity (boring) was on the diaphysis of the right humerus and right femur. Most elements were stained dark brown, likely from coffin wood or other organic compounds. Red staining, potentially the result of oxidized metal or coffin paint was on the right metacarpals.

Figure 5-75. Periosteal reaction on portion of cranial vault with woven bone on the endocranial surface.

Skeletal and Dental Inventory: The skeleton was complete with the exception of the right clavicle and many of the tarsal phalanges. The dentition was complete with the exception of the right deciduous mandibular canine and right deciduous maxillary canine which were lost postmortem.

Skeletal Pathology: A cranial vault fragment (possible parietal fragment) featured a periosteal reaction with woven bone on the endocranial surface (**Figure 5-75**). No similar lesions were noted on other observable surfaces.

Dental Pathology: No obvious dental pathology was observed, however lack of complete enamel mineralization precludes a definitive statement from being made.

BURIAL 15

Mortuary Characteristics

Casket/Coffin Shape: Rectangular casket

Casket/Coffin Measurements: 48 cm in length; 25 cm in width

Burial Measurements: 43 cm in length; 24 cm in width

Elevation of Top of Casket: 99.32 m

Depth of Bottom of Casket: 99.21 m

Body Position: half-flexed/fetal and supine with head at east; right hand over stomach and left hand at pelvis. Legs slightly bent.

Casket Hardware: 3 cut nails (6d), 6 cut nails (2d)

Personal Items: one 4-hole metal button, two 4-hole metal buttons (one with center backing missing, one 4-hole bone button, one unfaceted elongated bead of bone, four faceted six-sided elongated beads of milk glass, 32 black glass rounded beads, 7 smoky glass rounded beads, one faceted black glass bead.

Notes and Field Observations: The half-flexed posture of this individual was probably due to its young age and represents a natural fetal position. The fact that its head was at the east suggests it was buried before baptism or Christening. Although the head was crushed, there was excellent skeletal preservation in this burial (**Figure 5-76**). The child wore a necklace composed of a variety of beads. In addition to the beads recovered from the burial, excavators noted very fragile red seed beads that disintegrated to the touch. The buttons found with this burial seem to be too large to have been used for clothing and may have been part of a charm, or even part of the bead necklace worn by the child. The buttons were found in a short line under the child's torso (**Figure 5-77**). The top button was under a bead. Given the young age of the child, the buttons may have simply held together a hastily sewn shroud or other burial garment fastened with whatever buttons were on hand.

Figure 5-76. Fully exposed skeletal remains and base of casket for Burial 15.

Figure 5-77. Large metal buttons in situ under thoracic region of Burial 15.

Osteological Summary

Age: 2 months to 6 months

Sex: Indeterminate

Biological affiliation: Indeterminate

Stature: Indeterminate

Preservation/Taphonomy: Bone preservation was very good. The greater wing of the sphenoid was collected as the sacrum in the field. This may indicate that it was either somehow transported to the pelvis by taphonomic processes or that it was incorrectly labeled in field by accident.

Skeletal and Dental Inventory: The skeleton mostly complete, with only a few small portions of the cranium and small hand and foot bones either too fragmentary to identify or missing during of lab analysis. The dentition was complete with the exception of the maxillary left central incisor, lateral incisor, and canine were not present during lab analysis.

Skeletal Pathology: None observed.

Dental Pathology: None observed, however lack of complete tooth formation and incomplete enamel mineralization prevented most observations from being made.

BURIAL 16

Mortuary Characteristics

Casket/Coffin Shape: Octagonal or Hexagonal

Casket/Coffin Measurements: approx. 67 cm in length; 28 cm in width

Burial Measurements: 60 cm in length; 28 cm in width

Elevation of Top of Casket: 99.50 m

Depth of Bottom of Casket: 99.46 m

Body Position: partially flexed, supine with head at west; arms at side and left leg bent over the right (**Figure 5-78**).

Casket Hardware: 26 cut nails (6d–8d), 1 cut nail with metal conglomerate, 2 upholstery tacks,

Personal Items: 8 porcelain 4-hole buttons (same size), 48 beads in various materials (glass or shell), 1white round glass bead.

Notes and Field Observations: Severe crushing and bioturbation displaced many of the skeletal elements, flipping the right tibia onto its anterior side and other bones were also flipped. Beads were found in situ found near left scapula and thoracic area, suggesting a necklace. The configuration of in situ cut nails suggests an octagonal or hexagonal coffin, though most of the coffin wood was deteriorated.

Figure 5-78. Burial 16 exposed in situ.

Osteological Summary

Age: 39 weeks in utero to 3 months postpartum

Sex: Indeterminate

Biological affiliation: Indeterminate

Stature: Indeterminate

Preservation/Taphonomy: Skeletal preservation was excellent, with the exception of several friable skeletal elements. Most elements were stained dark brown, likely from coffin wood or other organic compounds. Red staining (potentially the result of oxidized metal or coffin paint) was observed on a cranial fragment. Green staining was observed on at least one vertebral arch and a clavicle. White, spotty mold was pervasive throughout (**Figure 5-79**). Several skeletal and dental elements were not in anatomical position, most likely the result of taphonomic disturbances. At least one isolated tooth and the left maxilla (with associated unerupted teeth in crypts) were recovered from the pelvic region.

Figure 5-79. White, spotty mold on skeletal elements.

Skeletal and Dental Inventory: This individual was mostly complete, with missing skeletal elements limited to very small hand and foot bones. The dentition was mostly complete. Six maxillary teeth were lost postmortem.

Skeletal Pathology: None observed

Dental Pathology: None observed, however lack of complete tooth formation and incomplete enamel mineralization prevented most observations from being made.

BURIAL 17

Mortuary Characteristics

Casket/Coffin Shape: Hexagonal coffin

Casket/Coffin Measurements: 175 cm in length; 60 cm in width at shoulders; 40 cm in width at feet; 30 cm in width at head

Burial Measurements: 160 cm in length; 47 cm in width

Elevation of Top of Casket: 99.87–99.77 m

Depth of Bottom of Casket: 99.60 m

Body Position: Extended supine with arms and legs extended and parallel, head at west

Casket Hardware: 7 lining tacks, 4 white metal coffin screws, 15 coffin tacks, 38 cut nails (8d), 5 broken nails

Personal Items: one mother of pearl 4-hole button, molded blue glass pin or pendant with metal backing, metal ring of cupreous material, 10 white rounded glass beads, one rounded yellow glass bead, one rounded shell bead, one rounded red seed bead, one rounded black seed bead, 62 smoky rounded glass beads.

Notes and Field Observations: This was one of the shallower burials in the cemetery. The skull was partially exposed while scraping the surface down to the top of the coffin. The coffin itself had mostly disintegrated, but the bones of the individual were quite well preserved and articulated (**Figure 5-80**). Coffin nails, however, were mostly in-situ in the appropriate places around the edges of the coffin. Coffin screws were noted on top of the coffin along the edges. Decorative coffin tacks were found down the center of what would have been the top of the coffin, but as noted, wood was poorly preserved and tacks were resting right on top of bones or at level with them (**Figure 5-81**). The head was at a higher elevation than the feet and the skull had flipped over so that foramen magnum was on top and the face was toward the bottom of the grave. The right clavicle was slightly displaced and only a partial mandible was recovered from this burial despite all other bones being present. The individual was an adult and was wearing a ring around her right hand. She also wore a beaded necklace that may have had a blue glass pendant attached (**Figure 5-82**). The blue glass pendant could also have been part of a pin, as it was metal-backed. Thin wire

Figure 5-80. Burial 17 exposed in situ; note red staining around the skeletal elements, suggesting paint.

Figure 5-81. Coffin tacks running in a line down the center of the burial. Tacks overlay skeletal elements, indicating they were on a coffin lid.

was observed attached to this object during the excavations, but it disintegrated to the touch.

Figure 5-82. Close-up of blue pendant and beads worn by Burial 17.

Osteological Summary

Age: 30 to 45 years

Sex: Female

Biological affiliation: Possible African American

Fragmentation of the face (one of the more ancestrally diagnostic regions of the cranium) made biological affiliation or ancestry determination difficult. Craniometrics obtained from this individual were compared to several iterations of nineteenth and twentieth century black and white females, modern forensic samples of black and white females, and pooled Native American females in computer program FORDISC Version 3.0. Utilizing only nineteenth century population data to form discriminant functions, Burial 17 best classifies as a white female (posterior probability = 0.743, typicality F= 0.802, typicality chi = 0.561). Utilizing both nineteenth and twentieth century data or just twentieth century data, Burial 17 best classifies as a black female with a higher typicality (posterior probability = 0.654, typicality F = 0.908, typicality chi = 0.732).

As a secondary means for identifying group affiliation, cranial macromorphoscopics collected on this individual were compared to trait frequencies for African, Native American, European, and Asian populations obtained from Hefner 2009. Many observations could not be made due to fragmentation of the midface. Based on a preliminary comparison of the traits which could be observed on Burial 17 to the frequencies seen in other populations, Burial 17 is most consistent with a female of African ancestry, with the potential for some degree of Native American admixture.

Based on the available data, this individual appears most consistent with a biological affiliation of possible African American, with the caveat that some degree of European or Native American admixture may be present.

Stature: 151.38 cm to 165.86 cm (4’11.6” –5’5.3”). Stature was calculated using formulas obtained from a pooled nineteenth century sample in the computer program FORDISC Version 3.0. Stature was calculated using the maximum length of the clavicle (CLAXLN), maximum length of the femur (FEMXLM) and maximum length of the fibula (FIBXLN), as this formula had the highest R Square value (R Square = 0.834). Values shown are at a 95 percent confidence level.

Preservation/Taphonomy: Bone preservation was good to very good. Areas of red-orange and green staining were noted on the cranium, and red staining was noted on the radii and scapulae, possibly indicating coffin paint. Taphonomic breakage was limited to cancellous regions of the os coxa and the craniofacial region. Taphonomic disturbances were noted throughout, the most notable being the movement of skeletal elements within the coffin. Elements recovered from north (lateral) of the left femur include several thoracic vertebrae, the left patella, several hand elements, and a tarsal (foot) bone. Within the region of the left foot, several hand bones and the right patella were recovered. Nothing abnormal or unusual was noted with the displaced bones, suggesting that their movement was not anthropogenic in nature.

Skeletal and Dental Inventory: The skeleton was mostly complete. No dental elements were present. The craniofacial region was highly fragmented at the time of recovery, with very little maxillary bone recovered in spite of the cranium being removed in bulk. As such, it is unknown if maxillary dental elements were lost antemortem or postmortem. All mandibular dental elements were lost antemortem.

Skeletal Pathology: Some degree of healed or healing periostitis was observed on the extent of the diaphyses for all long bones (femora, tibiae, fibulae, ulnae, radii, humeri), characterized by dense lamellar bone deposition and an undulating diaphyseal surface. An area of active periostitis was located on the distal half of the left femoral diaphysis, on the anterio-medial aspect (82 mm proximal/distal x 20 mm medial/lateral). Well-healed periostitis is also along the linea aspera of the left femur, characterized by dense lamellar bone deposition with only very minor marks of vascularization. The lateral surface of the distal half of the tibia features a region of healed periostitis with several sets of deep striations running medial lateral, bordered by particularly dense, sclerotic lamellar bone (**Figure 5-83**). These are consistent with venous impressions.

Proliferative periostitis (active) is on the medial aspect of the proximal tibial metaphyses (right and left), as well as several metatarsals and tarsals. Proliferative periostitis accompanied by woven bone is on the posterior aspect of the right tibia metaphysis. Proliferative, dense spicule growth is on the distal tibiae and fibulae at the location of the tibio-fibular syndesmosis. Dense proliferative spicule growth is on the anterior surfaces of the distal humeri metaphyses in the coronoid fossa and along the lateral supracondylor ridge. A region of woven bone and porosity is located at the base of the capitulum (**Figure 5-84**). Proliferative periostosis (active) was observed on the os coxa, posterior of the acetabulum. Lamellar spurs were

Figure 5-83. Deep striations running medial lateral and particularly dense, sclerotic lamellar bone on the lateral surface of the distal half of the tibia.

Figure 5-84. A region of woven bone and porosity at the base of the capitulum.

Figure 5-85. The fourth and fifth cervical vertebrae displaying complete perimortem fracture.

noted on several thoracic and lumbar vertebrae.

A lytic lesion was on the medial proximal articular surface of a left fourth metatarsal. The right femur features a region of osteoclastic activity just lateral and inferior of the femoral head, characterized by woven bone with poorly defined margins.

Evidence of musculoskeletal stress was noted on many long bones (femora, tibiae, fibulae, ulnae, radii, humeri, and clavicles). Significant hypertrophy of most appendicular muscle attachments, with many muscle attachments being very rugose and extremely well-developed. The ulnae also displayed strongly developed interosseous crests as well as enthesopathies at the location for the brachialis and supinator muscle attachments. Enthesopathies were also observed on the clavicles at the location of the coracoclavicular ligament attachment site. Squatting facets were also observed on the tibiae.

Trauma (both perimortem and antemortem) was noted on the cranium and mandible, cervical vertebrae, pectoral girdle, and right hip. Complete perimortem fracture of the spinous processes of the fourth and fifth cervical vertebrae (**Figure 5-85**). Furthermore, possible perimortem fractures were observed on the following skull elements: mandible (complete fracture of mandibular body); right lateral cranium (involving the temporal squama, greater wing of the sphenoid, and anterior parietal); right zygomatic arch; left zygomatic arch (**Figure 5-86**). Most of the maxillae were not recovered, something notable given the excellent preservation of the remainder of the skeleton. Although purely speculative, given the presence of perimortem fractures throughout the cranium and mandible, and cervical vertebrae, it is possible that these elements were also involved in some sort of traumatic event. Possible well-healed antemortem cranial depression fracture was observed on the right lateral aspect of the frontal, near the coronal suture and just inferior of the temporal line.

Figure 5-86. Possible perimortem fractures on various skull elements.

Figure 5-87. A healed fracture on the medial end of the left clavicle.

Trauma was also noted in the pectoral girdle. A healed fracture (remote) was on the medial end of the left clavicle (**Figure 5-87**). Additional pathologic changes were noted throughout the pectoral girdle, and may have been a response to this trauma and subsequent alteration of the joint. Superior luxation of the clavicle in the right sterno-clavicular joint appears to have occurred. Several lytic lesions are on or near the sternal end, and significant bony growth projecting medially is on the posterior aspect of the sternal end. The acromial process of the right scapula was thickened and elongated, with microporosity and macroporosity on the inferior acromial surface. Similar micro and macroporosity was also noted on the inferior surface of the left acromial process. Furthermore, enthesopathies were noted at the coracoclavicular ligament attachment site of the right clavicle and the inferior and medial surfaces of the acromial ends of the left and right clavicles. It is possible that these abnormal bone changes were related to the same traumatic event which caused the clavicle fracture or are the result of unrelated musculoskeletal stressors. Rearticulation of clavicles and sternum suggest that in life the articulation of the pectoral girdle to the sternum may have been greatly altered, likely do to a traumatic event.

Subluxation of the right hip joint occurred. Extensive remodeling and changes to and around the acetabulum suggest an anterio-lateral displacement of the femoral head occurred (**Figure 5-88**). The superior aspect of the right acetabulum was bulging medially. The bone in this area was extremely thin and broken, and it is possible that perforation of the acetabular cavity existed in life. The acetabulum itself has undergone extensive remodeling and changes to the shape, with woven bone covering all nonarticular surfaces, remodeling and bone deposition occurring on the inferior-posterior surface, an indentation (possible remodeled subchondral cyst) present on the ilia portion of the acetabular surface, and woven bone and macroporosity accompanied by thick lipping around the acetabular rim. The fovea capita of the right femur is also remodeled and irregular, with evidence of osteoclastic activity and woven bone. Possible minor subluxation was noted in the left hip joint, characterized by woven bone in nonarticular portions of the acetabulum, irregularity in the shape of the acetabulum, an undulating and uneven articular surface, and dense bone deposition around the acetabular margin giving the appearance of a thick lipped ring. Minor proliferative bone growth was on the region posterior of the left acetabulum. It is unknown if this is related to the acetabular pathology.

Figure 5-88. Remodeling and changes to and around the acetabulum suggesting ossible anterio-lateral displacement of the femoral head.

Evidence of degenerative joint changes was noted throughout the skeleton. Significant lipping and porosity was observed on the odontoid process of the axis (C2) and the corresponding articular facet of the atlas (C1). Marginal lipping was on the mandibular condyles, and most appendicular joint surfaces. The left humerus distal articular surface (anterior aspect) featured periarticular subchondral destruction and pitting.

Healed cribra orbitalia was on the superior orbital surfaces. A series of erosive lesions were on the right parietal. It is unknown if these are pathologic or taphonomic in origin. Two Schmorl's nodes were on mid to upper thoracic vertebrae.

All foot bones appear abnormally light and the external table of bone is very thin. It is possible that this represents some form of localized osteopenia, potentially a result of hip dislocation or other unknown source.

Dental Pathology: The mandible was edentulous, with all mandibular dental elements being lost antemortem. Complete resorption of the alveolus has resulted in a significant reduction of mandibular body height. Very slight porosity is associated with the ridge running the length of the resorbed alveolar surface, likely a result of the resorption process as opposed to being related to periodontal disease. No maxillary bone or dental elements were present for observation.

BURIAL 18

Mortuary Characteristics

Casket/Coffin Shape: Rectangular casket, possible vaulting

Casket/Coffin Measurements: 83 cm in length; 26 cm in width

Burial Measurements: 82.5 cm in length; 26 cm in width

Elevation of Top of Casket: 99.70–99.58 m

Depth of Bottom of Casket: 99.54 m

Body Position: Partially flexed with head at west; hands at sides and legs are bent with right leg over left.

Casket Hardware: 2 cut nails (8d), 8 cut nails (6d)

Personal Items: 5 white porcelain 4-hole buttons

Notes and Field Observations: Burial 18 had a very intact coffin with clearly definable lid covering most of the skeleton. Like so many of the burials, the lid had fallen into the center of the burial, giving the coffin a boat-like look (**Figure 5-89**). This burial shaft was probably vaulted. Though the lid and sides of the casket were largely intact, the boned underneath were already crushed and partially disarticulated. The skull of the child had cracked in half. Ribs were jumble and somewhat disarticulated and even the lower limbs were slightly out of place. Four buttons were found clustered near the child's right rib cage and clacicle. The bone preservation was relatively good, despite the disarticulation (**Figure 5-90**).

Figure 5-89. Collapsed lid of casket for Burial 18.

Osteological Summary

Age: 1 to 3 years

Sex: Indeterminate

Biological affiliation: Indeterminate

Stature: Indeterminate

Preservation/Taphonomy: Bone preservation was fair. Minor taphonomic deterioration of the outer table of bone was observed on many elements. The metaphyseal regions of many long bones were fragmented and friable, preventing many metric observations from being made. Most elements were stained dark brown, likely from coffin wood or other organic compounds.

Figure 5-90. Burial 18 exposed in situ.

Skeletal and Dental Inventory: The skeleton was partially complete. Elements missing or too fragmentary to identify during lab analysis include the right radius, right fibula, and many of the bones of the hands and feet. The dentition was complete. Many permanent teeth were unerupted and embedded in crypts, therefore preventing many observations from being made.

Skeletal Pathology: Endocranial aspect of the cranial vault features a proliferative periosteal reaction in the form of a layer of woven bone. This layer ranges between less than 1 mm thick to 1 mm thick, with the reaction extending over most of the occipital, the left and right parietals, and the posterior aspect of the frontal (**Figure 5-91**). Ectocranially, porosity (> 1 mm holes) was noted on the inferior surface of the pars basilaris (occipital), right zygomatic process of the frontal, lateral aspect of the left temporal squama (posterior to the mastoid portion), and the lateral aspect of the left mandibular ramus.

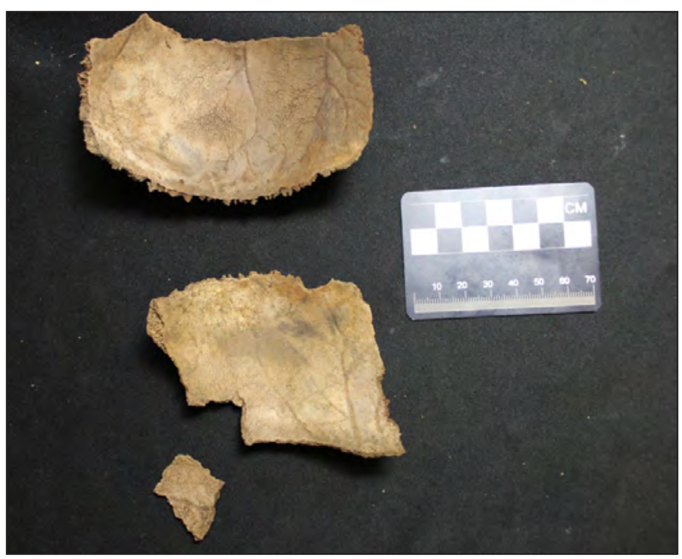

Figure 5-91. Endocranial aspect of the cranial vault featuring a proliferative periosteal reaction in the form of a layer of woven bone.

Dental Pathology: Incomplete crown development and enamel mineralization precluded pathology from being observed in the permanent dentition. Localized enamel hypoplasias of the primary canines were on the mesial aspect of the labial surface on the maxillary deciduous canines (#53 is 2.27 mm from CEJ, 1.04 mm in diameter; #58 is 2.30–4.12 mm from CEJ) and mandibular left deciduous canine (#63 is 1.58–3.68 mm from CEJ, **Figure 5-92a**). A second large LEHPC like defect was on the mesial crown surface of #63 (0.64–2.41 mm from CEJ, **Figure 5-92b**). A ridge-like defect was also on the distal crown surface of #58 (1.39 mm from CEJ).

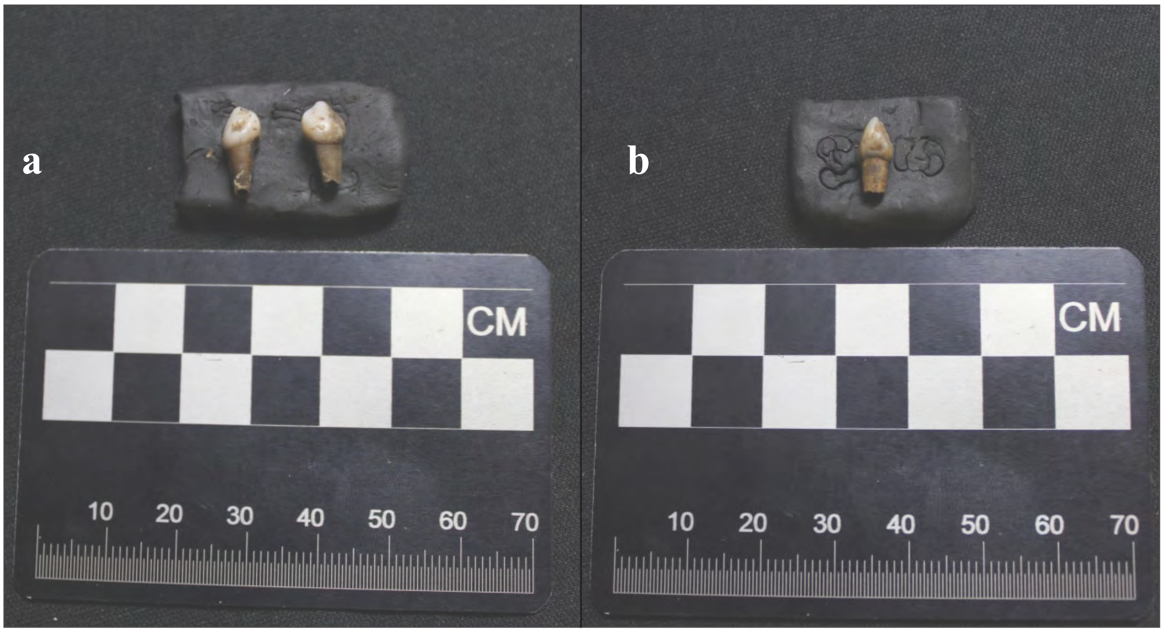

Figure 5-92. Enamel hypoplasias of mandibular left deciduous canine, a.) labial surface, and on the b.) mesial crown surface.

Dental use wear was observed in the form of oblique wear on the lingual surface of the mandibular deciduous central incisors and the labial surface of the maxillary right central incisor. This wear pattern suggests the individual may have had an underbite or developed because of some kind of food processing activity—though this last scenario is unlikely given the young age of the child. Chipping was observed on the several anterior deciduous mandibular dental elements. Several blocky chips were on the labial incisive surface of #66. Small chips were also on the mesial incisive edge of #67 and the labial and mesial incisive surfaces of #65.

BURIAL 19

Mortuary Characteristics

Casket/Coffin Shape: Rectangular

Casket/Coffin Measurements: 75 cm in length; 22 cm in width

Burial Measurements: 65 cm in length; 18 cm in width

Elevation of Top of Casket: 99.74–99.60 m

Depth of Bottom of Casket: 99.54 m

Body Position: Extended supine with head at west; right arm extended under pelvis and left arm bent over pelvis; legs and feel parallel

Casket Hardware: 16 cut nails (6d)

Personal Items: 1 white porcelain 4-hole button

Notes and Field Observations: This burial had a well preserved casket, the sides of which were completely intact as well as much of the lid. The casket was exposed in a day, but several inches of rain overnight filled the excavation cell we were working in and saturated the burial. Though water was bailed and drained, the bones inside the casket were saturated and soft as a result. As with all the juvenile burials in this population, the skull was crushed in place, and the rib cage and pelvis were flattened. The left clavicle and left ulna were disarticulated, as was a portion of the mandible. One button was near the top of the left femur. No hand or toe bones were discernible in situ through the wet sticky clay (**Figure 5-93**).

Osteological Summary

Age: 9 months to 1.5 years

Sex: Indeterminate

Biological affiliation: Indeterminate

Stature: Indeterminate

Preservation/Taphonomy: Bone preservation ranged from good to fair. The ends of most long bone diaphysis were broken taphonomically, preventing most measurements from being taken. Taphonomic erosion of the outer table of bone was evident for many cranial and postcranial elements.

Skeletal and Dental Inventory: The skeleton was partially complete. Elements missing include the right scapula, right clavicle, right pubis, left and right ischium, and all hand and foot elements. The deciduous dentition was mostly complete with the exception of the deciduous maxillary lateral incisors, deciduous left maxillary canine, and deciduous right central incisor. Considering the degree of development, the permanent dentition was partially

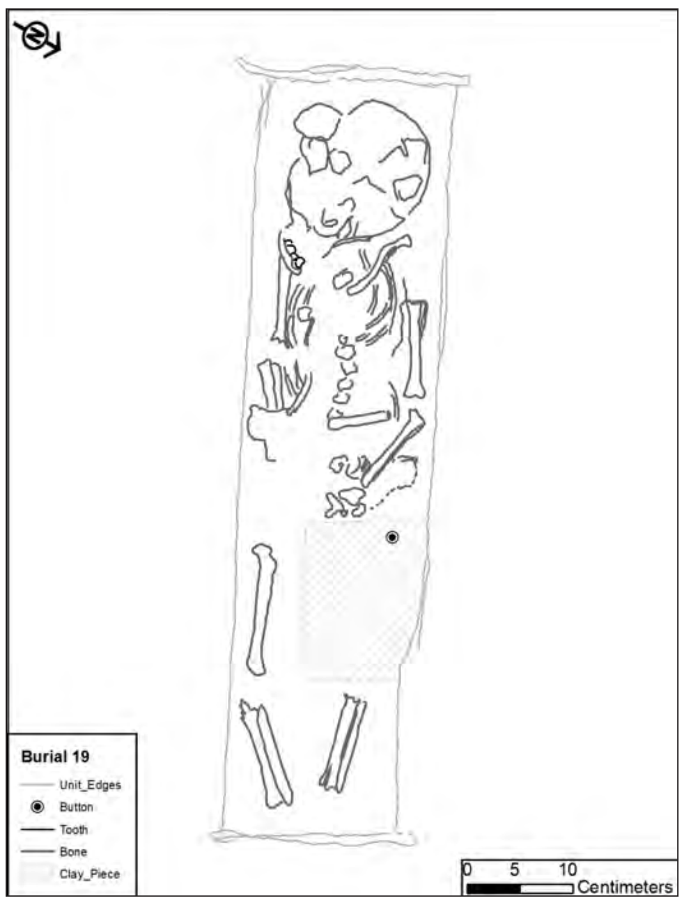

Figure 5-93. Burial 19 exposed in situ.

complete. The most notable missing permanent dental elements include the permanent right incisors, and deciduous left incisors.

Skeletal Pathology: Endocranial surface of the right and left parietals displayed noticeable thickening of diploë along entire observable length of sagittal suture (width = 13.5 (right), 15.4 (left). This diploë expansion is associated with active proliferative periostosis, the combination of which may indicate porotic hyperostosis. Active proliferative periostitis is on the superior half of the endocranial occipital surface. Periostosis was noted on the lateral right cranium (ectocranial surface) including much of the temporal, greater wing of the sphenoid, inferior parietal (supra-squamous region), and right lateral frontal (posterior of the zygomatic process of the frontal bone and inferior of the temporal line, (**Figure 5-94**). The left side is mostly unobservable due to taphonomic erosion. Possible healed cribra orbitalia was observed on the superior surfaces of the right and left eye orbits.

Anterior bowing of the right and left femora, tibiae, and fibulae was noted; it is unclear if this bowing is pathologic or taphonomic in origin (**Figure 5-95**).

Figure 5-94. Periostosis on the lateral right cranium.

Figure 5-95. Anterior bowing of the right and left femora, tibiae, and fibulae.

Dental Pathology: Evidence of severe developmental disruption was observed throughout the deciduous and permanent dentition, with nearly all present dental elements affected. Many of the deciduous dental elements had severe enamel hypoplasias which resulted in a mottled appearance of the enamel. This mottled appearance was created by a combination of numerous large pit-like defects, large areas of significantly reduced or absent enamel, and plane enamel defects. Hypocalcifications were also observed in conjunction with some of these defects. These severe mottled defects were primarily restricted to the deciduous canines and deciduous 1st and 2nd molars (**Figure 5-96a-b**); however, less severe hypoplasias (primarily pit defects) were also found in the deciduous incisors. The maxillary deciduous central incisors and mandibular deciduous right central incisor were the only teeth to not display evidence of enamel hypoplasia; possible enamel hypocalcifications were noted on these teeth.

Severe developmental disruptions were also evident in the developing permanent dentition (despite their early stage of development). The developing right and left permanent maxillary and mandibular 1st molars feature deep pitting of the occlusal surface with a marked reduction in occlusal dental tissues giving the cusp tips a very pointed appearance (**Figure 5-97**). Deep

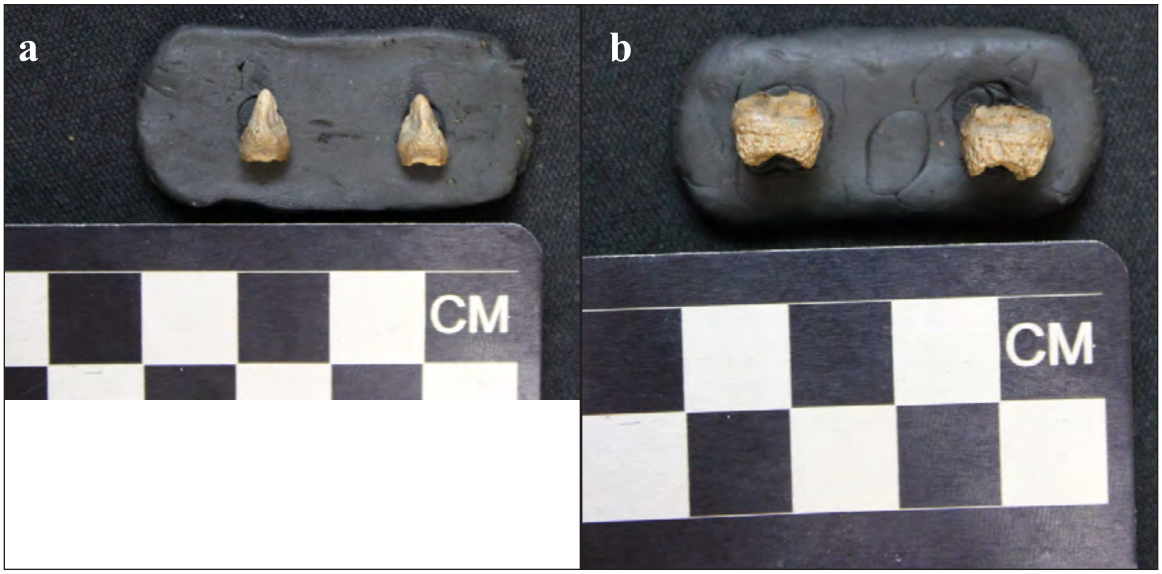

Figure 5-96. Severe enamel hypoplasias resulting in a mottled appearance of the deciduous dentition.

pitting was also located on the buccal, mesial, and mesial lingual crown surfaces of the maxillary permanent molars, as well as the buccal and distal crown surfaces of the mandibular permanent molars. This marked reduction in occlusal dental tissues may have eventually resulted in a plane type defect (creating a shelf like appearance). The permanent right maxillary central incisor features deep pitting along the incisive edge, with marked reduction in dental tissues at the mid incisive edge, giving the tooth almost a notched appearance on the labial surface. The right mandibular permanent incisor also featured deep pitting along the incisive surface and a plane form defect near the incisive edge, extending further on the incisive edge than the lingual edge.

Figure 5-97. Pointed appearance of permanent molars featuring deep pitting of the occlusal surface and a marked reduction in occlusal dental tissues .

BURIAL 20

Mortuary Characteristics

Casket/Coffin Shape: Rectangular casket

Casket/Coffin Measurements: 110 cm in length; 20 cm in width

Burial Measurements: 99 cm in length; 19 cm in width

Elevation of Top of Casket: 99.43–99.38 m

Depth of Bottom of Casket: 99.32 m

Body Position: Extended supine with head at west; arms at sides, and legs and feet parallel

Casket Hardware: 9 cut nails (8d), 6 cut nails (6d or broken)

Personal Items: two mother-of-pearl 4-hole buttons (one disintegrated), one white porcelain 4-hole button

Notes and Field Observations: The skeleton of this child of about 3–5 years in age was well preserved, though the casket appears to have been somewhat compacted in the clay (**Figure 5-98**). The skull was fragmented, but almost all skeletal elements were in place and articulated. Two mother-of-pearl buttons were found under the right and left rib cages. A third porcelain button was found under the child's pelvis.

Figure 5-98. Burial 20 exposed in situ.

Osteological Summary

Age: 3–5 years

Sex: Indeterminate

Biological affiliation: Indeterminate

Stature: Indeterminate

Preservation/Taphonomy: Bone preservation was excellent with only minimal evidence of taphonomic erosion. Some minor breakage of distal diaphyses of several long bones was noted.

Skeletal and Dental Inventory: The skeleton was mostly complete, with only several elements of the hands and feet missing during lab analysis. The dentition was complete. Many permanent teeth were unerupted and embedded in crypts, therefore preventing many observations from being made.

Skeletal Pathology: Minor porosity was observed on the right and left temporal, superior to the external auditory meatus. Minor, active cribra orbitalia was observed on the right and left superior orbital surfaces.

The left and right maxillary sinuses displayed woven bone and proliferative boney deposits. Furthermore, moderate macroporosity and microporosity were observed on the maxillary palate. These are indicative of maxillary sinusitis.

Proliferative periosteal reaction observed on the endocranial superior surface of the occipital, parietals and frontal bone (**Figure 5-99**). Proliferative bone deposits form a woven layer of bone, less than one millimeter thick which overlays the "normal" periosteal surface (layer easily flakes off). The margins of the reaction are characterized by porosity (less than or equal to 1 mm in diameter), while the remainder of the reaction is characterized by woven bone bisected by meandering channels (max length of 2 cm). The parietals and occipital display noticeable thickening of the along the sagittal suture, reaching a maximum thickness of 8 mm at obelion with only 4.5 mm attributable to the diploë thickness.

Figure 5-99. Proliferative periosteal reaction on the endocranial surface of the occipital, parietals and frontal bone.

Evidence of healed periostosis (sclerotic in appearance) was observed on the diaphyses of the left and right tibia and fibulae. Reactive bone was noted at humeral and radial muscle attachment sites, giving these sites a rugged appearance. Although not necessarily pathologic, this may be evidence of some type of musculoskeletal stress.

Dental Pathology: Incomplete crown development and enamel mineralization precluded pathology from being observed in the permanent dentition. Several enamel hypoplasias and enamel hypocalcifications were noted on the deciduous maxillary dentition. A single pit defect was on the mesio-buccal surface of #52 (3.70 mm from CEJ). An array of pit defects was on most of the distal aspect of #54. As no additional hypoplasias were noted in the deciduous dentition, these defects may be indicative of some form of trauma to the right maxilla. Light brown and light brown-cream opacities were on #58 (diffuse on distal aspect of crown), #59 (1.35 mm to cusp tip), and #60 (1.45 mm to cusp tip).

A small blocky chip was located on the mesial surface of #52. An unknown brown material was adhering to the labial surface of #53, 54, 55, and 57 . It is possible that this material may be calculus or some other material from the coffin.

BURIAL 21

Mortuary Characteristics

Casket/Coffin Shape: Rectangular casket, possible vaulting

Casket/Coffin Measurements: 76 cm in length; 17–18 cm in width

Burial Measurements: 70 cm in length; 15 cm in width

Elevation of Top of Casket: 99.72–99.62 m

Depth of Bottom of Casket: 99.54 m

Body Position: extended supine with head at west; hands over pelvis; legs and feet parallel

Casket Hardware: 10 cut nails (8d), 6 cut nails (6d), 1 cut nail (4d)

Personal Items: six white porcelain 4-hole buttons (matching), 1 animal tooth pendant (probably dog or pig incisor)

Notes and Field Observations: The coffin lid and base of this burial was almost completely disintegrated and bone was stuck directly into clay. However, a horizontal shadow of the lid still intact stretched across the center of the burial, suggesting that the shaft had been vaulted at one time. The skull of this infant was very crushed as were many of the ribs and pelvic bones (**Figure 100**). The right humerus was incomplete and a left humerus was never identified at all in the field. The right radius and ulna were broken in place as well. The femurs were both slightly out of place and the ends of were fragile and disintegrating. Curiously, the vertebrae were all well-articulated in a nice little line down the center of the body. We identified a line of buttons down the back, under the spine stretching from the stomach and up to the base of the skull. An animal tooth pendant was found lodged near the right humerus.

Figure 5-100. Burial 21 exposed in situ.

Osteological Summary

Age: 6 –9 months

Sex: Indeterminate

Biological affiliation: Indeterminate

Stature: Indeterminate

Preservation/Taphonomy: Bone preservation ranged from good to very good. The diaphyseal ends of several long bones had taphonomic breakage.

Skeletal and Dental Inventory: The individual was mostly complete. The left humerus was noted to be missing during field excavation, and no fragments which could be confidently attributed to it were observed during lab analysis. Only the proximal portion of the right humerus was observed. Furthermore, only a small portion of the proximal left radius was identified and the left ischium and several of the bones of the hands and feet were missing. The deciduous dentition was complete, and a mandibular left molar was also present.

Skeletal Pathology: Active periostosis was on portions of the sphenoid (ectocranial surface of the greater wings and endocranial surface of the lesser wings) and pars basilaris.

Dental Pathology: Small pit enamel defects were on cusp tips of the maxillary and mandibular deciduous first molars . No additional dental pathology was observed, however enamel mineralization has not completed for all dental elements.

Skeletal Notes: A lambdoid ossicle was in the right aspect of the lambdoid suture.

BURIAL 22

Mortuary Characteristics

Casket/Coffin Shape: Rectangular casket

Casket/Coffin Measurements: 75 cm in length; appr. 30 cm in width

Burial Measurements: 45 cm in length; 25 cm in width

Elevation of Top of Casket: 99.81–99.58 m

Depth of Bottom of Casket: 99.55 m

Body Position: Extended supine with head at east. Right hand straight and left hand probably over pelvis; legs parallel

Casket Hardware: 6 cut nails (6d), 1 cut nail (4d)

Personal Items: none

Notes and Field Observations: This infant probably died at childbirth or before it could be Christened and, therefore, its head was placed on the east of the grave, rather than to the west. The preservation of the coffin lid was fair to good and it appears as though this shaft was vaulted (**Figure 5-101**). The lid of the coffin was constructed with long pieces nailed to at least one cross piece in the central portion of the body. The lid had collapsed inward quite a bit leaving the tale-tell boat signature. The skeletal elements underneath the lid were crushed and somewhat dispersed. There were no personal items with this burial.

Osteological Summary

Age: 36 weeks in utero to birth

Sex: Indeterminate

Biological affiliation: Indeterminate

Stature: Indeterminate

Preservation/Taphonomy: Bone preservation ranged from good to very good, with only minor erosion of several diaphyseal ends. Most bones were stained brown, likely from coffin wood or other organic compounds.

Figure 5-101. Burial 22 exposed at top of coffin.

Skeletal and Dental Inventory: This individual was mostly complete. The right ulna, left scapula, left and right pubis, the bones of the hands, and several bones of the feet were missing. The cranium and mandible were fragmented and several cranial elements were observed during lab analysis. The dentition was incomplete, with only a mandibular left central deciduous incisor, deciduous canine, and first deciduous molar recovered during lab analysis. It is unknown if the remainder of the teeth were lost postmortem or absent congenitally.

Skeletal Pathology: None observed

Dental Pathology: None observed, however lack of complete tooth formation and incomplete enamel mineralization prevented most observations from being made.

BURIAL 23

Mortuary Characteristics

Casket/Coffin Shape: Rectangular casket

Casket/Coffin Measurements: 80 cm in length; 25–30 cm in width

Burial Measurements: 80 cm in length; 26 cm in width

Elevation of Top of Casket: 99.35–99.32 m

Depth of Bottom of Casket: 99.28 m

Body Position: Extended supine with head at west; hands over stomach and legs parallel

Casket Hardware: 11 cut nails (8d), 6 cut nails (6d), 1 cut nail (4d)

Personal Items: 1 straight pin

Notes and Field Observations: This was a small child and the coffin on this burial was almost completely disintegrated, leaving nothing but paint dust stain to follow. However, the skeletal elements were very well-preserved. The skull was crushed, as was typical for all child burials but the teeth were mostly intact and some were still in place in the mandible and maxilla. A few teeth were found embedded in the soil next to the mandible. Most elements were still articulated though legs and feet had seen a bit of movement (**Figure 5-102**). The only artifact with this burial was a straight pin found over the pelvis. This broke when we tried to remove it. Some toe bones may also have been lost during excavation of the thick clay matrix around the feet. Traces of white or other light colored paint from the casket lid were still evident over portions of the skeleton.

Figure 5-102. Burial 23 exposed in situ.

Osteological Summary

Age: 1–2 years

Sex: Indeterminate

Biological affiliation: Indeterminate

Stature: Indeterminate

Preservation/Taphonomy: Bone preservation was very good. Pitting and erosion of the outer table of bone was noted on a few bones, primarily cranial elements. Dark staining was observed on pelvis bones, left ulna, and thoracic vertebrae.

Skeletal and Dental Inventory: This individual was complete with the exception of several hand and foot bones missing during lab analysis. The deciduous dentition was complete, and four permanent teeth were present.

Skeletal Pathology: Minor cribra orbitalia was noted on the superior and lateral orbital surfaces.

Dental Pathology: Localized enamel hypoplasias of the primary canine were observed on the mesial aspect of the labial surface of the mandibular left and right deciduous canines. No other dental pathology was observed, however pathology was unobservable for permanent dentition due to degree of dental development and lack of completion of enamel mineralization.

BURIAL 24

Figure 5-103. Burial 24 exposed in situ.

Mortuary Characteristics

Casket/Coffin Shape: Rectangular casket

Casket/Coffin Measurements: 72 cm in length; 43 cm in width

Burial Measurements: 68 cm in length; 25 cm in width

Elevation of Top of Casket: 99.45–99.24 m

Depth of Bottom of Casket: 99.22 m

Body Position: Extended supine with head at west; right hand over pelvis and left hand over stomach; unknown leg position.

Casket Hardware: 24 cut nails (6d) and 1 broken cut nail

Personal Items: 5 straight pins, 2 metal hook-and-eye clasps, 2 hexagonal glass beads (blue and black), 5 whole red glass doughnut shaped beads (with 40+ broken fragments), 12 white rounded shell beads, 67 whole rounded smoky/clear glass beads, 87 ring-like black glass beads.

Notes and Field Observations: The casket lid and sides were very degraded with only a small amount of wood still intact. The burial contained a small child or infant with very friable bones. The skull was crushed and many bones were out of place in this burial. The child's right radius was found above the skill, and the lower bones of the right leg were found 10 cm below the left leg. Bits of skull and other small bones were out of place as well. Small black and red beads were found in the neck area just below the skull (**Figure 5-103**). The soil around the skull and neck area was only lightly exposed in order to keep the skull fragments and small beads intact. The body was lifted in bulk matrix out of the shaft in hopes of isolating elements more carefully in the lab.

Osteological Summary

Age: Birth to 3 months postpartum

Sex: Indeterminate

Biological affiliation: Indeterminate

Stature: Indeterminate

Preservation/Taphonomy: Bone preservation was fair. Many elements were very friable and as a result not all observations were able to be made. When possible, metric measurements of long bones were taken in situ. Dark grey-black staining was observed on several right ribs, many elements of the vertebral column, the right scapula, and the right clavicle.

Skeletal and Dental Inventory: This individual was complete, with the exception of the right pubis and ischium. These elements were not present during lab analysis and also appear to be absent from the field photographs. The deciduous dentition is complete with the exception of the maxillary and mandibular left canines.

Skeletal Pathology: Regions of minor active periostosis were noted on the ectocranial surface of several elements composing the base of the cranium and the lateral surfaces of the temporal bones (petrous and squamous portions) (**Figure 5-104**). This exceeds what would be expected with normal bone growth and development. Whatever etiology caused these lesions did not appear to also affect the endocranial bone surfaces.

Proliferative periostosis was noted in the supraspinous fossa and lateral border of the left and right scapulae (**Figure 5-105**) and the superior-medial surface of the left and right clavicles (**Figure 5-106**). Proliferative periostosis was also observed on the visceral surface of several left and right ribs, beginning at least at rib 2 and continuing caudally through the rib cage.

Dental Pathology: None observed, however lack of complete tooth formation and incomplete enamel mineralization prevented most observations from being made.

Figure 5-104. Minor active periostosis of several elements composing the base of the cranium.

Figure 5-105. Proliferative periostosis in the scapula.

BURIAL 25

Mortuary Characteristics

Casket/Coffin Shape: Rectangular casket

Casket/Coffin Measurements: 75 cm in length; 20 cm in width

Burial Measurements: 63 cm in length; 15 cm in width

Elevation of Top of Casket: 99.29 m

Depth of Bottom of Casket: 99.10 m

Body Position: Extended supine with head at west. Not clear how arms and legs were positioned

Casket Hardware: 31 cut nails (6d)

Personal Items: 1 straight pin, 1 white 4-hole porcelain button.

Figure 5-106. Proliferative periostosis on the superior-medial surface of the clavicle.

Notes and Field Observations: This was one of the deeper burials in the cemetery. No casket lumber was preserved in this burial at all, though in place nails regularly spaced around the body suggests a casket was present at one time. The in situ preservation of this burial was extremely poor. Cranium was crushed and the fragments of them were dispersed over a 20 cm area. All the long bones were fragmentary. This burial was removed in bulk in hopes of preserving the taphonomy of some of the skeletal elements.

Osteological Summary

Age: 1 to 2 years

Sex: Indeterminate

Biological affiliation: Indeterminate

Stature: Indeterminate

Preservation/Taphonomy: Bone preservation was fair. Many elements are friable, with taphonomic erosion of the outer table of bone observed for approximately 70 percent of elements and erosion of the metaphyseal regions of all long bones. This prevented most metric measurements from being taken and evidence of pathology from being observed. Black staining is observed on the left femur, several ribs, and several vertebral neural arches.

Skeletal and Dental Inventory: This individual was mostly complete. The partial completeness score given for most elements likely is a result of the friable nature of many bones.

Skeletal Pathology: None observed, however poor bone preservation prevented most observations from being made.

Figure 5-107. Deciduous dentition showing enamel hypoplastic and hypocalcification defects.

Dental Pathology: Enamel hypoplastic and hypocalcification defects were noted on several of the deciduous dental elements (**Figure 5-107**). These defects were generally expressed bilaterally however there is some variation in the bilateral expression. Single isolated pit defects are on the disto-lingual surface of #70 (3.03 mm from CEJ) and on the mesio-buccal surface of #62 (1.39 mm from CEJ). Localized enamel hypoplasias of the primary canine were on the medial aspect of the labial surface on the mandibular canines (#63 1.8 –3.67 mm and #68 2.8–3.78 mm from CEJ). A localized array of pits is also on the distal surface of #63 (1.4–2.51 mm from CEJ) and #68 (2.8–3.78 mm). A linear array of pits is on the lingual surface of #52 and is directly associated with a brown banded opacity (0.72–1.33 mm from CEJ). A linear horizontal array of pits is around the entire crown circumference of #53 (0.85–2.01 mm from CEJ) and #58 (0.62–1.40 mm from CEJ). #58 also features an additional array of pits on the distal surface (2.55 mm from the CEJ). A liner array of pits was on the cervical aspect of the lingual and mesial surfaces of #59 directly associated with a brown banded opacity (CEJ–1.95 mm). Grey-cream and brown banded opacities were on #51, 63, and 68.

Incomplete crown development and enamel mineralization precluded most pathology from being observed in the permanent dentition (**Figure 5-108**). Although development of permanent dentition is still in early stages, possible developmental defects are evident in the anterior mandibular permanent dentition. A significant reduction in incisal diameter of the mandibular central incisors, mandibular right lateral incisor, and mandibular canine is observed, resulting in what appears to be a plane like defect.

Antemortem chipping was observed on the incisive surface of the deciduous maxillary right central and lateral incisors (#54 and 55), and the deciduous mandibular left lateral incisor (#64). Chipping of the deciduous anterior dentition would not normally be expected for a child of this young age, and may suggest some kind of a habitual behavior.

SHERIFF DEPT. REMAINS

Age: 30–50

Sex: Male

Biological affiliation: African-American

Stature: Unknown

Preservation/Taphonomy: Bone was in good condition. Taphonomic erosion of external table of bone, green staining (possibly from algae), and root activity were noted on cranium. The posterior-lateral surface of the cranium shows evidence of bleaching from surface exposure. The remaining bones were likely recovered from at least a partially buried context and were stained dark brown from soil.

Skeletal and Dental Inventory: Remains collected include a cranium, missing the face and basicranium regions, mandible, 1st and second cervical vertebrae, and a coracoid process (likely from a right scapula). A perissodactyla (possibly horse or donkey) metapodial bone was also collected with these remains. Three teeth were present in the mandible. No maxillary bone or dentition was recovered.

Skeletal Pathology: Erosion of the outer table of bone prevented most pathology from being observed. Porosity and parietal thinning was noted on the right superior parietal and occipital surfaces. Although the left parietal was not able to be observed due to taphonomic erosion, these lesions appear consistent with biparietal atrophy. Although not necessarily pathologic, arachnoid pitting was noted on the frontal along the midline. An atypical foramen was located on the left parietal, posterior and lateral of bregma. The mandible showed marked thinning and significant eversion of the coronoid process. Marginal lipping was noted on the articular facets of the first cervical vertebra. A Schmorl's node was noted on the inferior body surface of the second cervical vertebrae, and marginal lipping was noted on the articular facets and dens.

Dental Pathology: Mandible exhibits moderate periodontal disease with moderate to significant resorption. Many posterior dental elements were lost antemortem with complete or nearly complete resorption. A pocket of woven bone and porosity is disto-lingual of the mandibular right third molar. An active apical abscess is in region of #25 and 26, and perforates both the labial and lingual surfaces. Although lost postmortem, these teeth were likely carious root stumps. Marked oblique buccal wear of the mandibular left 1st premolar was noted. The wear facet forms a "V" shape in profile and runs from approximately mid-occlusal surface to the mesial buccal crown surface.

Additional notes: It is possible that the mandible and vertebrae may not belong with the same individual. The cranium appeared very male, while the mandible (specifically the mental eminence) suggested an indeterminate sex. Although it is possible for the cranium and mandible of the same individual to show differences in expression of sexually dimorphic traits, without the presence of the basicranium and maxillae (to see if the mandible favorable articulates with cranium) a definite statement on number of individuals represented cannot be said for certain.

Chapter 6

Spatial and Artifact Discussion

by Rachel Feit

Spatial Analysis

The Montgomery Hill Cemetery contained 21 children and four adults, six counting the disarticulated remains found on the beach surface in 2009 and 2011. Adults were spatially distributed among the children's graves with no meaningful separation between their interments and those of the children. In fact, in the case of three of the remains (Burials 17, Burial 6 and Burial 9) children's graves are situated in proximity, suggesting that they could be parents of those children. Curiously, a neat line of interments (Burials 18–25) runs along the edge of the cemetery. These have no clear association to an adult, nor do Burials 12 and 13, located farthest downslope.

The interments at the Montgomery Hill Cemetery reflect Christian burial practices (**Figure 6-1**). Minor differences in direction may indicate a notable period of time passed between these interments. Bodies were placed supine and extended in their coffins or caskets with their heads to the west and feet to the east. According to Christian belief, this practice allows bodies to face toward Jerusalem and toward Christ when the dead rise from their graves on Judgment Day (Jordan 1982). Following West African traditions as well, this orientation also allowed the dead to face the rising sun. Curiously, three individuals (Burials 5, 15, and 22) were interred with their heads to the east. All three were infants under two months in age, and one (Burial 22) was 36 weeks in utero to seven months post-partum based on skeletal and dental characteristics. These three children may have died before they were baptized or Christened. If so, the reverse placement of their bodies may have been intentional since unbaptized souls could not rise from the dead at Judgment Day. In some West African traditions, infant burials are physically separated from those of adults (Jamieson 1995). This was not the case at the Montgomery Hill Cemetery, though the reverse orientation of two neo-natal infant burials could be alternatively interpreted as a symbolic separation from those that died after a longer period of life. On the other hand, Burial 2 is the youngest individual (32-36 weeks) and was buried with its head to the west.

In terms of spatial organization, it is possible to perceive two loosely organized rows of bodies, running along a northwest-southeast axis. This linear patterning of graves is also typical of Christian cemeteries, though most seem to have a more pronounced north-south alignment. The Freedmen's Cemetery in Dallas, the Phillips Memorial Cemetery in Galveston, the Sinclair Cemetery in Dallas County (41DT105), and the Third New City Cemetery in Houston (41HR886), and many others across the country are organized in a similar manner. At the Montgomery Hill Cemetery, while two loosely organized rows are apparent, there are four additional burials randomly distributed at the northern edge of the cemetery in no apparent line. None of the graves in the cemetery overlapped, though a few (notably Burials 14–17)

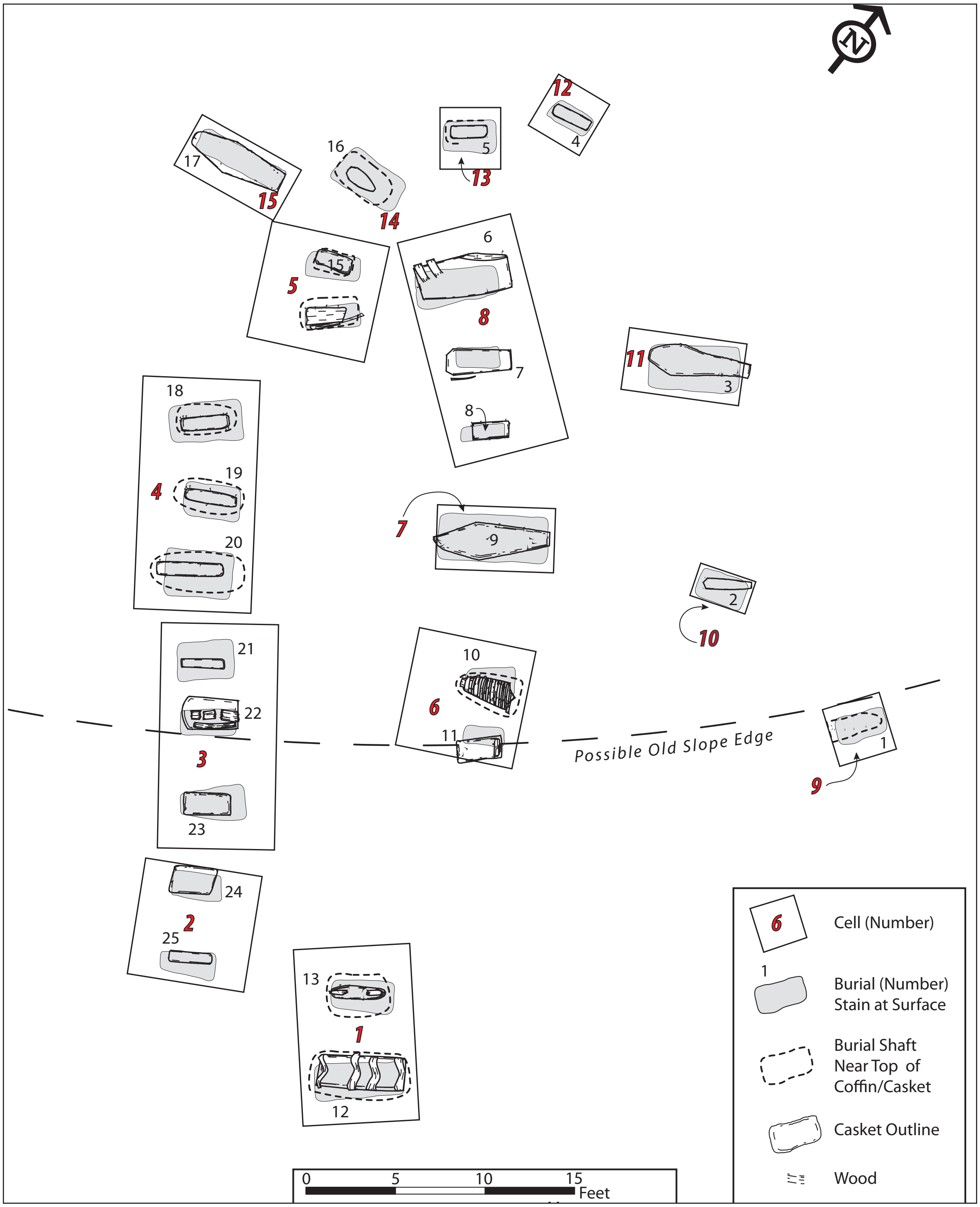

Figure 6-1. Plan map of burial layout showing grave shafts and tops of caskets.

were placed quite close together, and these may represent part of a family unit composed of one adult female (Burial 17) and three infants (Burials 14–16).

Indeed, comparing Montgomery Hill Cemetery to others of its general age, it is evident that while an attempt was made at order, burials were nonetheless more haphazardly placed than seen at more well-tended graveyards with clearly delineated, non-perishable above-ground markers. They may have had some marker, but was perishable. Terry Jordan has commented that Southern folk cemeteries are a mixture of order and chaos with "graves strewn about in a rather disorderly manner, in staggered rows, separate clusters, and freestanding sites (Jordan 1982)." He notes that this propensity for ordered chaos is most common in African American cemeteries, but is not unknown in white cemeteries as well. Certainly, the Montgomery Hill Cemetery would fall into this tradition of Southern folk cemeteries.

Nonetheless, the irregularity of the interments may have more to do with an uncertainly about where exactly previous graves were placed. In terms of burial markers or headstones, it is not clear whether any non-perishable formal markers were ever placed at this cemetery. Eureka natives who remember the cemetery before it was inundated knew of its presence, but claim there were never any markers. B. J. Perry believes that the cemetery used to be marked with rocks (Perry 2011). Henry Jennings, who grew up about 50 yards from the cemetery, remembers that they used to plow around it (Jennings 2012). It is possible that wooden crosses were originally placed above the graves, but these would have weathered quickly and were gone by the time Perry and Jennings (born 1930–1940) were children. It is also possible the grave locations were marked with unmodified rocks. In fact, several large rocks were observed during excavations on the exposed section of beach near the cemetery (**Figure 6-2**); however, none of them were in close enough proximity to the grave shafts to be indisputably linked with them.

Figure 6-2. Large rocks on the beach near the Montgomery Hill Cemetery may be displaced grave markers.

Jordan and others have discussed African American burial practices and some ways in which they can differ from white burial practices. For instance, in African American graveyards, graves are often outlined in shell, marked with broken bits of pottery, scraped earth, glass or bottles (Jordan 1982, Garmon 1994, Davidson 2010). However, no one has been able to categorically define a set of consistent burial practices for African Americans and this is probably because there is simply too much diversity through time and place to generalize in that way. One aspect of African American graveyards that appears to be fairly widespread, however, is that there is a physical separation of African American graves from white graves. This was certainly the case for Montgomery Hill Cemetery, which was separated from the white Eureka cemetery, located two miles to the west along the main road. By contrast, the Montgomery Hill Cemetery appears to have been placed off the road, behind a cluster of dwellings, all of which were occupied by either enslaved black laborers (if they were there prior to 1865) or post-emancipation black tenant farmers (see Figure 3-4). The dwellings themselves were situated several hundred yards from the Plantation owner's (P. K. Montgomery's) house, and therefore, it can be assumed that burial of the dead took place with Montgomery's awareness. But while Montgomery may have sanctioned this area for use as a burial ground, he probably had little control over or contribution to the actual interments. White land owners (and later post-bellum landowners) largely left the dedication, funerals and burial practices of black laborers to African Americans (Jamieson 1995). Thus the responsibility for marking, and commemorating the Montgomery Hill Cemetery probably rested entirely within the black community. Lu Lee, who grew up near Blooming Grove recalled that "I remember when folks died they built plank coffins and lined the inside with plain white cloth and the outside with black. They didn't have no funerals in them [slavery] days—they just buried folks in the burying ground we had (WPA 1936–1938)." Former slave, Mattie Gilmore's recollections of burial practices were similar. She recalled "Marster Barrow give us nuff ground ter bury our dead. De coffins was allus homemade and sometimes dey was covered in black cloth and sometimes dey was jes plain boxes." (WPA 1936–1938)

Regardless of whether the cemetery was ever marked in any way, after 30 years underwater, all above ground evidence of the site's location was completely erased by the time it was rediscovered in 2009. It is impossible to reconstruct what the cemetery may have looked like before it was submerged. B. J. Perry remembers finding a bucket of bullets at the cemetery when he was hunting there in the 1960s or 1970s (Perry 2011). Aerial photos show the cemetery location in the 1940 (see Figure 3-5). The image clearly depicts an irregular, densely wooded strip among plowed fields, so it can be assumed that the cemetery was tree-shaded at one time. The fact that the area was not plowed, but left vegetated suggests that at that time, there was a clear community memory of the cemetery, though according to Henry Jennings, few people, if any remembered anyone being buried there. Topographically, the cemetery was placed on a hillside, near the top of a hill. The hill sloped to the south and graves were placed along that south-trending slope.

All bodies were interred in the hard clay subsoil. Three of the adult burials were deeper than average (and deeper than nearby child interments), while one, Burial 17, was shallower than average. However, based on its location farthest from the water at the northern end of the cemetery, the apparent shallowness of this burial could be the result of soil erosion. According to Dockall et al. (1996, quoting Parler), children were typically buried in shallower graves than adults. This is particularly true for stillborn babies following the belief that deeper burials will harm the mother (Dockall et al. 1996). However, for the Montgomery Hill Cemetery, the three possible stillborn burials (Burials 5,15, and 22) do not seem to be significantly shallower than surrounding graves of other children.

Based on a comparison of the beach levels, island levels, and topographic maps it is possible to reconstruct, within a general range, how deep the original grave shafts were dug into the clay. During the 2011 drought when several hundred feet of normally submerged beach lay exposed, the ground surface was mostly flat to gently sloping toward the water. However, bank exposures between the beach and the normal edge of the island suggest that between 50–100 centimeters of soil had eroded from the top of the hill. The relative depths of the burials throughout the cemetery reflect this erosion. The deepest burial in the cemetery was Burial 12, located closest to the shoreline. This was a child of about 7–10 years in age (probably female) and the bottom of her coffin was recorded at a depth of more than one meter below the surface at the time of investigations (at a depth of 98.94 m). The shallowest burial, Burial 8, was toward the north end of the cemetery (though not the northernmost burial). The bottom of Burial 8 was only 33 cm (99.77 m) below the surface, and the top of the casket was visible at the surface prior to excavations. Other burials near the north end of the cemetery were also quite shallow, averaging to about 40 cm below the surface in depth.

Even considering erosion, there appears to have been a fair amount of spatial variation in the total depth that each interment reached. The average depth of all burials in the cemetery was 99.44 m (56 cmbs). By plotting the depth of all burials with respect to the overall average depth it is possible to see that the shallower-than-average burials tend to be those on the north end of the cemetery, close to the island edge, while the deeper-than-average burials tend to be toward the shoreline (**Figure 6-3**). This suggests that more soil has eroded from the upslope northernmost graves than the southernmost. Thus it is probably fair to assume that while up to about a meter of soil has eroded from the island edge representing the original edge of the hilltop, only between 10 and 30 centimeters of soil has eroded from lower elevations along the hillside. This would help explain why disturbed remains were found north of the intact burials on the surface of the beach in 2009 and 2011. The disturbed grave (or graves) was probably originally north of the intact portion of the cemetery, and the individual within it was probably interred no deeper than about a meter below the surface. It is reasonable to assume then, that burials at the Montgomery Hill Cemetery were probably on average dug to about a meter (3.28 ft) or a little more below the surface, with adults being buried slightly deeper.

Burial practices

Coffin Shapes and Burial Shafts

Until the middle of the nineteenth century, the hexagonal coffin was the most common form of burial container in the United States. These types of containers were intended to conform to the shape of the body, and generally required less wood to build than rectangular containers. However, by the 1850s rectangular containers or caskets became widely available. Derived from the French word "casque" meaning jewel box, rectangular caskets generally appear around the same time that the beautification of death movement emerged (Davidson 2000). The beautification of death movement sought to romanticize and idealize death and this was reflected in material culture transformations (Bell 1990). Rectangular caskets were meant to disguise their contents, in contrast to hexagonal coffins that were increasingly perceived as morbid. Coffins and caskets were used concurrently in Texas and elsewhere throughout the late nineteenth century. However, coffins largely fell out of use by the beginning of the twentieth

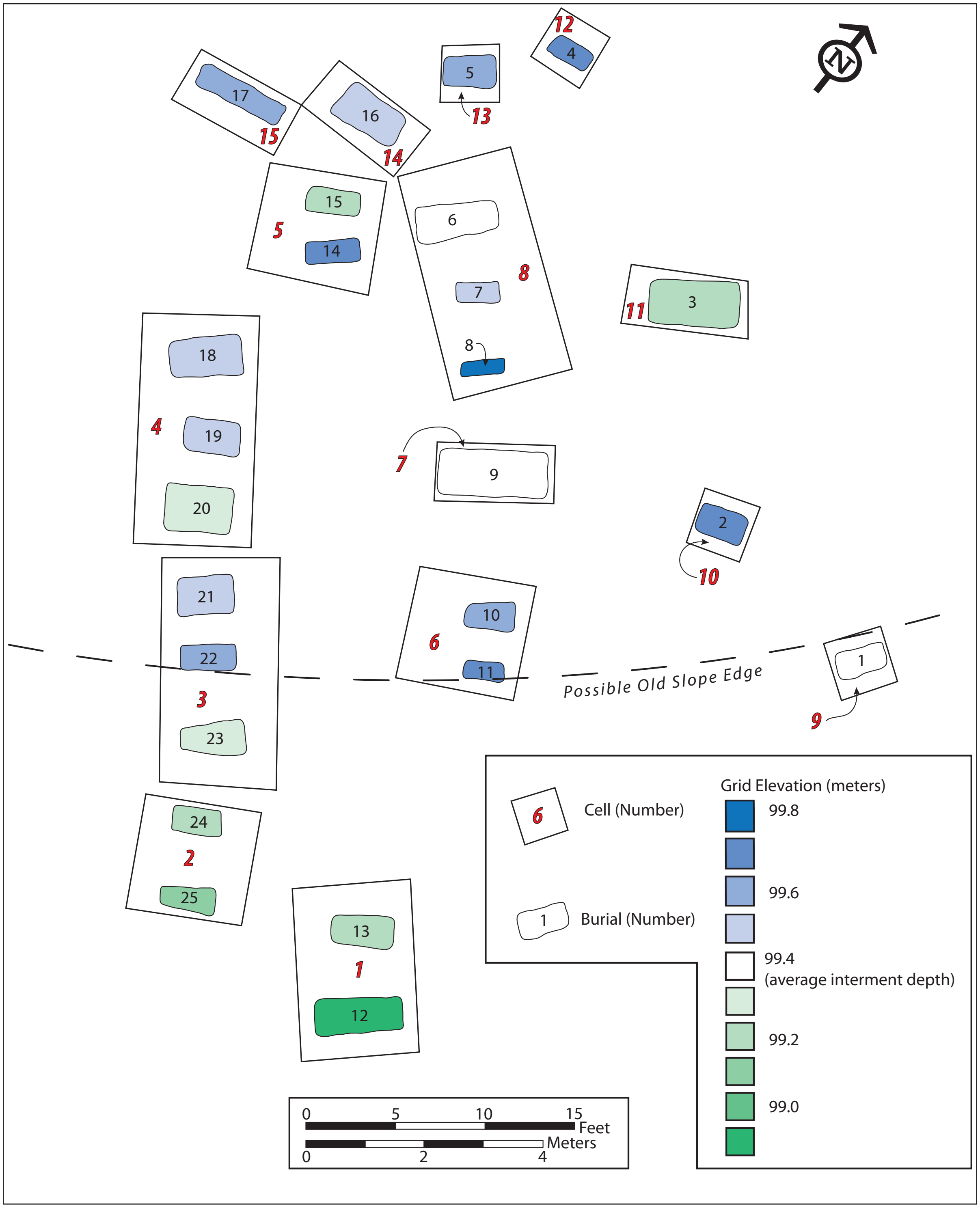

Figure 6-3. Color coded map depicting burial locations and depths.

century. The presence of rectangular shaped caskets in a cemetery, then can generally be used as a temporal marker indicating a burial date after about 1850 (Davidson 2000).

Burial containers at the Montgomery Hill Cemetery were simple wooden rectangular boxes, or wooden hexagonal coffins held together with square nails. These were almost certainly locally made, as none of them contained fancy hardware, handles, viewing plates or plaques more commonly associated with factory manufactured containers. In most cases, where coffin wood was still present, lids had slumped in toward the body in boat-like fashion, and were directly above the bones of the skeleton. The sides of coffins had also slumped from the pressure of the clay above them. Other joinery details were impossible to determine due to the poor preservation of most of the burial containers. Sixteen of the burials were in rectangular caskets, while eight of the burials occurred in hexagonal coffins. In the case of one burial, wood was too disintegrated to determine that shape of the burial container.

Vaulting was observed in at least 11 of the burials, and may have been present in more. However, poor preservation of many of the burial containers, coupled with dense hard clay soil made it difficult to discern burial shaft details. Davidson describes the practice of vaulting as one where a grave shaft would be dug to a depth of about 3½–4 feet, then a smaller niche would be dug out of the bottom of the shaft to place the actual burial container in. Transverse planks of wood nailed together would then be placed over the top of the niche, resting on the ledge formed at the base of the initial burial shaft. The purpose of this form of burial is not entirely clear. Davidson has suggested that it could have been intended to protect the burial container and its contents from the elements (Davison 2000:271). Another explanation is that vaulting requires less overall excavation than digging a large burial shaft to the maximum depth of the container.

At Montgomery Hill Cemetery, where clay subsoil is remarkably dense and compact, it is possible to imagine that the expediency of vaulting would have been a motivating factor for grave diggers. Vaulting was inferred in two ways at Montgomery Hill Cemetery. First, preserved transverse planks running across the burial were observed in several cases. These lids were often very slumped, and appeared to be wider than the actual coffin/casket width. Second, vaulted burial shafts were inferred in several cases (most notably in Burials

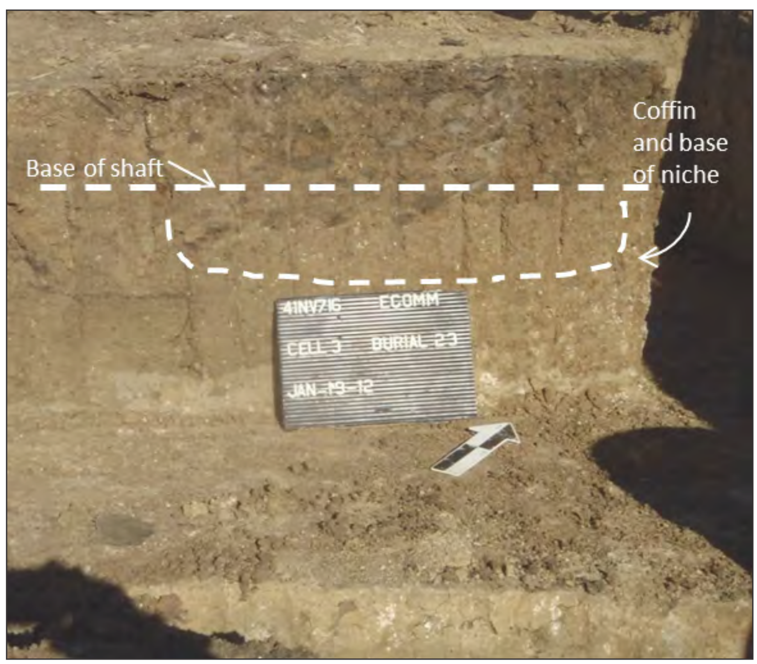

Figure 6-4. Profile of a grave shaft. The top of casket was located under the darkened soil at the base of the grave shaft as seen in profile, suggesting a vaulted lid.

18–25) by the presence of a clear burial shaft in profile down to a certain point (**Figures 6-4** and **6-5**). The actual coffins, however, were found at the base of that shaft in what appeared to be a smaller niche. These details were not always recorded in the field. However, reconstruction through field notes and photographs suggest that this mode of burial was the case for Burials 18–25.

Figure 6-5. Burial 7 excavated to the top of the casket. Note the organic staining at a higher elevation and wider than the coffin width.

Davidson notes that the practice of vaulting is common among the earliest group of burials dating from 1865–1884 at the Freedman's Cemetery in Dallas. He further argues that vaulting appears to have some temporal significance, in that almost none of the burials from the Freedman's Cemetery middle to late sequence (1885–1907) had vaulting. At the Matagorda Cemetery, burial vaulting was also observed and the age range attributed to those interments was 1850–1860 (Crow et al. 2001). Vaulting, therefore, seems to have been a common interment practice until about 1885 and this fits well with evidence from the Montgomery Hill Cemetery that suggest most, if not all, interments occurred before that time.

Coffin Hardware

All burial containers were fastened with cut nails at the corners, top, and bottom of the coffin. No wire nails were found in association with any of the burials. Five hundred and sixty-two whole nails or nail fragments were recovered during burial excavation. Using the pennyweight guide in Jurney et al. (1987:84), these ranged in size from 2d nails (1.9–3.2 cm) to 12d size nails (ca. 8.5 cm) with most nails falling in the 8d range (5.7–7.0 cm), followed by those in the 6d range (4.4–5.7 cm). The commonest types of nail were the 8d and 6d size nails used for joinery identified during the excavation of historic period sites around the Richland-Chambers Reservoir (Jurney and Moir 1987).

Not surprisingly, the adult burial containers typically had more nails than child burials did. Adult burials averaged 34.5 nails per container, while child burials averaged about 20 nails per container. In general, a wider variety of nail sizes were used in adult containers (4d–10d), while a smaller variety of nail sizes was used in the child containers. Though it should be noted that the largest nail in the assemblage (a 12d nail) was found in association with the burial of an infant (Burial 7).

During the excavations, archaeologists did not individually plot and physically separate every nail from each burial. Although nails were individually plotted on burial forms, they were not necessarily individually numbered or placed in separate bags (though some were). Therefore, there is no reliable way to tell where each of the various sizes of nails came from on all the burial containers. However, longer nails found at the head and foot of the coffin were consistently noted in burial features (**Table 6-1**), and this may represent a more widespread pattern among the burial population as a whole. The same trend of using longer nails at the head and feet was noted for four eighteenth century enslaved burials at the Seville Plantation in Jamaica (Armstrong and Fleischman 2003).

Table 6-1. Summary of Nails from the Montgomery Hill Cemetery.

Burial Number	Item	Quantity	Material	Location	Depth (m)	Size	Notes
1	cut nail	31	iron	around coffin	99.62–99.37	8d	two broken
Total		31					
2	cut nail	23	iron	left clavicle	n/r	8d	
Total		23					
3	cut nail	20	iron	around coffin	99.35–99.22	8d	
3	cut nail	2	iron	around coffin	99.35–99.22	10d	
3	cut nail	10	iron	around coffin	99.35–99.22	4-6d	
Total		32					
4	cut nail	6	iron	around coffin	99.90–99.65	8d	
4	cut nail	21	iron	around coffin	99.90–99.65	4d–6d	3 broken
Total		27					
5	cut nail	25	iron	around coffin	99.72–99.63	8d	
5	cut nail	1	iron	n/r	n/r	n/r	broken
Total		26					
6	cut nail	6	iron	around coffin	99.8–99–99.42	8d	
6	cut nail	6	iron	around coffin	99.8–99–99.42	6d	
6	cut nail	2	iron	around coffin	99.8–99–99.42	2d	
6	cut nail	1	iron	around coffin	99.8–99–99.42	n/r	broken
Total		15					
7	cut nail	1	iron	around coffin	99.63–99.52	12d	
7	cut nail	7	iron	around coffin	99.63–99.52	8d	
7	cut nail	5	iron	around coffin	99.63–99.52	6d	
7	cut nail	4	iron	around coffin	99.63–99.52	2d	or possibly broken
Total		17					
8	cut nail	3	iron	around coffin	99.94–99.80	8d	
8	cut nail	2	iron	around coffin	99.94–99.80	6d	
8	cut nail	2	iron	around coffin	99.94–99.77	4d or broken	
Total		7					

Burial Number	Item	Quantity	Material	Location	Depth (m)	Size	Notes
9	cut nail	4	iron	around coffin	99.79–99.40	10d	
9	cut nail	14	iron	around coffin	99.79–99.40	8d	
9	cut nail	26	iron	around coffin	99.79–99.40	6d	
9	cut nail	4	iron	around coffin	99.79–99.40	2d	could be broken
Total		48					
10	cut nail	25	iron	around coffin	88.84–99.63	8d	
10	cut nail	1	iron	n/r	n/r	n/r	
Total		26					
11	cut nail	23	iron	around coffin	99.81–99.65	8d	
11	cut nail	2	iron	n/r	99.81–99.65	4d	or possibly broken
Total		25					
12	cut nail	12	iron	around coffin	99.29–98.94	8d	
12	cut nail	13	iron	around coffin	99.29–98.94	6d	
12	cut nail	10	iron	around coffin	99.29–98.94	n/r	broken fragments representing at least 7 indiv. nails
Total		35					
13	cut nail	3	iron	at head and feet	99.37–99.24	8d	
13	cut nail	13	iron	around coffin	99.37–99.24	6d	
13	cut nail	4	iron	around coffin	99.37–99.24	n/r	broken
Total		20					
14	cut nail	13	iron	various	99.74–99.70	2d-6d	
Total		13					
15	cut nail	3	iron	around coffin	99.32–99.21	6d	
15	cut nail	6	iron	around coffin	99.32–99.21	2d	
Total		9					
16	cut nail	26	iron	various	99.77–99.46	6d–8d	
16	cut nail	1	iron	n/r	n/r	n/r	nail frag. with conglomerate
Total		27					
17	cut nail	38	iron	around coffin	99.87–99.60	8d	
17	cut nail	5	iron	around coffin	99.87–99.60	n/r	broken
Total		43					
18	cut nail	8	iron	around coffin		6d	or broken
18	cut nail	2	iron	around coffin	99.70–99.54	8d	
Total		10					
19	cut nail	15	iron	around coffin	99.74–99.54	6d	
Total		15					
20	cut nail	9	iron	around coffin	99.43–99.32	8d	
20	cut nail	6	iron	around coffin	99.43–99.32	6d	

Burial Number	Item	Quantity	Material	Location	Depth (m)	Size	Notes
Total		15					
21	cut nail	10	iron	around coffin	99.72–99.54	8d	
21	cut nail	6	iron	around coffin	99.72–99.54	6d	
21	cut nail	1	iron	around coffin	99.72–99.54	4d	
Total		17					
22	cut nail	6	iron	around coffin	99.81–99.55	6d	
22	cut nail	1	iron	around coffin	99.81–99.55	4d	
Total		7					
23	cut nail	11	iron	around coffin	99.35–99.28	8d	
23	cut nail	6	iron	around coffin	99.35–99.28	6d	
23	cut nail	1	iron	around coffin	99.35–99.28	4d	
Total		18					
24	cut nail	24	iron	around coffin	99.45–99.22	6d	
24	cut nail	1	iron	n/r	n/r	n/r	broken
Total		25					
25	cut nail	31	iron	around coffin	99.29–99.10	6d	
Total		31					

Three burials contained screws and/or decorative coffin tacks (**Table 6-2**). White metal screws were found with Burials 17 and 3—both adults; while plain gimlet screws were noted around the coffin of Burial 4, a child.

Coffin screws and other hardware can be important chronological markers for burial studies. Fashions in type and design of burial hardware changed over time to reflect changing attitudes toward death. As Davidson (2000:235) points out, "at the beginning of the nineteenth century, the use of elaborate burial containers or trimmings was likely the exception rather than the rule." In the early nineteenth century, most burials occurred in plain coffins held together with nails. However this began to change to with the beautification of death movement that occurred around the middle of the nineteenth century. At this time, it became fashionable to have decorative hardware adorning the casket or coffin. To meet the ever increasing demand for coffin adornments, hardware suppliers began offering decorative screws and hinges for coffins at prices that were relatively affordable. New shapes and styles proliferated quickly. Comparison of the types of coffin and casket adornments found archaeologically to the trimmings illustrated in various catalogs and in patent records makes it possible to place burials within a general temporal framework.

During the middle to late nineteenth century several important innovations in burial hardware, particularly fasteners, occurred. Plain white metal coffin screws with a slot in the top to accept a screwdriver and ferrous shanks made their first appearance around 1853 and were in fashion into the 1870s (**Appendix A**). Starting in the early 1870s these white metal coffin screws were largely replaced by thumbscrews whose tops were more elongated, cylindrical, and decorative. By the mid-1870s, these decorative thumbscrews eventually evolved into screws with protruding flat faces, designed to be turned by hand. These were cast in a variety of shapes and decorative styles, sometimes even having messages such as “At Rest” embossed on their sides. It is important to note that, while coffin hardware manufacturers and dealers largely replaced the original plain white metal coffin screws with decorative thumbscrews by the mid-1870s, the use of plain white metal coffin screws continued through the end of the nineteenth century (Davidson 2000). This is particularly true for rural areas, where it may have taken longer for general merchandise emporia to replace their old stock. Thus, while the presence of decorative thumbscrews on a burial container can provide a *terminus post quem* of about 1875, the presence of obsolete white metal coffin screws does not necessarily indicate that a burial was interred before about 1875.

Table 6-2. Summary of Coffin Hardware from the Montgomery Hill Cemetery.

Burial Number	Nails	Screws-White metal	Screws-Gimlet	Coffin Tacks/ Dummy Screws	Lining Tacks	Paint Noted Y/N
1	31	0	0	0	0	N
2	23	0	0	0	0	N
3	32	4	0	0	3	Y
4	27	0	8	0	0	N
5	26	0	0	0	0	Y
6	15	0	0	0	0	N
7	17	0	0	0	0	N
8	7	0	0	0	0	N
9	48	0	0	0	0	N
10	26	0	0	0	0	N
11	25	0	0	0	0	N
12	35	0	0	0	0	N
13	20	0	0	0	0	N
14	13	0	0	0	0	N
15	9	0	0	0	0	N
16	27	0	0	0	2	N
17	43	4	0	15	7	Y
18	10	0	0	0	0	N
19	15	0	0	0	0	N
20	15	0	0	0	0	N
21	17	0	0	0	0	N
22	7	0	0	0	0	N
23	18	0	0	0	0	N
24	25	0	0	0	0	N
25	31	0	0	0	0	N
Total	*562*	*8*	*8*	*15*	*12*	*3*
Ubiquity	100%	8%	4%	4%	12%	12%

Thus for the two burials among the Montgomery Hill population that contained white metal coffin screws, it is possible to assume they date after 1853, when white metal coffin screws became widely available. However, it is not possible to say that those burials must have been interred before 1875. The screws alone cannot provide a firm *terminus ante quem* for the burials, but other corroborating data does help to support the theory that most of the burials from the Montgomery Hill Cemetery do pre-date about 1885. This will be discussed in more detail in the following chapter.

The use of decorative coffin hardware confers more than chronological data. Although more affordable by the 1850s, white metal screws and tacks were still more expensive that plain nails. Therefore, the use of four white metal screws on Burial 3 (adult male), and white metal screws and tacks on Burial 17 (adult female), both adults, does suggest that families went to some trouble to decorate the coffins of these specific loved ones.

This is particularly evident in Burial 17 from which four metal screws and 15 matching white metal dummy screws (whose appearance was meant to mimic the more expensive screws, see Appendix A) were recovered. Not only were screws and tacks placed around the edge of the coffin to seal or mimic the appearance of sealing the lid shut, but in this instance tacks were also placed on top of the coffin. Even more interesting, a perfect line of five white metal tacks was placed down the center of the lid of the coffin (the wood for the lid itself was completely disintegrated, see Figure 5-81). This seems not to have been a functional choice. That is, the white metal tacks, manufactured for decorative purposes alone, did not fasten two boards together. Rather, the tacks were purely aesthetic, and it is possible that the pattern they formed atop the lid of the coffin may have some spiritual importance as well, which will be further explored in the following chapter. Aesthetics and spirituality notwithstanding, the coffin trimmings on Burial 17 are exceptional for the Montgomery Hill population, and together with other personal effects found with the skeleton, do suggest that the woman who was buried within may have held a prominent place in her community.

Coffin lining tacks are another class of artifact that convey socio-economic information (**Figure 6-6**). Lining tacks were used to hold cloth lining inside a coffin to the coffin sides. Like coffins containing decorative hardware, upholstery lined coffins were also more expensive and time-consuming to produce. So the presence of lining tacks generally signals that individuals buried in lined containers may had been more affluent or prominent within a community. Upholstery tacks

Figure 6-6. Coffin tack from Burial 17.

were found with Burials 16 (n=2), 17 (n=7) and 3 (n=3), indicating that these three coffins were probably cloth-lined at one time.

Finally, paint is another coffin/casket detail that implies a certain amount of care was taken in the construction of the burial container. Paint, however, is highly perishable and typically does not preserve on degrading wood. This was certainly the case with the Montgomery Hill burials. However, possible traces of red paint were noted on the interior coffins of several burials. Archaeologists observed and noted what appeared to be paint flaking off bones, earth and coffin lumber on Burials 17, 3, and 5.

Personal Effects

Personal effects included in the burial shafts or container largely consist of clothing items worn by the interred. Buttons, clothing clasps and pins were the most common. It is evident from the condition and age of the remains, the plainness of the coffins, and what is known historically about the post-bellum Montgomery Hill population that the individuals buried here lived lives of hardship and poverty, even after emancipation. It is probable that they had little money and few personal items with which to bury their loved ones. Nonetheless, many of the individuals were intentionally adorned in death and these adornment choices are of primary interest to archaeologists.

The things people choose to bury their loved ones with for the afterlife typically have considerable meaning. This is true across cultures and is certainly something shared by both West African and Christian traditions. However, as Davidson (2010) has pointed out, the meaning these objects confer can vary. Sometimes objects have sentimental value and other times they may have supernatural or spiritual value. In other cases, items are truly mundane or incidental. Context plays a major role in determining which of these cases applies to the personal effects worn or held by the dead, and there are times when intentionality cannot be determined. Nonetheless, placing unique personal effects in graves or adorning the dead with objects of spiritual significance is a tradition that has been well documented among African American cemeteries. In the case of Montgomery Hill Cemetery, there are number of personal effects that clearly have sentimental or spiritual value. These include beads, metal buttons, coins, pendants and a black glass chain among other items. Personal effects, their context, and possible meaning (where burial-specific meaning may apply) are discussed below based on artifact categories.

Beads

A total of 440 whole beads was found with six burials (Burials 1, 13, 15, 16, 17, and 24) at the Montgomery Hill Cemetery (**Table 6-3**). Fragments of seed beads were also noted in several of these same burials but because the fragments were tiny and impossible to count, they were recorded as being of unknown quantity. The bead necklaces were all worn by juveniles, except for the one on Burial 17 which was an adult female of roughly middle age.

Table 6-3. Summary of Beads from the Montgomery Hill Cemetery.

Burial Number	Quantity	Material	Size	Shape	Color	Method of Manufacture	Notes
1	15	glass	2–3mm dia.	doughnut shaped	smoky, metallic finish?	drawn w/ rounded edges	
1	1	shell	2mm	doughnut shaped	white		possibly shell or compound glass.
13	3	glass	4.22, 6.44, 5.75mm	short, tubular, faceted	clear	drawn	slightly rounded/ tapered at edges
13	39	shell	3.5–4.58mm	doughnut shaped	white		possibly some other material
15	1	bone?	1 cm	tubular	black	drawn	possibly glass
15	32	glass	3.18–3.89mm	doughnut shaped	black	drawn w/ rounded edges	
15	1	glass	6mm	short, faceted	black		
15	unknown	glass	unknown	fragments	red	unknown	seed bead fragment
15	7	glass	2.4mm	doughnut shaped	smoky (blue?)	drawn w/ rounded edges	
15	4	glass	10.3–11.2mm	tubular, six-sided faceted	white	drawn	
16	1	glass	ca. 7 mm	round	white	drawn	
16	46	glass	ca. 3mm	doughnut or thick disk shaped	white, smoky and black	wound and drawn	different colors and shapes not recorded individually, some may be shell beads
17	1	glass	ca. 7.5mm	spheroidal	yellow	drawn?	
17	1	glass	ca. 2 mm	seed bead, doughnut shaped	black	drawn w/ rounded edges	
17	1	glass	ca. 2 mm	doughnut shaped seed bead	red	drawn w/ rounded edges	
17	62	glass	3.5–6mm	doughnut shaped	smoky	drawn w/ rounded edges	
17	1	shell	ca. 3.5mm	doughnut shaped	white		
17	10	glass	ca. 5mm	spheroidal	white	drawn w/ rounded edges	
24	1	glass	4.9mm	Short faceted tubular	black	drawn	
24	87	glass	ca. 2.986mm	ring-like seed beads	black	wound	
24	1	glass	4.44mm	short faceted tubular	blue	drawn	
24	45	glass	2.96mm	seed bead, doughnut shaped	red	Drawn beads	5 whole beads and at least 40 bead fragments
24	67	glass	ca. 2.91 mm	doughnut shaped	smoky (blue?)	drawn w/ rounded edges	
24	13	shell	2.59mm	doughtnut shaped	white		
Total	440						

The beads were all found around the neck and shoulder region of the skeletons and therefore were interpreted to be necklaces. Fragile fragments of thread that disintegrated to the touch were noted during the excavation of several of these burials (Burial 17 and 13, for instance), further supporting the idea that these were necklaces rather than clothing items. Beaded necklaces such as these have been reported in other African American burials throughout the American south. At the Third New City Cemetery in Houston, for instance, at least three burials (Features 23, 53, and 295) had beaded necklaces (Foster and Nance 2002); and at the Freedman's Cemetery in Dallas, 29 individuals wore beaded necklaces (Owens and Green 2000), although comparisons are difficult in the case of Freedman's Town, since the report does not analyze the beads in any detail. Beads were also recovered with a few burials in New York's African Burial Ground (Bianco et al. 2006) and the Stafford Plantation cemetery in Georgia (Hopwood 2003). Additionally, beads have been unearthed in non-cemetery contexts on a number of plantation and former plantation sites, including Jefferson's Poplar Forest and the Levi-Jordan Plantation in Texas (Brown and Cooper 1990, Lori Lee and Ken Brown, personal communication, 2013). By percentage and number, however, the beads from Montgomery Hill Cemetery are far more common than on most other cemeteries.

The vast majority of beads from Montgomery Hill Cemetery were glass, though some possible shell beads and one bone bead were also noted. Due to the fact that the analysis of the beads took place in a field lab, and were immediately reburied (per the project scope), analysts were not able to spend as much time as they would have liked recording exact size, color, manufacture and other attributes of each bead. It is possible (and likely) that some of the beads originally recorded as shell were actually degraded glass beads. However, general notes on size and shape were recorded, and the photographs taken in the field lab do allow us to make some important observations about this artifact group.

Overall beads were doughnut shaped, tubular, round/spheroidal or faceted, with the vast majority of beads being doughnut shaped. These were irregular in size and shape in general. The most common bead was a heat-rounded drawn bead that was smoky gray or purplish in color (**Figure 6-7, and 6-8**). The color seemed to be somewhat translucent and the beads in this color may have had a bluer or more purple coating at one point. During the excavations, recorders reported a metallic or iridescent sheen to the soil surrounding these beads. These beads ranged in size from about 2–3 mm with a few beads up to 6 mm in diameter.

Figure 6-7. Small, smoky gray or purplish beads from Burial 1.

Black was the next most common bead color, followed by white and red. Most of these were heat-rounded drawn beads with an overall doughnut or disk shape; although larger (ca. 5 and 7 mm) spheroidal white beads were found with Burials 16 and 17. Black beads were generally larger than the smoky glass beads, ranging in size from 3–4 mm in diameter. Red beads recovered from Burial 24 were all about 2.9 mm in diameter, though most disintegrated after removal. Burial 17 had one small red bead (ca. 2 mm) and Burial 15 also contained red beads, but these disintegrated upon excavation and could not be measured. It can be assumed that they were likely 2 mm or smaller. One blue and one yellow bead were also recorded (**Figure 6-9 and 6-10**). The blue bead was a short translucent faceted drawn bead about 4.4 mm in size (a faceted black bead of

Figure 6-8. Small rounded black beads, very small smoky gray beads, black and white tubular (mock wampum) beads and a faceted black bead from Burial 15.

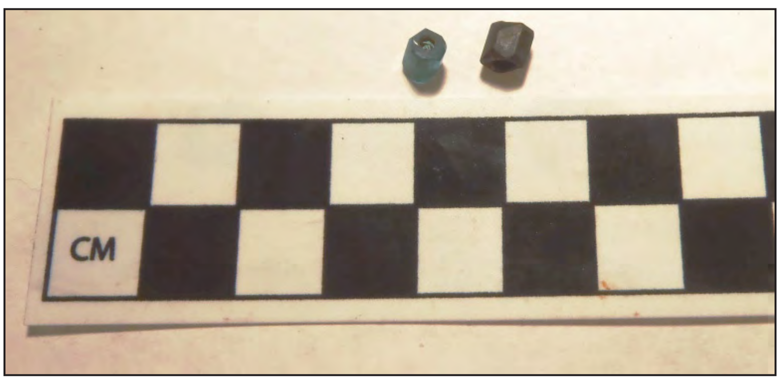

Figure 6-9. Faceted blue and green beads from Burial 24.

Figure 6-10. Beads from Burial 17. Smoky rounded beads, one shell bead white rounded beads, a yellow rounded bead, possible shell bead, one very small red seed bead, one very small black seed bead, and a blue glass pendant.

this type was also found with it) and the yellow bead was a large 7.5 mm in diameter drawn bead that was spheroidal in shape.

In terms of spatial patterning, Burials 15–17 were physically adjacent to each other and all wore bead necklaces of smoky, doughnut shaped beads, among other colors. Burials 16 and 17 both had white spheroidal beads, while Burials 15 and 17 had small red beads. This could indicate a family connection. Since Burial 17 was an adult female, while Burials 15 and 16 were babies, perhaps they were her children. The other burials with bead necklaces, all infants, were physically separated in different parts of the cemetery and therefore, there is no reason to posit a family connection between them, though certainly some sort of family connection between many or all the individuals interred in the Montgomery Hill Cemetery cannot be ruled out.

During the sixteenth through nineteenth centuries, glass beads of the type found with the Montgomery Hill Cemetery burials were typically manufactured in Venice or Bohemia and then transported to Africa or America for purposes of trading with blacks and Native Americans. Ghana and Nigeria also had active local bead making industries in the nineteenth century, and some researchers posit that some glass beads made their way to the New World from these production centers (De Corse 1989, Hopwood 2003). Additionally, beads frequently made their way onto the American frontier through military expeditions, fur traders and other impresarios who would buy beads by the pound to sell to Native Americans in exchange for furs and other goods (Billeck 2010).

The beads from Fort Pierre Chouteau, a frontier military fort and trading post in Wyoming offer a good comparison to the beads from Montgomery Hill Cemetery because this site was occupied from about 1832–1856, making it roughly contemporaneous (about 20 years earlier) with the presumed age of the Montgomery Hill Cemetery. Moreover, Fort Pierre Chouteau has one of the best- analyzed mid-nineteenth century bead assemblages in the American west. According to Billeck (2010), small rounded drawn beads in the less than 2–3 mm range were the most common beads at Fort Pierre Chouteau, comprising more than 96 percent of the collection. Billeck further noted that within this range, two clear size categories were present: one representing a very small seed bead with an average diameter of about 1.7–1.79 mm and another representing a small pound bead with an average diameter of about 2.8–2.89 mm. The most common bead color was white, followed by blue or purple beads. Billeck argues that very small rounded beads of this type became quite popular on the nineteenth century Western frontier and are generally well represented in both archaeological assemblages and trade ledgers (Billeck 2010). Certainly, most of the beads at the Montgomery Hill Cemetery fall in this size range and type. Direct comparisons can even be made with some of the beads from Pierre Chouteau. For instance, Burial 15 contained four long tubular white beads identical to specimens found at Fort Pierre Chouteau (Billeck 2010, see fig.1.1a). These conform to Kidd and Kidd's (1970) Ia bead type, and Billeck further describes them as Mock Wampum beads using legers inventories for the fort. The smoky gray/purple beads that are most numerous at the Montgomery Hill Cemetery (particularly those from Burial 1) are quite comparable to Billeck's Variety 21 (Billeck 2010, fig. 1.2s). Finally, a black faceted bead from Burial 15 is identical in size and shape to Billeck's Variety 35, which also conforms to the Kidd and

Kidd code If (Billeck 2010, fig. 1.1f). Thus it appears as though there are a number of strong similarities between the bead necklaces worn by the women and children of Montgomery Hill and the trade goods that found their way to other parts of the western frontier during the mid-nineteenth century.

One of the intriguing questions that arises from the Montgomery Hill bead analysis, then, is origin. Where did the Montgomery Hill population acquire these beads, which are most commonly associated with trade between European and Africans or Native Americans? Were they available locally for purchase or trade, or were these heirloom items that families carried through generations? If the latter, this suggests that the beads were acquired during the slavery period, and if that was the case, the beads were likely brought to Texas from Louisiana or Mississippi, where the Montgomery family and many of their enslaved laborers originated. Navarro County, was still very much part of the frontier during the middle nineteenth century to early post-bellum period. Therefore, access to commercial emporia would have been somewhat limited for both whites and blacks, though access would have been even more constrained for enslaved or recently emancipated blacks. Washington Hill's trading post, in the western part of the county, did trade with Native Americans. It is possible that beads were acquired there and theoretically, it is possible that the Montgomery Hill population actually traded with Native Americans for beads. There is some minor skeletal evidence that suggests at least one of the adults may have been partially Native American. However, the evidence is thin, and this idea is largely speculative. It seems most likely that the Montgomery Hill population brought these beads with them from other places, and in this manner they may have been handed down through one or more generations.

Jerome Handler (2006) has argued that enslaved Africans in the Americas most generally acquired beads during the middle passage or afterward through various exchange networks. Although beads were important for clothing, decoration and charms in many parts of west Africa, Handler argues, it seems unlikely that captured Africans brought beads with them from their homeland. Documentary records strongly suggest that captured Africans were stripped of all clothing and adornment prior to being placed on middle passage ships. However, in some cases, captors supplied women with beads to string during the voyage as a sort of reward for good behavior, or to keep them occupied (Handler 2006). Once in the Americas, enslaved Africans must have acquired beads through other sources; either through direct purchase, trade or an internal plantation reward system.

Whatever the means of acquisition, the importance of beads worn as jewelry or on clothing has been fairly well documented among Africans and enslaved African populations in the Americas (Handler 2006, Hopwood 2003, Stine et al. 1996, DeCorse 1989). Mollie Dawson, a formerly enslaved person from Navarro County described girls wearing "charm strings" made of buttons or beads in which each individual button or bead was a gift from a friend or relative (WPA 1936–1938). Beads are frequently found in domestic and mortuary contexts of enslaved African populations and archaeologists have generally come to accept that they had both aesthetic and spiritual meaning, though the precise nature of the latter has not been fully explained. It is likely that beads held different meanings for different communities, just as other types of artifacts, such as pierced coins, crystals, and broken plates did. In the case of the Montgomery Hill Cemetery, the fact that six of the 25 burials wore beaded necklaces is statistically significant and strongly suggests more than aesthetic choices were at work during interment. Family connections are likely, but so too were spiritual beliefs or folk practices at work. In fact, three of the burials with bead necklaces (Burials 1, 15, and 17) had other charm-like artifacts associated with them. Burial 1 also had coins, Burial 15 contained buttons possibly used as charms, and Burial 17 bore a very prominent blue glass pendant or pin. All of these will be discussed in more detail below. Simply put, the beaded necklaces worn by the individuals interred at the Montgomery Hill Cemetery are extremely meaningful, either as expressions of personal aesthetics, heritage, folk practice, or spiritual belief. They suggest strong ties to generations past, and a possible retention of cultural practices inherited from Africa. This allegiance to tradition, be it cultural or familial, will be discussed more fully in the conclusion of the report.

Other Jewelry and Pendants

In addition to beads, two individuals were interred with homemade pendants. One was a coin and the other an animal tooth, probably a pig incisor. Burial 17 also wore a molded blue glass pendant at her sternum, along with her beaded necklace.

Tooth pendant

Burial 21 was a 6–9 month old infant who was wearing an animal tooth necklace (**Figure 6-11**). The string, probably of leather or twine, had dissolved in the ground. The tooth itself was over the right humerus region. Necklaces made of animal teeth have been found with burials of enslaved Africans elsewhere. At the Newton Plantation in Barbados, for instance, an adult individual was buried with an elaborate necklace of dog teeth, cowrie shells, and beads (Handler 1997, 2006). Handler speculated that the individual was a healer or "obeah" of prominence within the community, and that the necklace itself may be been imbued with magical properties. Handler also suggested that the necklace likely reflects a significant African retention, and this is noteworthy when comparing to the tooth necklace at the Montgomery Hill Cemetery, because the Newton Plantation burials were interred more than 100 years before those at Montgomery Hill Cemetery.

Figure 6-11. Tooth pendant found with Burial 21. The tooth appears to be a pig incisor, though definitive identification was not made prior to reburial.

Figure 6-12. Coin pendant showing a fragment of clothing stuck to it.

Coin pendant

Burial 1, an infant of 9–12 months wore a pierced coin pendant (in addition to, or as part of a beaded necklace) suspended from cotton twine. The coin was a heavily-worn 1866 "shield" nickel and it may be that the date represents the birth year of the child (**Figure 6-12**).

Pierced coins are very commonly found in association with African American burials and in domestic contexts (Davidson 2004, 2010, Wilkie 1995). The pervasive folk tradition also has roots in parts of West Africa (Davidson 2010:616). However, pierced coins are not exclusive to African American customs; they are frequently found in white household and mortuary contexts as well (Merrifield 1988, Davidson 2004, see also Feit et al. 2003, vol II, fig 9.10a). At Freedman's Cemetery in Dallas, for instance, 15 burials had pierced coins that were worn as necklaces or anklets. Four of those were also strung with beads, like Burial 1 at the Montgomery Hill Cemetery. Pierced coins were also found with three burials at the Third New City Cemetery in Houston, and one of them also had glass beads associated with it (Foster and Nance 2002). According to Davidson, people wore pierced coins to protect the wearer from harm, witchcraft or sickness. However, as Davidson demonstrated through a survey of WPA former slave narratives, the specific ailments the coin charms were meant to protect against varied from wearer to wearer. Although some folklorists have noted that pierced coins often bear the birth year of the wearer (Wilkie 1995), Davidson (2004) found no consistent connection between year of mint and the age of the individual at the Freedmans Cemetery in Dallas.

Henry Jennings grew up in a house next to the Montgomery Hill Cemetery in the 1940s. His great grandmother, Winnie Cole, was born on the Montgomery Hill Plantation around 1865. Her daughter, and her daughter's daughter (Jennings's mother) lived at this location their entire lives. Jennings recalls that as a child, he and all of his brothers and sisters wore pierced coins around their necks, although he could not remember what the specific purpose of them was. Nonetheless, when questioned, he responded with a general comment about how his parents and grandparents kept a whole series of folk beliefs and remedies and this was one of them

(Jennings 2012). The pierced coin around Burial 1's neck was clearly a part of this same tradition.

Molded blue glass pendant

A molded blue glass pendant or pin with a metal backing (see Figure 6-10) was found with Burial 17, an adult female, who also wore a beaded necklace. The pendant is circular (24.68–26.08 mm in diameter) with a molded flower or starburst pattern on front. The color is bright blue. The pendant has a cupreous metal backing with a raised metal loop for a string to go through. Given the flat metal backing, it is possible that this object was a pin, though no matching opposite hinge loop was noted. Investigators observed thin wire attached to the pendant during excavations of Burial17. However, the wire disintegrated to the touch. It has been argued that African Americans exhibited a marked preference for the color blue in their aesthetic choices, particularly in regard to beads (Stine et al. 1996). While this preference is not evident among the beads the Montgomery Hill Cemetery, it may be that the startlingly bright blue of the Burial 17 pendant can be linked to it. Stine et al. argue that color choices among African Americans can be linked to symbolic expression. Blue symbolizes truth or life, whereas black is most often associated with evil or death (Stine et al. 1996).

Cupreous Ring

One cupreous ring was found with Burial 17, the same adult female who wore the blue glass pendant and bead necklace. The ring was on the fourth finger of the right hand. It is a plain thin band, approximately 2 mm wide and less than a millimeter thick. Its diameter is about 17.5 mm. Although on the right hand, the ring was probably a wedding ring representing a common law marriage.

Buttons

A total of 68 buttons were found in 19 of the burials at the Montgomery Hill Cemetery (**Table 6-4**). The most common button type was a 4-hole sew-through white porcelain button (n=43, **Figure 6-13**). This button type appeared in 13 of the graves. Although the sizes were not entirely uniform, for the most part, these buttons were small, ranging in size from 10–12 mm in diameter. All were plain and undecorated except for one (Burial 16) that had an embossed pie crust pattern encircling the front face. For the most part, buttons of this type were found exclusively with the children's burials, except three white, 4-hole buttons found with Burial 3—an adult male. These were probably cuff buttons, as they were all found around the hands and wrist of the individual. In the case of the 12 children buried with small white porcelain buttons, those fasteners were typically found around the torso area or along the spine/thoracic area, suggesting that they fastened a loose garment such as an infant gown or diaper.

Large bone buttons were found with both of the adult male burials. Burial 9 had three nearly identical bone buttons (appr. 16.8 mm in diameter) around the pelvis. These were probably trouser buttons. The same is true for Burial 3 which yielded eight bone buttons of nearly identical size and style (to each other as well as Burial 9) from under the pelvis and around

Table 6-4. Buttons from the Burials 1-25.

Burial Number	Item	Quantity	Material	Location	Color	Size (dia.)	Notes
2	button	1	porcelain	base of skull	white	11 mm	4-hole, white
3	button	3	porcelain	under thoracic region	white	15.8 mm	4-hole, white
3	button	3	porcelain	around hards and fingers	white	11.12 mm	4-hole, white, probably cuff buttons
3	button	8	bone	under groin and hips and thoracic region	brown	16.8 mm	4-hole, all identical
5	button	3	porcelain	from base of elbow to center of pelvis	white	9 mm	4-hole, white, extend in a line down front of body
6	button	1	unknown	upper thoracic region	n/r	n/r	swept away while cleaning and not recovered
7	button	1	mother of pearl	at feet	white	9 mm	4-hole, disintegrating
8	button	2	porcelain	torso	white	11 mm	4-hole, white
8	button	1	porcelain	torso	cream	14 mm	4-hole, cream colored
9	button	3	bone	around pelvis	brown	ca. 17 mm	19.99, 16.2, 17.1 mm in size, not uniform and homemade looking; one broken
11	button	1	mother of pearl	under prox. end of rt. humerus	white	1 cm	
11	button	1	porcelain	rt. side of pelvic region	white	1 cm	
12	button	1	bone	below coffin near head	brown	17.51 mm	4-hole
13	button	4	porcelain	at chest and pelvis	white	11 mm	4-hole white; one button near each shoulder and one at pelvis
13	button	2	porcelain	near head and neck	white	9.46 mm	4-hole white
14	button	2	glass	under body	black	7.7 mm	black glass, 3 hole, irregularly shaped
15	button	1	bone	n/r	brown	17.27 mm	4-hole, hand made (could be wood)
15	button	3	metal	chest	metallic	16.84 mm	4-hole with decorative etched lines, two appear identical, one is missing center
15	button	1	metal	under ribs	metallic	16.84 mm	4-hole
16	button	7	porcelain	chest and torso	white	11 mm	4-hole white
16	button	1	porcelain	n/r	white	11 mm	4-hole white with embossed rays encircling the front face
17	button	1	mother of pearl	behind spinal column	white	1 cm	4-hole and very deteriorated
18	button	3	porcelain	right rib cage	white	12 mm	white 4-hole; clustered together at rib cage
18	button	3	porcelain	right rib cage	white	10 mm	white 4-hole; clustered together at rib cage
19	button	1	porcelain	top of left femur	white	10.55 mm	white 4-hole, one disintegrated
20	button	2	mother of pearl	under rt and left ribs	white	7.3 mm	white 4-hole
20	button	1	porcelain	on top of torso	white	11.44 mm	white 4-hole

Burial Number	Item	Quantity	Material	Location	Color	Size (dia.)	Notes
21	button	6	porcelain	along spine under body	white	11 mm	white 4-hole, arranged in line along spine running from top of neck to stomach
25	button	1	porcelain	on top of rt. shoulder area	white	11.03 mm	white 4-hole

Figure 6-13. White, 4-hole porcelain buttons common in many burials at Montgomery Hill Cemetery.

Figure 6-14. Large 4-hole bone buttons from Burial 3.

Figure 6-15. Black glass 3-hole buttons from Burial 14.

the thoracic region (**Figure 6-14**). The buttons around the thoracic region above the skeleton were probably jacket or suspender buttons. Adult shirt buttons were also represented in Burial 3 by a line of three larger (ca. 15.8 mm in diameter) white porcelain 4-hole buttons running in a line under the spine. For Burial 3, the individual was probably dressed in a shirt that fastened in the back. This was not an uncommon mortuary practice. For instance, a mortician interviewed in Matagorda County remarked that often it was easiest to dress a corpse by slitting clothing along the back and tucking clothing under it (Dockall et al. 1996: 216).

Mother of pearl buttons were found with just four burials, one of them the adult female represented by Burial 17. Two black glass three-hole buttons were found under the body of Burial 14 (**Figure 6-15**). This was probably another garment that fastened in the back. Metal buttons were found only in Burial 15.

In all but two cases, buttons appeared to be related to clothing worn by the individual buried. The exceptions were Burials 12 and 15. Burial 12 contained a large bone trouser or jacket button. This was found under the skull and under the base of the coffin. Burial 12, a female child of about 10, was the deepest burial in the cemetery and theoretically it is possible that the exertion needed to excavate through the hard clay caused the digger to lose a button. On the other hand, an intentional placement cannot be ruled out.

Burial 15, an infant, also yielded one large bone button likely from under the body, though the precise location of this button was not recorded on field notes. The button was discovered in the lab while analysts were picking through associated burial matrix. Three large (16.8 mm in dia,) metal buttons were also found under the chest of the same child (see Figure 5-77). Two were identical metal 4-hole buttons with embossed rays emanating from the center; (**Figure 6-16**) the third button was disintegrated in the center, though it seems reasonable to assume that it was the same or similar to the other two, since it was the same diameter. These were the only metal buttons found at the Montgomery Hill Cemetery. Curiously all three buttons were placed slightly overlapping, in a line. The buttons are quite large for an infant garment and could indicate that those who buried the child, did so hastily with the only materials they had on hand at the time. On the other hand, the large size of the buttons could mean that they were not necessarily used for clothing, but rather for religious or spiritual purposes that will be explored in more detail in the following chapter. If so, it is not unreasonable to suggest that the single large bone button also associated with Burial 15 had some spiritual significance as well. Following that same logic, the similar bone button found with Burial 12 may have been more than accidental.

Figure 6-16. Metal button with embossed rays from Burial 15.

Pins and Clasps

Straight pins and hook and eye clasps were found with eight burials (Burials 3, 6, 11, 13, 14, 23, 24 and 25). A total of 10 straight pins were found with Burials 3, 11, 13, 23, 24 and 25 and generally occurred around the torso region from the clavicle to the pelvis and likely fastened a loose garment or, in the case of the one adult burial (Burial 3) may have fastened a boutonniere. Burial 24 contained five straight pins and the remaining burials yielded just one each. Hook and eye clasps (n=6) occurred with Burials 6, 14 and 24. In the case of the adult burial (Burial 6), the hook and eye clasps (n=2) were found around the clavicle region and probably fastened a dress collar.

One metal rivet was found with Burial 5 and excavators did not record where this item came from.

Other inclusions

Unlike burials reported at many African American cemeteries, none of the Montgomery Hill population were interred with shells, broken dishes, medicine bottles, or toys. These items have been reported at the TNCC in Houston (Foster and Nance 2002), Freedman's Town in Dallas (Peter et al. 2000), and the African Burial Ground in New York, among others (see Davidson 2004, 2010), but do not occur here. While it is possible that these things were placed on top of graves at one time, after 150 years in the ground, and 20 of those under water, any original grave markings had long-since disappeared. However, a few miscellaneous items were found to be associated with the Montgomery Hill interments that bear mentioning, because they appear to have been meaningfully placed.

Lead Shot

Excavators found two small pieces of lead bird shot over the casket of Burial 4. These tiny lead balls were uncovered just above the pelvis and knees. They were not in direct contact with any skeletal element, and were slightly above the level of the bones themselves, therefore it seems unlikely that this individual, an infant one to one and one-half years of age, died as a result of a gunshot. No evidence of gunshot-related trauma was noted on any of the bones. One possibility that cannot be ignored is that these were be-bes that were lost during a hunting expedition and simply migrated down the soil column over time. This possibility is easier to consider in light of the shallowness of this particular burial. The other possibility is that the lead shot was intentionally placed over the body of the infant. The of burial of bullets and lead shot as charms has been reported in several instances (Feit 2011, Brown and Cooper 1990) and this could be one of those cases.

Shoes

Burial 12, possible girl of about 7 to 10 years in age, was buried with shoes. Excavators discovered two cellulose or compressed leather boot heels at the feet of this burial. According to local mortician Mable Scott of Scott funeral home (Scott personal communication 2012), it is uncommon, but not unheard of, for people to be buried with their shoes on. This has been born out by other excavations such as those at Freedman's Town (Peter et al. 2000), where 67 individuals were interred wearing shoes. Among those who were wearing shoes in the Freedman's Cemetery, the majority were children, followed by women, with just a few men being interred with shoes. Burial 12 from the Montgomery Hill Cemetery was also a child and possibly was female. Additionally, the individuals wearing shoes at the Freedman's Cemetery more frequently were associated with the early cemetery period ranging from 1869–1884. This time-frame correlates with posited time-frame for the Montgomery Hill Cemetery.

Coins

One pierced coin, worn as a pendant, has already been mentioned. This coin was found with Burial 1, who was an infant. The same burial also yielded a second coin, a heavily-worn 1853 seated Liberty quarter dollar (**Figure 6-17**). This was found under the skull, near the right humerus. Placing a coin in a coffin or casket is "one of the most universally recognized burial

Figure 6-17. 1853 Quarter dollar found with Burial 1, showing the front of the coin with the date (a), and the reverse side (b).

traditions (Davidson 2010)." Coins were often placed over the eyes, mouth or around the head and have been reported in a number of cemeteries, including the Freedman's Cemetery (Peter et al. 2000, and the TNRR in Houston (Foster and Nance 2002), as well as others around the country (Davidson 2010). Coins were used to hold the eye-lids of the deceased shut, but were also used as tokens or charms to symbolically pay the ferryman or some other guardian of the afterlife (Merrifield 1988), and have a long tradition in Western and African American mortuary practices (Davidson 2004).

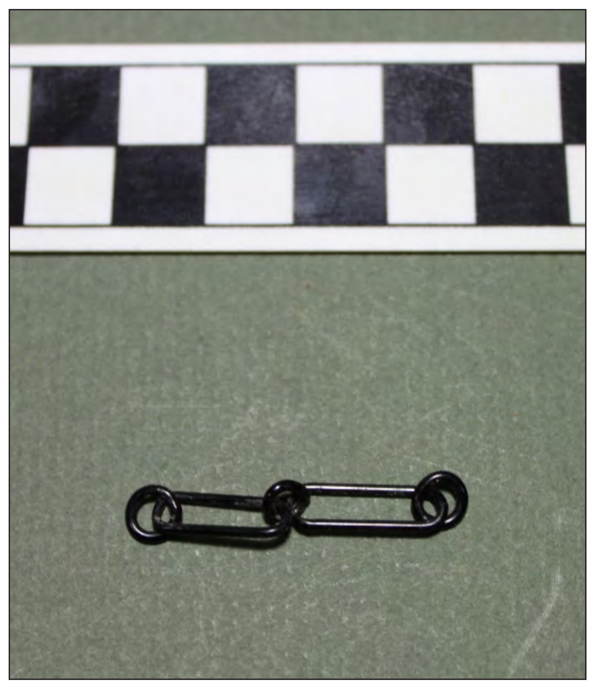

Figure 6-18. Short black glass chain found near right shoulder of Burial 12.

Black Glass Chain

One final artifact found with Burial 12 was a short black glass chain composed of two elongated and three circular links (**Figure 6-18**). This was found under the right humerus of a 7–10 year old child (presumably female) and did not appear to be attached to anything. The same burial also wore shoes, as previously discussed in this section.

The three-linked chain is one of the most common symbols of the Grand United Order of Odd Fellows (GUOOF)—a fraternal organization—which welcomed both white and black membership. The first African American lodge was founded in 1843 in New York and by the end of the century the GUOOF had become the second most powerful fraternal organization in the country. There was a GUOOF lodge in Corsicana (with black participants) around the turn of the century and perhaps earlier, though research has not been able to determine when exactly the GUOOF chapter was founded. In Navarro County, as in many parts of the segregated south, the Odd Fellows organization was split into the GUOOF for African Americans and the International Order of Odd Fellows (IOOF) for whites only. The IOOF was operating in Navarro County by 1885 and founded a widows and orphans home on the outskirts of Corsicana. The linked chain found with Burial 12 could be related to someone's participation in the GUOOF. However, the interment was a child, not an adult, and it seems unlikely, though certainly not inconceivable that a black GUOOF chapter would have been operating in the rural parts of the county during the 1870s and early 1880s.

An alternate interpretation of the chain's significance comes from Robert Farris Thompson who has written about the African symbolism of chains. Death breaks the chains that hold the spirit to the living world (Thompson 1984). For enslaved blacks in the Americas, chains may have had a double meaning: signifying the actual bondage they endured. The fact that Burial 12's chain was black and made of glass may have further significance as well. Black is the color most closely associated with death. In the same way that glass beads were often imbued with magical properties among Africans and African Americans, a chain made of glass may also have stored a certain magic. It would be foolish to venture too far into the realm of speculation regarding the true meaning of the chain. Suffice to say, given that this item was found in a mortuary context, it is well within reason to assume that it was placed with the burial intentionally, and spiritual or magical purposes are not beyond the realm of possibility.

Chapter 7

Bioarchaeology and the Montgomery Hill Population

by Willa Trask

Skeletal remains and associated cultural artifacts from 25 graves were recovered from the Montgomery Hill Cemetery. The demographic composition of the cemetery is unlike any other previously excavated in Texas in that it is predominately composed of sub-adults. Furthermore, the skeletal remains are, on average, better preserved than most other sites previously documented in Texas (e.g., Winchell et al., 1992; Tine et al., 2002; Dockall et al. 1996; Mahoney 2000; Taylor et al. 1986). Such preservation allowed for an extraordinary amount of osteological data to be gathered on a subset of the late nineteenth century Texas population previously underrepresented in archaeological investigations—poor, rural children. Skeletal data collected from those individuals exhumed from Montgomery Hill Cemetery are compared to contemporaneous cemetery populations excavated in Texas and the southeastern United States. From this we may expand our knowledge of underrepresented sharecroppers and tenant farmers, and their families in rural east Texas in the decades following the 1865 emancipation of slaves. The present chapter will specifically address the results and implications of the paleodemographical and paleopathological analyses of the skeletal sample of from the Montgomery Hill Cemetery as to the life history of possible emancipated sharecroppers on the Texas prairie margin.

Previously Recovered Human Remains

Human remains were previously recovered from the 41NV716 site area on two separate occasions. A cranium, mandible, vertebrae and other isolated elements identified as being from a middle adult African-American male were collected in 2009 as part of the initial discovery and salvage of the cemetery (see Whitley and Skinner 2012 for further details). After reservoir water levels lowered in 2011 the site was revisited and AR Consultants performed a survey and surface scrape of the site area. In addition to identifying the extent of the grave shafts, additional disturbed human bone exposed on the surface was plotted, recovered, and analyzed (Whitley and Skinner 2012). According to available reports, all these previously collected human remains were analyzed and described by Whitley and Skinner (2012). For the present analysis, time constraints prevented an osteological reanalysis of these remains.

Based on data presented in Whitley and Skinner's 2012 analysis of the skeletal material, it appears that at least one adult individual, a male, is represented. The authors noted, however, that although there were no repeat elements recovered during the 2009 and 2011 investigations, two individuals may be represented (Whitley and Skinner 2012:8). In the two years which separated the two previous investigations, the cemetery was completely submerged under the reservoir water table and additional erosion of the ground surface occurred. Furthermore, it appears that the cranium, mandible and vertebrae found in 2009 were spatially distinct from the scattered surface finds recovered in 2011 (Whitley and Skinner 2012). Because none of these remains were recovered totally in situ and some degree of water transport likely occurred (during normal wave movement and as the water was receding), we are unable to identify from what section of the cemetery they originated.

As there is little question that these remains represent part of the Montgomery Hill Cemetery population, they will be included in demographic analyses. Because of general lack of skeletal completeness, commingling, and inconsistencies in data collection procedures the skeletal material from 2009 and 2011 will not be included in the remainder of the analysis. Of note, the metric measurements and skeletal robusticity of the bone recovered in 2011 were found to be very similar to those of Burial 6, an especially robust middle adult female, providing ancillary evidence that the 2011 individual may also be a male or particularly robust female.

Bioarchaeology Data Collection Procedures

All human remains exhumed during 2011 and 2012 AmaTerra excavations at Montgomery Hill Cemetery (41NV716) were cleaned, examined, and documented in accordance with the methodology outlined in the lab methods (see Chapter 4).

Taphonomy and Preservation

After almost a century and a half of burial, the remains exhumed from 41NV716 displayed variation in preservation. Generally speaking, the skeletal remains were in good to excellent condition, allowing for an optimal amount of data collection for many of the individuals in the cemetery. Preservation may have been aided by the cemetery having been submerged under a reservoir for over 20 years. Previous researchers have noted that areas with constant soil moisture content generally tend to result in a higher level of bone preservation due to a lack of intermittent ground shrink and swell. Furthermore, deep lacustrine environments and anoxic aqueous environments have been known to promote preservation of both soft tissue and bone (Haglund and Sorg 2002, Allison and Briggs 1991).

Individuals were classified into ordinal preservation categories based on protocols outlined in the Lab Methods section of Chapter 4. Preservation was classified as good to excellent for 16 of the 25 individuals. Preservation for eight individuals, all under the age of five years, was classified as "fair," with only one individual (an infant) considered "poorly" preserved. Bones of infants and children are still developing and tend to be thinner and frailer than adult bones. Thus, it is not surprising that many of the younger individuals buried at 41NV716 showed a heightened degree of taphonomic damage to the remains.

The cranial and dental remains for most individuals were considered mostly complete to complete, indicating that over 75 percent of elements were present and observable. Cranial and dental assemblages for four individuals were considered to be partially present. All four of these were infants under the age of five. In most cases, the lack of skeletal and dental completeness is likely a result of the friability of the developing bones and teeth, resulting in the elements being too fragmentary to identify by the time of lab analysis. When possible, field excavation photos were used to enhance observations. There were instances where elements were noted to be completely missing (e.g., Burial 21 missing a left humerus). This is not necessarily abnormal, and is most likely the result of displacement due to a natural taphonomic process occurring during or after the skeletonization process (e.g., rodents, roots, etc.), rather than an anthropogenic/cultural activity (Haglund and Sorg 2002). Skeletal elements in several graves at 41NV716 were found to be located a significant distance from their expected anatomical position, and a variety of rodent and root activity was noted during burial excavation and lab analysis.

No remains collected during 2011–2012 AmaTerra excavations showed evidence of surface exposure. Root damage and staining from organic materials and artifacts were the most frequent taphonomic modifications to the bone. Of the remains recovered in 2009, only the cranium showed minor evidence of damage from surface exposure. As previously stated, none of the remains recovered during AR Consultant's 2011 survey and scraping of the project area were reexamined.

Montgomery Hill Demography

During 2011–2012 excavations, 25 individuals were excavated. Four of these were adult individuals (two males, two females) and the remaining 21 individuals were juvenile. Previous investigations at the cemetery identified at least one or possibly two individuals: one male recovered in 2009, and disturbed isolated bones recovered in summer 2011 reported to be of undetermined sex. Minor inconsistencies in descriptions and analysis provided by Whitley and Skinner (2012) make it difficult to determine how many individuals are actually represented by these isolated remains. Whitley used an MNI of 1 during her 2012 analysis although she noted that two individuals were most likely represented (Whitley and Skinner 2012:8). Because these individuals are only represented by fragmentary remains and detailed pathology analysis was not undertaken by the author, they will be included in the demographic analyses but will be excluded from the remainder of analyses. It is hoped that by including them a better picture of the original demographic composition of the cemetery may be obtained.

Age and Sex

The demographic distribution of the cemetery is presented in **Table 7-1**. In all, 21 of the 27 possible individuals (77 percent) recovered were juvenile with an age of death of less than 10 years; many of these were less than the age of two years at the time of death (76 percent of juveniles, 65 percent of the total sample). The youngest individual recovered was fetal (Burial 2), assessed to be consistent with the development of 32–36 weeks in utero based on skeletal and dental development. The oldest individual had a maximum age of around 55 years of age at the time of death. No individuals between the ages of 10 years and 20 years were recovered.

Reports of child mortality rates for modern pre-industrialized and industrialized populations have provided highly variable estimates (from less than five percent up to 70 percent of the population dying before the age of 15) with the majority of juveniles dying between the ages of one and five years (Weiss 1973; Schofield and Wrigley 1979). Many archaeological populations almost characteristically experience a significant under-representation of non-adult individuals, a phenomena traditionally believed to be the result of cultural, taphonomic, or methodological factors. Because of this, in archaeological populations, around 30 percent is considered a minimum standard of child mortality to aid with identifying underrepresentation in a sample (Lewis 2007:22).

Table 7-1. Demographic Distribution of the Montgomery Hill Cemetery.

Age (years)	Female	Male	Indeterminate	Total
Fetal/neonate (in utero– 0.08)	0	0	5	*5*
Infant (0.09–1.9)	0	0	12	*12*
Child (2–4.9)	0	0	2	*2*
Child (5–9.9)	0	0	2	*2*
Adolescent (10–19.9)	0	0	0	*0*
Young Adult (20–34.9)	0	1	0	*1*
Middle Adult (35–55)	2	2*	0	*4*
Adult (20–99)	1**	0	0	*0*
Total	*3*	*3*	*21*	*27*

* Includes one individual from 2009 and 2011 (Whitley and Skinner, 2012)
** Includes one individual from 2011 (Whitley and Skinner 2012)

In order to further examine the seemingly high childhood mortality rate at Montgomery Hill Cemetery, the number of individuals who have died before the age of five were compared to other, approximately contemporaneous historic Texas cemeteries (**Table 7-2**). The percent of the individuals who had died before the age of five varies significantly between the Texas cemeteries. Some of this variation is likely an artifact of archaeological sampling strategies or preservation of fragile infant bones. Furthermore, variables such as economic differences, cultural practices, and intermittent periods of increased childhood mortality all may have influenced the values. Tine and Boyd (2003) noted a general absence of grave markers for young individuals at Pioneer Cemetery (41BO202), with only two markers out of 46 being for individuals under the age of five. They speculated that economic strain may have accompanied higher childhood mortality, and many burials may have only been marked by ephemeral or perishable markers (Tine and Boyd 2003). Similar discrepancies were noted between preliminary excavation of Pioneer Cemetery/Dallas Convention center and comparisons to records (Cooper et al. 2000). Regardless, when compared to skeletal samples from other historic Texas cemeteries, Montgomery Hill Cemetery is clearly and significantly higher than all other cemeteries, including populations represented by both pioneer/temporary occupations and stationary/long-term occupations.

With this in mind, the Montgomery Hill Cemetery's child mortality rate of 77 percent of the population may not only be considered unusual in terms of a higher distribution of juveniles

Table 7-2. Percent of Cemetery Sample Deceased Before the Age of Five for Selected Texas Historic Cemeteries.

Site	Biological affiliation	Number of individuals	Number of individuals > 5 years	Percent of individuals less than 5 years	Source
Montgomery Hill Cemetery	African American	27	19	70.04	Whitley and Skinner 2012; Present study
Pioneer Cemetery/ Dallas Convention Center	European American	15	8	53.3	Cooper et al. 2000:122
Potter's Field/ Greenwood Cemetery (Dallas, TX)	European American	14	5	35.7	Tine et al. 2002:105
41DT105	European American	16	2	12.5	Winchell et al. 1995
Tucker Cemetery (41DT104)	European American	11*	3*	27.3	Lebo1988:97
Matagorda Cemetery	European American?	4	1	25	Derrick 2001
Choke Canyon Reservoir	European American	34	11	34.4	Fox 1984
Morgan Chapel (41BP200)	European American	21	13	61.9	Massey 1986
Boothill Cemetery (41CN40)	European American	11	4	36.4	Gill 1991:222-223
Freedman's Cemetery (Dallas, TX)	African American	1150	439	38.2	Tine 2000:468
Allen Parkway Village (41HR886)	African American	341	29	8.5	Foster and Nance (eds.) 2002:120
Pioneer Cemetery (41BO202) (excavated)	African American?	3	1	33.3	Tine and Boyd 2003

* Does not include two additional infants present in records but not represented by skeletal remains

than what is seen in many other archaeological samples, but a far higher child mortality rate than what would be expected from a normal, fully represented population. In isolation (which is not likely for this scenario), a population with a similar child mortality rate would have a difficult time maintaining sustainable numbers. Possible factors contributing to this abnormally high mortality rate may include high disease rates (potentially disease epidemics), a mobile or temporary occupancy, or cultural practices. These will be discussed in further detail below.

Sex could only be estimated for adult individuals. The adult cemetery population was divided equally between males and females (2 males and 2 females). Based on the analysis provided by Whitley and Skinner (2012) it is possible that one additional male was present (represented by a femur and other fragmentary remains). The roughly equal distribution of males and females is suggestive of an evenly distributed male and female adult population.

Biological Affiliation

The estimation of biological affiliation or ancestry from human skeletal remains is a difficult, yet important part of skeletal analyses of both forensic and archaeological remains. Metric and non-metric differences have been documented in adult cranial and postcranial skeletal morphology between two or more discrete populations. For the purpose of this report, biological affiliation was estimated using the following criteria (listed in order of preference): craniometrics, macromorphoscopics, and postcranial metrics. Dental metric and nonmetric data were collected but not used in biological affiliation estimates due to time constraints and lack of readily accessible comparative samples.

Classification of individuals based on linear or three dimensional metric measurements (typically craniometrics) is often considered the more accurate method of group classification. Complications from metric comparisons usually arise as a result of insufficient representative comparative samples or fragmentation of the cranium. At this time the only widely accepted metric methods for determining biological affinity from skeletal material are on adult remains. All craniometric analyses were undertaken with the aid of the computer program FORDISC 3.0 (Owsley and Jantz 2005). Biological affiliation estimations were attempted on all adult individuals recovered from Montgomery Hill Cemetery with intact crania.

Non-metric or macromorphoscopic traits have long been utilized as a means to qualitatively document observed group differences in the cranium and mandible through nominal or ordinal categories (e.g., orbital shape, inferior nasal sill, nasal bone contour, post-bregmatic depression, etc., see Gill and Rhine 1990). No single morphoscopic observation can be used to unequivocally determine ancestry, and all of these observations are found in varying frequencies within a given population (Hefner 2007, 2009). Because of this, it is important to consider the individual in light of overall frequencies of traits within and between populations (Hefner 2007, 2009). In light of the absence of a readily available comparative database to make rigorous statistical comparisons, the macromorphoscopics scored were compared to the trait frequency data for each population to provide a general, preliminary assessment of biological affiliation. Non-metric or macromorphoscopics traits are utilized secondary to cranial metrics for biological affiliation estimation. Macromorphoscopic data was collected on all individuals with a minimum age over three years at the time of death.

Although postcranial skeletal remains are not considered nearly as diagnostic in terms of biological affiliation as the skull, they are still considered to be a useful line of data to assess group affiliation when other methods are not available or present. Biological affiliation classifications for postcranial remains were made using FORDISC 3.0 (Owsley and Jantz 2005).

The estimation of biological affiliation was attempted on all adult remains. Because of the lack of broadly accepted methods for estimating biological affiliation on infant and young children, biological affiliation was not able to be estimated for the majority of the individuals interred at the cemetery.

Biological affiliation was assessed with a high degree of confidence on three of the five adults. Burials 3, 9, and the cranium recovered in 2009 are primarily consistent with adult males of African American ancestry. Fragmentation of the midface complicated ancestry assessments for the two females, Burials 6 and 17, and as a result metric analyses did not provide classifications with a high degree of statistical confidence. Burial 17, a 30–45 year old female, was assessed to be of possible African American ancestry (meaning the majority of indicators were most consistent with African American); however, in addition to African American traits, traits consistent with both Native American and/or European American ancestry were noted, suggesting that some degree of admixture may have been present. This would not be uncommon for enslaved and formerly enslaved blacks of the mid to late nineteenth century. For Burial 6, a 35–45 year old female, a general lack of craniofacial data and conflicting results based on available data did not allow a definite biological affiliation to be assigned to this individual at this time.

Making biological affiliation assessments on subadult remains is more difficult because the bone growth has not yet reached full maturity. Attempts to assess biological affiliation were made on two subadult individuals (Burials 12, and 20) utilizing morphoscopic observations made on the face and cranial vault. The two subadult individuals displayed traits consistent with more than one biological group, preventing a definitive statement on biological affiliation from being made at this time.

Discrete dental traits and dental measurements have been shown to be helpful in assessing biological affiliation for both adults and children. Unfortunately, time precluded a detailed analysis of these data for the present work. Preliminary analysis of the dental nonmetric data identified individuals with traits consistent with Native American, European, and/or African populations (such as Tome's roots, mesial canine ridge, Carabelli's cusp, and shovel shaped incisors among others). For example, shovel shaped incisors, a dental trait found in the highest frequency in Native American populations although present in low frequencies in many other populations (Scott and Turner 1997:181–187), were also observed in the deciduous and permanent dentition of several of the Montgomery Hill subadult individuals (Burials 4, 7, and 12). Interestingly shovel shaped incisors have also been noted to be present in some frequency in other Texas cemeteries (e.g., 41DT105 [Winchell et al. 1995], 41HR886 [Foster and Nance eds. 2002], Freedman's Cemetery (Tiné 2000), and Matagorda Cemetery [Derrick 2001]), indicating some degree of admixture may have been present between Native Americans and European American and/or African American populations.

In summation, the males interred at Montgomery Hill Cemetery appear to be predominantly African American. The difficulty in classifying the females and children in this sample is interesting, and may be a result of inherent issues in the data, or alternatively may be the result of increased biological diversity and admixture in those individuals. Future analysis of the dental data collected on the Montgomery Hill remains may aid in further elucidating these results.

Biological Relatedness

Several children appeared to share similarity in the patterning in the presence and expression of several dental nonmetric traits. For instance, five children (Burials 4, 7, 10, 19, and 21) had what appeared to be a five-cusped deciduous maxillary first molar. This is a very unusual crown pattern and little published literature could be found describing it elsewhere. As the presence and expression of dental traits has a strong genetic component, the presence of this these traits in some children but not all may indicate one or more familial lineages within the cemetery. In Texas during the nineteenth century it was not uncommon for families to bury members in family cemeteries located near their residence. The 1980 archaeological investigations at Richland-Chambers Reservoir identified and documented several other family cemeteries, indicating that a similar burial practice was popular in the immediate area during the 1800s and early 1900s (Jurney and Moir 1987; Whitley and Skinner 2012).

As time constraints prevented biological relatedness from being investigated at a more systematic level, it is hoped that future research may systematically investigate patterns in shared dental traits to aid in possibly identifying family units based spatial patterning.

Paleodemography

Paleodemographic studies inform the dynamic changes that affected earlier populations, be they the effects of disease, conquest, or cultural practices. As important as this field may be, paleodemography is plagued by a number of assumptions and biases which, if not taken into account, can skew data. Failure to critically analyze data creates a rather tenuous foundation on which inaccurate hypotheses might be based. As living human populations are the only comparative samples we have to work with, models developed from living populations must be applied to past populations. These analogous relationship studies will never be perfect, yet if undertaken in a responsible manner they may still be very informative for helping researchers better understand past populations.

Paleodemography must assume that the population in question is stationary. In other words, the composition of the population did not change through immigration or emigration and that the age-sex structure remained the same throughout time with population growth/decline remaining constant (Hoppa 2002:12). Though the work of Acsádi and Nemeskéri (1970) indicates that population structure fluctuations average over time to a growth rate approaching zero, it is imperative that analytical tools are available that allow paleodemographers to accurately capture these fluctuations. This assumption, however, is contrary to a later study by Wood and colleagues (1992), who maintain that populations are not stationary, will change over time, and are more susceptible to fluctuations in fertility rather than in mortality. Because of this, life tables more effectively measure fertility than mortality (Johansson and Horowitz 1986; Wood et al. 1992: 344). For the purpose of simplicity within the present study, we will assume a stable population albeit recognizing that this may not be the case for such a small cemetery like this one.

Wood and colleagues (Wood et al. 1992: 344) further discuss two additional concerns that paleodemographers, as well as paleopathologists, must address during the course of an analysis: selective mortality and hidden heterogeneity in risks. Selective mortality presents the notion that a sample does not include individuals who were at risk from a disease at a specific age, only evidence that those individuals died at that age (Wood et al. 1992: 344). For instance, suppose two individuals exhibit skeletal responses from an epidemic, however, one individual died during the epidemic, but the second individual survives the epidemic only to die at a later date. Though each individual exhibits lesions, separation of the population into two groups—victim and epidemic survivor—is impossible. Wood and colleagues also discuss hidden heterogeneity in risks. In other words, a skeletal population is composed of different individuals with unknown degrees of susceptibility to a specific disease (Wood et al. 1992: 344–345). This susceptibility might be related to genetics and individual variation, and so may not be readily apparent to the researcher.

Unlike demographic studies undertaken on living human populations, age of death, one of the key components of paleodemographic research, is unknown. Researchers must predict the chronological age of an individual based on their skeletal age using methods whose underlying biological responses are not fully understood. Due to various genetic and environmental influences, secular trends in skeletal development and growth cast further doubt on the eligibility of skeletal reference populations that do not temporally match the sample population (Hoppa 2002: 11; Kemkes-Grottenthaler 2002: 48). Furthermore, Bocquet-Appel and Masset (1982: Figure 1) have found that paleodemographic profiles of a sample population can mirror the reference population. Current efforts have begun to address these issues through advanced statistical methods, such as the use of parametric and semi-parametric models (Konigsberg and Hermann 2002; Love and Müller 2002; Wood et al. 2002).

Further misrepresentation of population structure can occur due to differential preservation and sex-based age-related changes. Quite often infants and older individuals, particularly females, are underrepresented in sample populations. Walker and colleagues (1998) found that geologic and faunal taphonomic factors and the general frailty of human undeveloped infant bone resulted in rapid disintegration (Walker et al., 1988: 187). The authors further noticed that age related changes in the skeleton could both speed up bone destruction, and that sexual dimorphism continues to develop throughout the life of the individual via a general increase in appearance of skeletal robusticity (Walker et al., 1988). Such morphological changes can heavily bias a collection when pelvis preservation is lacking, potentially resulting in the misclassification of older women as males and younger males as females (Walker 1995:37–40).

Hazard modeling

Hazard models are highly useful tools in demographic and paleodemographic analysis that express the risk of death as a continuous function over time (Chamberlain 2006; Wood et al. 1992). Hazard models have the potential for a much higher level of accuracy than the traditional life-table analysis (Frankenberg and Konigsberg 2006). In particular, they use the exact age of death (in contrast to the categories seen with life tables), and therefore, they use the maximum amount of information in an analysis. Hazard models were utilized to empirically compare the skeletal-age-at-death distributions of various demographic subsets within the cemetery. A brief summary of the definitions of survivorship and mortality are presented here.

Survivorship models predict the probability that an individual will survive to a specific age. Survivorship models function such that individuals have a 1.0 probability (100 percent chance) of being born and a 0.0 probability (0 percent chance) of exceeding the maximum age recorded for the population. The probability of survivorship for any age is expressed as a value between 1.0 and 0.0. Obviously, the probability of survivorship decreases with age. As such, each survivorship value is dependent on previous ages in the model (Chamberlain 2006). The mortality (or hazard) rate of a population is the proportion of a population that dies within a specific interval of time (Chamberlain 2006). Among humans, the mortality rate is not consistent at all ages but varies throughout life. Typically, mortality is high in juveniles (particularly children and infants), decreases in late adolescence and early adulthood, and then increases again throughout middle and old adulthood (Caughley 1966). Survivorship and mortality rates vary as a result of many factors, including, but not limited to, immigration and emigration, disease, sex, and socioeconomic status (Chamberlain 2006).

Siler Hazard Models

Siler models examine mortality across the entire lifespan, including juveniles, for whom the risk of death often starts high at birth and then declines rapidly. The Siler model consists of three components describing juveniles, age independents, and senescence. These three components can be thought of as clusters of distinct causes of death (Wood et al. 2002). A benefit of the Siler model is that, although it was not developed to account for infectious diseases, the method has empirical accuracy in so doing, because many infectious diseases target the juvenile and senescent portions of a population (Gage 1991). Furthermore, degenerative diseases predominantly affect the senescent portion, whereas accidents are associated with the age-independent category of the model (Gage 1991). The Siler model is able to document these hazards and gives the researcher a tool for empirically demonstrating differential exposure.

To examine total population mortality and survivorship, the following four-parameter Siler functions were utilized (Herrmann and Konigsberg 2002):

> Here *a* is a variate representing an exact age at death, α^1 and β_1 are parameters that represent the juvenile component of mortality, and α_3 and β_3 represent the senescent component (Wood et al. 1992). The constant, age independent hazard parameter (α_2) is excluded from this analysis as it is rarely possible to estimate it in paleodemographic analyses (Wood et al. 2002).

The individual parameters (α, β, etc.) for the hazard models are estimated in the program "R version 2.13.0" (http://www.r-project.org/) utilizing code adapted and modified from that provided by Lyle Konigsberg (http://konig.la.utk.edu/). Parameters were then graphed using their respective model. Additional statistical tests were utilized using the Log Likelihood statistic produced by "R." These consisted of a basic Chi-Square test of similarity of the sex, age, and/or biological affinity age ratios and Likelihood Ratio Test of the modeled functions. If significance was found between the modeled functions, they were then examined in an effort to identify possible sources for the observed differences.

Hazard model Results

The Montgomery Hill Cemetery population was compared to two large, contemporaneous cemeteries from the southeastern United States: Freedman's Cemetery (N=1150), an urban free black cemetery in Dallas, Texas (Condon et al. 1998; Tine 2000), and Cedar Grove Cemetery (N=80), a rural free black cemetery in Lafayette County, Arkansas (Rose 1985). These comparative samples were selected based on their large size, readily available raw age data for all individuals and their location in the urban south and rural south, respectively. Although it is unlikely that any skeletal sample represents a true cross section of the total population, ideally larger samples may begin to approximate what would be expected to be seen in a normal, stable population. Thus, it is hoped that the larger sample sizes present with Freedman's and Cedar Grove may act as a means to compare rural and urban mortality and survivorship from contemporaneous populations which were possibly impacted by many similar hazards and diseases.

To obtain a better understanding of the differences between urban (Freedman's) and rural (Cedar Grove) black southern cemeteries and the Montgomery Hill Cemetery sample, I used a five parameter Siler model, the results of which are presented in **Figures 7-1 and 7-2**. For all populations, the first year of life was characterized by a sharp decrease in probability of survivorship and high rate of mortality. Interestingly, the Montgomery Hill Cemetery sample appears to have a much more dramatic drop in probability of survivorship (only a 34 percent chance of surviving to the age of two compared to 60 percent for Cedar Grove and 51 percent for Freedman's), as well as a more prolonged period of increased mortality for the first few years of life. Freedman's and Montgomery Hill Cemetery both show a decreased survivorship and increased risk of mortality in the 5th and 6th decades of life; however it appears that the risk of mortality in later life occurs sooner and more dramatically in the Montgomery Hill sample than that seen at Freedman's Cemetery. Survivorship for Cedar Grove decreases steadily through middle and old adulthood, and after the late 1920s it appears that mortality risk for Cedar Grove individuals was consistently significantly lower than the other two populations.

The results of the hazard models suggest several things. First, it does not appear that the Montgomery Hill Cemetery sample is demographically similar to either an urban or rural population. Montgomery Hill represents a population with a much higher and prolonged period of childhood mortality and a much lower likelihood of surviving past early childhood than seen in other contemporaneous southern cemeteries. Furthermore, adult individuals at Montgomery Hill Cemetery died at younger ages than in the comparison cemeteries. Interestingly, the rural cemetery sample, Cedar Grove, represents the sample with highest survivorship through time, and the only sample with a significant number of individuals living past middle adulthood. Based on the results from the hazard modeling, it is quite possible that the Montgomery Hill population may not represent a stable, normal population.

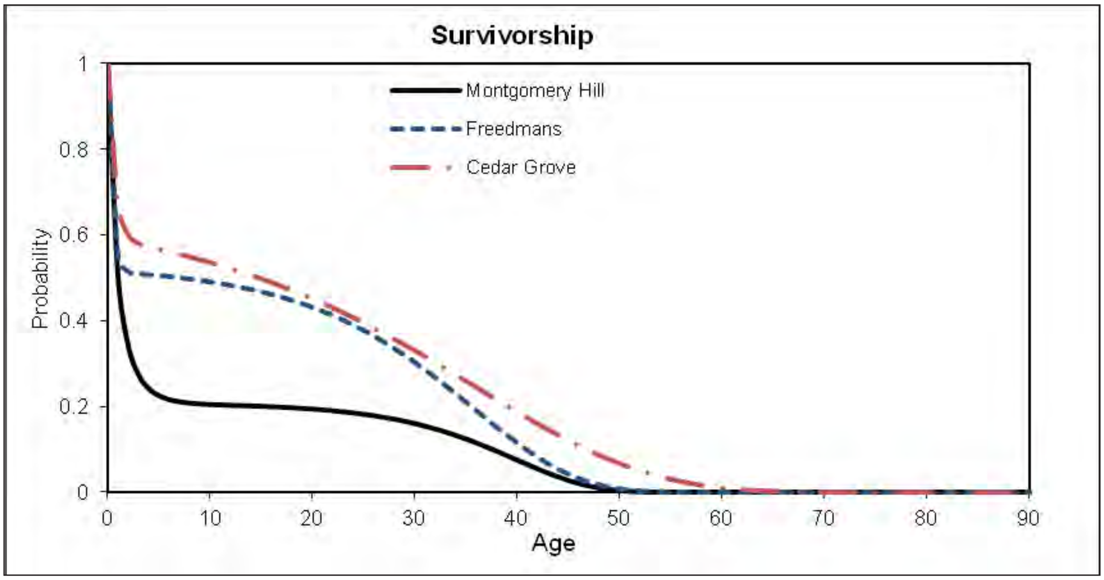

Figure 7-1. Comparison of survivorship for Montgomery Hill, Freedman's, and Cedar Grove cemeteries.

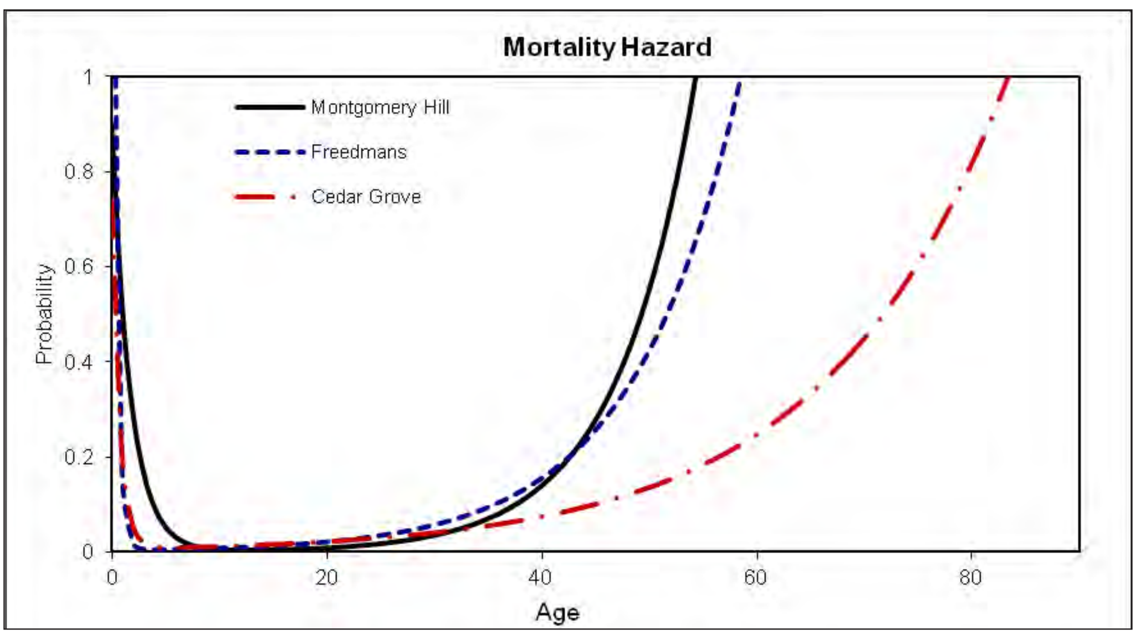

Figure 7-2. Comparison of mortality for Montgomery Hill, Freedman's, and Cedar Grove cemeteries.

Several potential explanations may be given for the seeming bias towards younger children in the sample. First, because a skeletal population is composed of different individuals with unknown degrees of susceptibility to a specific disease (Wood et al. 1992:344–345), it is possible that (for a yet unknown reason) the young individuals at Montgomery Hill may have hidden heterogeneity risks and thus have been more susceptible to death from childhood diseases and stressors which may not necessary kill children in those communities contributing to the Cedar Grove and Freedman's cemetery populations.

An alternative explanation is that the high prevalence of very young individuals may be a result of cultural interment and/or taphonomic processes. Although previous research on Texas historic cemeteries suggests children are typically buried in close proximity to their parents or to other immediate family members, it is possible that the children were buried in a separate location than the adults. If this is the case, it is quite possible that if the majority of the adults were initially buried nearby they may have become eroded after the reservoir was filled, or alternately are still present in a yet unidentified location. Whitley and Skinner (2012) suggest that the abnormal demographic composition may reflect a high infant mortality rate (2012:27–28) combined with a pattern of short term or temporary tenant farmer and sharecropper residence in the area. Based on background research, this seems to be the most likely explanation. A final, though less likely alternative explanation is that the cemetery was potentially reserved for specific individuals in the population, such as the diseased and sick. It is hoped that the present analysis may aid in elucidating some of these hypotheses.

Stature

Adult stature, or living standing height of a fully developed individual, is the result of a highly complex relationship between both environmental and genetic factors (Steckel 1995). Cortical bone mass and long bone length, both factors which ultimately contribute to the stature of an individual, have been shown to be particularly sensitive to environmental influences (including nutrition, disease, trauma, and biomechanical stressors (Larson 1999:14). At a very basic level, genetics play an important role in determining the potential stature of an individual and also may have an impact on how and to what degree an individual's stature is affected as a response to stressors during development (Mielke et al. 2006:259). Population trends in stature are useful as a basic indicator of some kind of stress during growth and development, however the complex interrelationship between environment and genetics should be kept in mind while interpreting the results of stature comparisons between archaeological populations. (Larson 1999).

For sub-adults, the estimation of stature is typically not attempted in archaeological populations, as the living standing height is the result of cartilaginous growth plates (not present in skeletonized remains) connecting the developing epiphyses and diaphyses. Furthermore, subadult long bone and limb lengths are not directly proportional to adult long bone length. Juveniles who have experienced a period of stress resulting in a lower than average stature during childhood may undergo a period of "catch-up" or accelerated growth in late adolescence, granted they are no longer subjected to the growth-dampening condition (Bogin 1988). Instead, diaphyseal lengths are typically compared to individuals of similar age as a means to measure development.

Stature was estimated on two adult males and two adult females using regression equations created in FORDISC 3.0 (Owsley and Jantz 2005). As a standard, the stature range provided by the regression equation yielding the lowest prediction interval was used. Mean estimated stature values for males at Montgomery Hill ranged from 165–176 cm with a mean of 171 cm (or about 5’7”), while mean estimated stature values for females ranged from 158–162 cm with an average of 161 cm (or about 5’3”).

Comparison of the Montgomery Hill Cemetery stature estimates with others available from other historic cemetery sites throughout the central and eastern United States finds that the Montgomery Hill adult males fall roughly within the middle of these stature ranges, while the adult females seem to place nearer the tall end of the spectrum (**Table 7-3**). Overall the Montgomery Hill adults have higher mean stature estimations than all of the comparative slave samples (with the exception of the Catoctin Furnace males), the freed urban sample from Houston (41HR886), and Voegtly Cemetery (urban white). The stature for both Montgomery Hill males and females fall below Cedar Grove (rural freed), and white frontier cemeteries (Cross Homestead and the Texas State Cemetery).

With the exception of Cedar Grove and Voegtly, the sites composed of white males tend to have higher mean stature values than both the slave and free African American samples. Fewer readily identifiable patterns based on biological affinity or site location seem to exist between the female samples. Furthermore, when looking only at roughly contemporaneous Texas cemeteries, the female stature mean for Montgomery Hill (160.5 cm) is remarkably similar (within 1 cm) to the stature estimations of all but one other Texas cemetery (41HR886), regardless of biological affiliation. For males, the average stature for Montgomery Hill (170.75 cm) is shorter than all Texas cemeteries except 41HR886. Keeping in mind the highly complex relationship between environment and genetics on stature, the observed differences between males and females may potentially be the result of differences in sexual division of labor, differential access to resources during periods of catch up growth, differences in marriage patterns, or other unknown factors. Interestingly, freed African American samples represented both the lowest (41HR886) and the highest (Cedar Grove, AR) estimated stature values of the comparative samples for males and females, potentially indicating environmental influences encountered during urban and rural living may have an impact on growth and development.

A lack of sufficient comparative samples prevented any juvenile living stature comparisons from being made, however several rough generalizations were noted during lab analysis which warrant mentioning. Preliminary comparison to published measurements of cranial bones (Fazekas and Kosa 1978) for individuals aged fetal to less than a year postpartum, and long bone diaphyses (Fazekas and Kosa 1978; Scheuer and Black 2000) for all sub-adult individuals found that generally speaking for the same age cohort (based on dental age) the Montgomery Hill juveniles tended to be noticeably smaller than the mean lengths given in the published clinical literature. Significant differences in diaphyseal and cranial bone measurements may indicate several things, including environmental effects resulting in short term or prolonged stress (metabolic, nutritional, as a consequence of disease, or psychological) or population and genetic differences in growth rates. In the event that future researchers undertake additional analysis of these data, work could include a statistical comparison of the diaphyseal lengths

Table 7-3. Mean Adult Male and Female Stature Estimations for Montgomery Hill and Selected Comparative Sites.

Site	Group	Male N	Male Mean (in cm)	Female N	Female Mean (in cm)	Source
Remely Plantation, (SC)	African American (slave)	13	168	15	158	Rathburn 1987
African Burial Ground (NY)	African American (slave)	?	168.4	?	157	Blakey et al. 1998
Catoctin Furnace (MD)	African American (slave)	7	171.6	8	156.4	Kelly and Angel 1987:204
Freedman's (Dallas, TX)	African American (free)	88	171.9	81	159.6	Tine 2000
Cedar Grove, AR	African American (free)	14	177.9	19	163	Rose 1985
First American Baptist Church, Philadelphia, PA	African American (free)	34	172.2	34	159.1	Rankin-Hill 1997:144
Allen Parkway Village (41HR886) (Houston, TX)	African American (free)	15	166.09	14	155.56	Foster and Nance (eds.) 2002:132
Texas State Cemetery (Austin, TX)	European American	47	174.67	5	160.9	Dockall and Baker 1996
Cross Homestead (IL)	European American	5	174.8	6	163.3	Craig and Larson 1993
Choke Canyon Reservoir (TX)	European American	2	174.1	8	159.9	Fox 1984
Voegtly (Pittsburgh, PA)	European American	32	170	14	160.2	Ubelaker and Jones 2003
Montgomery Hill Cemetery	African American	2	170.75	2	160.5	Present volume

of the Montgomery Hill children to other populations (ideally from contemporaneous or biologically similar groups).

Paleopathology

The analysis of skeletal and dental manifestations of disease in the Montgomery Hill Cemetery population provides valuable insights into the general health and diet of people in rural Texas during the latter part of the nineteenth century, as well as potentially providing information on their living conditions and occupations. In the United States during the pre-antibiotic era, a large majority of deaths were the result of infectious disease, with typically half the population dying in infancy and early childhood. Because people tended to die at a much younger age than today, diseases like degenerative joint disease, cardiovascular disease and cancer which tend to affect older individuals in a population tended to be much less common than they are in modern times. Instead, skeletal manifestations of chronic infectious disease, trauma, and some forms of metabolic diseases tend to be more commonly observed.

The studies of pathologic conditions found in skeletal samples are an important means to obtain a greater understanding of the general health of a population. In archaeological populations, these studies largely rely on macroscopic observations and description of abnormal bone changes and their distribution in the skeleton. The study of disease in the human skeleton is hindered by a number of limitations. First and foremost, bone is limited in how it is able to respond to stress, and similar skeletal changes may occur for different diseases and conditions. Furthermore, many diseases and traumatic conditions only affect soft tissue, and as a result no evidence of the disease will be present by the time of analysis (Roberts and Manchester 2005). Documentation of skeletal lesions may be further complicated by various taphonomic processes which may destroy any evidence of bone abnormalities or conversely closely mimic pathologic or traumatic conditions (Ortner 2003). In humans, responses to disease span a spectrum from rapid death to complete recovery (Ortner 2003). The rate of the body's response will affect the changes which are observed on bone. Acute or rapidly progressing illnesses do not typically leave evidence of changes in bone, while extended survival with a chronic condition is typically needed for skeletal involvement to occur (Ortner 2003; Roberts and Manchester 2005). Additional conceptual issues were previously discussed in the above paleodemography section.

The generally good to excellent preservation of the skeletal remains recovered from Montgomery Hill Cemetery allowed for a thorough documentation of skeletal pathology to be made. Although it is believed that mostly minor taphonomic damage to bony abnormalities occurred before lab observation, poor preservation may have hampered the observation of lesions in several cases, particularly with several poorly preserved infant skeletons. As such, the presence and prevalence of these lesions in the population should be regarded as a minimum number.

The following sections present information on prevalence of skeletal abnormalities and their importance for revealing information on the general health and livelihoods of individuals of those individuals buried at Montgomery Hill Cemetery. Only those individuals excavated and documented during the AmaTerra's 2011–2012 excavations will be included in the present analysis (N=25) (a full analysis of the remainder of skeletal material can be found in Whitley and Skinner (2012). More interesting individuals will be briefly discussed.

Biomechanical/Musculoskeletal Stress Markers

Everyday activities leave evidence on the skeleton through continuous absorption and re-deposition of bone. Repetitive and strenuous activities will result in bony changes at the attachment sites for muscles, tendons, and ligaments known as musculoskeletal stress markers (Merbs 1983; Kennedy 1989; Mann and Hunt 2005). These changes usually take the form of increased general rugosity or hypertrophy of a muscle attachment site. It is not uncommon for enthesopathies to form on the attachment sites for more heavily used muscles, which can take the form of a raised, smooth eminence, well-defined lytic lesion, or a raised ridge or crest. Several studies have yielded good results with assigning these markers to general and specific activities (Merbs 1983; Bridges 1989; Stirland 1991; Hawkey and Merbs 1995). These studies, however, have used well documented populations or have featured groups with highly specific continuous daily activities. Therefore, a degree of caution should be used in evaluating populations where the daily activities may be diverse or not well documented.

In cases such as these, skeletal markers can be used to infer some idea of the lives these individuals lived. Additional bony changes that may form as a result of biomechanical stress include nonpathologic articular modifications or extensions which may form as a result of extreme flexion of joints due to habitual activities (Kennedy 1989).

Evidence of significant biomechanical and musculoskeletal stress was observed throughout the cemetery. Both adult males and females had extremely robust and very well-developed muscle attachments in the pectoral and arm region (including scapula, clavicles, arms and forearms). Enthesopathies were observed in some form on all adults, many of which also occurred in the arm or pectoral region. Two juveniles, aged 3–5 years (Burial 20) and 7–10 years (Burial 12), also displayed remarkably robust muscle attachments given the young age of the individuals on several arm, thigh, and pectoral muscle attachment sites. Similar extreme hypertrophy of pectoral and arm muscle attachments has been noted on previous archaeological investigations of slave cemeteries (Kelly and Angel, 1987; Shuler, 2011) and may reflect a lifetime of hard physical labor.

Os acromiale, a persistent ossification center (non-union) at the free end of the acromial process of the scapula, was observed on three of the four adults (75 percent) in the Montgomery Hill Cemetery population. Two of these individuals (Burials 3 and 6) only displayed an os acromiale on one side (left and right, respectively), while Burial 9 displayed os acromiale bilaterally (both the right and left sides). Os acromiale is believed to occur as a result of strenuous and habitual activity involving the pectoral girdle (shoulder joint) beginning at a very early age and preventing the epiphyseal union of the epiphysis from occurring (Saunders 1989; Roberts and Manchester 1995:113). The presence of very robust muscle attachments on the clavicle, humeri, and forearms of these individuals (more so than Burial 17) further corroborate the assertion that these individuals performed strenuous upper body labor from a very early age. It is not likely that this condition had any significant impact on health or mobility, however modern clinical research suggests there is evidence that it may have some deleterious effect on the rotator cuff (Resnick 1995:1312).

Nonpathologic changes in the shape of the proximal femoral diaphysis of an adult male individual (Burial 3) may be the result of prolonged biomechanical stressors involving the leg and thigh muscles. Nonpathologic articular extensions in the form of Poirier’s facets and squatting facets were also noted on the femora and tibiae of Burial 3. Burial 6, a middle adult female, also featured Poirier’s facet or Allen’s fossa on the proximal femoral head. Poirier’s facets are believed to be the result of hyperflexion of the hip and knee and extension of the hip joint (Kennedy 1989) and have been associated with activities such squatting, sitting cross-legged, and horseback riding

Trauma

The investigation of traumatic injuries sustained by an individual throughout his or her life and during the time period immediately surrounding death can provide important information for determining how an individual died, as well as drawing inferences about human behavior and the quality and style of life within a community (including material culture, economy, an urban verses rural living environment, occupation, and interpersonal violence) (Roberts and Manchester 1995:73–79; Larson 1999). The prevalence and type of traumatic events an individual may encounter during life is influenced by their culture; in an urban industrial community, one may encounter dramatically different hazards than a rural farming community, and individuals within each community may experience different traumatic events as well (Roberts and Manchester 1995). For example, men, women, and children within a single social group may exhibit dramatically different distributions of traumatic lesions.

The majority of traumatic assaults and injuries sustained by an individual during their life occur to soft tissue, and as a result typically will leave little to no readily identifiable bony evidence behind. Because of this, the traumatic lesions observed during osteological analyses represent only a very small percentage of those lesions an individual may have actually sustained during life (Ortner 2003). Injuries occurring as a result of physical or biomechanical force result in a wide variety of skeletal lesions including "(1) partial to complete break in a bone, (2) an abnormal displacement or dislocation of joints, (3) a disruption in nerve and/or blood supply, and (4) and artificially induced abnormal shape or contour of bone" (Ortner 2003:119).

Estimating the timing of traumatic lesions is one of the most important considerations in an evaluation of trauma, yet sometimes can prove to be quite problematic (Sauer 1998; Galloway 1999). Although it is not readily possible to calculate the precise amount of time which has passed since a particular traumatic event had occurred, often it is possible to tell if it occurred around the time of death, relatively recently before death (several weeks to months), or if it occurred at a more remote time in an individual's life. Antemortem injuries are generally defined as those injuries which occur a sufficient time prior to death for some evidence of remodeling to occur, while perimortem injuries are those which occur approximately around the time of death (Galloway 1999). Previous research has found that it may take at least one to two weeks (influenced by factors including location, bone, and extent of injury) for evidence of osseous remodeling to be identified on skeletal remains (Sauer 1998). Additionally, because bone retains some of its elastic properties for a variable period of time after death, fractures sustained soon after death may be indistinguishable from those sustained a week before or at the time of death (Sauer 1998; Galloway 1999). Because it can be difficult to distinguish these postmortem fractures from perimortem fractures, caution should be used when making these distinctions.

Instances of trauma were particularly high in the Montgomery Hill Cemetery, with 18.5 percent of the total cemetery population showing evidence of at least one traumatic lesion (**Table 7-4**). The majority of these lesions were in adults, with only one juvenile individual displaying a lesion which could be readily attributed to trauma. Skeletal distribution of traumatic lesions is provided in Table 7-4. In order to better understand the distribution and frequency of these lesions, they will be separated by age (juvenile versus adult), location, and type of lesion (fracture versus dislocation).

Table 7-4.. Distribution of Traumatic Lesions.

Element		Juvenile (N=21)		Adult (N=4)	
		# Individuals affected	Percent individuals	# Individuals affected	Percent individuals
Cranium		0	0.00	3	75.0
Mandible		0	0.00	1	25.0
Ulna	Left	0	0.00	0	0.0
	Right	0	0.00	2	50.0
Radius	Left	0	0.00	2	50.0
	Right	0	0.00	2	50.0
Hand	Left	0	0.00	0	0.0
	Right	0	0.00	3	75.0
Femur	Left	1	4.76	0	0.0
	Right	0	0.00	0	0.0
Feet	Left	0	0.00	1	25.0
	Right	0	0.00	2	50.0
Clavicle	Left	0	0.00	1	25.0
	Right	0	0.00	0	0.0
Ribs	Left	0	0.00	0	0.0
	Right	0	0.00	2	50.0
Vertebrae		0	0.00	4	100.0
Pelvis		0	0.00	1	25.0
Dental		0	0.00	1	25.0

Fracture

One juvenile (Burial 10) displayed a healed mal-aligned spiral fracture of the left femoral diaphysis. Based on the age of the individual (6 months to a year) and the advanced state of healing, it is likely that this fracture occurred around the time of birth or very shortly after.

All four of the adult individuals recovered from Montgomery Hill Cemetery displayed evidence of multiple bone fractures. These include healed fractures (antemortem), perimortem fractures, and antemortem vertebral compression fractures and Schmorl's nodes.

Antemortem, healed fractures of the forearm and hands were found in three of the four adult individuals (75 percent of adults), and involved the radius (Colle's fractures), ulna (parry fracture) and hands (metacarpals and phalanges). Colle's fractures typically occur as a result of extending the arm out when falling, while parry fractures typically occur as a result of a direct blow to the medial aspect of the forearm and typically are sustained when the arm is raised to protect the head and face (Galloway 1999). Forearm and hand fractures tended to occur more frequently on the right side of the body. An antemortem fracture was also noted on the clavicle of one individual (Burial 17) and resulted in significant remodeling of right and left pectoral girdle elements and sternum, perhaps to the extent that posture may have been affected. One individual had several possible healed rib fractures. Several individuals also sustained healed cranial depression fractures. No readily apparent evidence of fracture was noted on the humeri, femora, tibiae, or fibulae.

Burial 3, a 35–55 year old male, had an unusual antemortem vertebral fracture; a complete type II fracture of the odontoid process base of the second cervical vertebrae (C2) (Anderson and D'Alonzo 1974), with subsequent non-union and pseudo-arthrosis of the odontoid and C2 vertebral body. The odontoid process was not recovered, however the presence of a facet for the odontoid process on the anterior first cervical vertebrae (C1) indicates that the odontoid process was in fact present and in articulation at the time of death (as opposed to congenital aplasia). The fractured superior C2 body surface appears well-healed, indicating that the trauma did not occur just prior to death. Furthermore, hypertrophy of the cruciate ligament attachment sites on the C1 and C2 and moderate marginal lipping around the C1 facet for the odontoid process indicate that the joint continued to be used after trauma occurred, albeit with some difficulty. Absence of occipital condyles prevented the observation of alar attachments. Type II fractures, where the odontoid process is completely sheared off the C2 body, are relatively rare in both modern and archaeological populations and are typically the result of the displacement of the C1 either anteriorly or posteriorly, however hyperflexion or hyperextension as a result of an anterior-inferior or posterior-superior force are also possible causative forces (Galloway 1999; Anderson and D'Alonzo 1974). Because of the difficult location of this fracture, non-union is common and subsequent minor trauma may result in pain and significant neurological involvement or death.

In modern clinical cases, complete odontoid fractures are often the result of car accidents, falls, or head trauma (Anderson and D'Alonzo 1974). Although Burial 3 did not display any noticeable evidence of lack of mobility caused by neurological trauma, they did have healed fractures of both right and left forearms, significant evidence of vertebral osteophytosis and vertebral degeneration in the lower thoracic and lumbar regions of the vertebral column, and evidence of subchondral joint destruction of his knee and ankle joints. The vertebral column generally appeared much more porous than normal and appeared to have a reduction in bone density, however actual bone density lost or osteopenia cannot be confirmed without radiographic evidence. It should also be noted that this individual also displayed previously mentioned biomechanical stress markers which may be indicative of horseback riding

Evidence of perimortem trauma was observed on one individual, Burial 17. This individual appears to have sustained a series of perimortem fractures to the cranium and mandible, and cervical vertebrae, in addition to antemortem trauma noted elsewhere in the cranium and in the pectoral girdle and right hip. A complete perimortem fracture of the spinous processes of the fourth and fifth cervical vertebrae was present. Fractures of cervical spinous processes are not infrequent and may result from hyperflexion and/or hyperextension of the head with rotation, as well as from repetitive stress. Furthermore, perimortem fractures and probable perimortem fractures were observed on the following skull elements: mandible (complete fracture of mandibular body); right lateral cranium (involving the temporal squama, greater wing of the sphenoid, and anterior parietal); right zygomatic arch; left zygomatic arch. Facial fractures typically result from direct force to the face, and often result in one segment of the face being sheared off (Galloway 1999). The pattern of identified perimortem fracture and possible perimortem fractures suggest either a La Fort type II or type III fracture (which typically occur as a combination of the two fractures rather than their ideal form and would suggest that force of the blow which resulted in the fracture was centered and directed fronto-nasially) or bilateral tripod fractures of the zygomatic bones (which would indicate bilateral blows to the zygomatic bones) (Galloway 1999:74). The co-occurrence of neck, face, and mandible fractures are not uncommon (Galloway 1999:77).

Adults at Montgomery Hill also displayed additional indirect trauma to vertebral elements observed in the form of vertebral body compression fractures (resulting in overall or localized decreased body height), Schmorl's nodes (believed to be the result of rupture of the intervertebral disc), and an abnormal, angulated possible compression trauma of the superior vertebral body.

Luxation/Subluxation

Subluxation or partial dislocation of the hip was observed in Burial 17, a female aged 30–45 years. Many of the foot elements are very porous and seem abnormally light, and it is possible that the decreased blood flow may have caused periostitis in the legs and localized osteopenia.

Neoarthroses or the formation of new joints occurred in the left wrist of Burial 3 as a response to a comminuted fracture to the distal right radius.

Dental Trauma

Burial 6 had an antemortem fracture of the distal crown of the left first maxillary premolar and mesial crown of the left second maxillary premolar. The left second premolar was further displaced during life, so that it was positioned horizontally (mesial surface up) on the mandible with the crown oriented towards the oral cavity. The tooth would have been held into place by soft tissues. The mesial surface was highly polished indicting continued use as a functional surface.

Infectious Disease

Before the advent of antibiotics, infectious disease was one of the most frequent causes of death for most historic and prehistoric populations in the world (Roberts and Manchester 1995, Larsen 1999). Infection pertains to infiltration by potentially pathogenic microbes, such as bacteria, viruses, fungi, or parasites (Ortner 2003; Larsen 1999). While infection does not always produce disease, the progression from infection to disease depends on the virulence of the pathogen, the transmission route, and the strength of the host's immune system (Larsen 1999). The potential for the progression of an individual from exposure to an infectious agent to illness, or disease, and possibly to death is increased when the immune system is compromised (potentially the result of genetic defects, poor nutrition, previous infection, behavioral influences, or environmental factors) (Ortner 2003:113). Cultural mechanisms can also either minimize or augment a disease process (Ortner 2003:109).

When undertaking paleopathological analysis on archaeological remains it is important to keep several things in mind. First, while analyzing and interpreting infectious lesions the mechanisms used by the human body to respond to these infections should be kept in mind, as these responses to infectious agents are what will show up on bone (Ortner 2003). Second, evidence for infectious disease is relatively rare in skeletons when compared with the actual numbers of individuals who have suffered from infections. This is because the period of time between transmission and either healing or death can be short, and frequently occurs before the skeleton becomes affected (Roberts and Manchester, 1995; Ortner 2003). Skeletal manifestations of the disease usually only develop when the disease is chronic and affects the actual bone.

Infections can be sub-divided into specific and non-specific infections. In paleopathology, specific infections will typically include diseases which can be positively identified in skeletal remains based on the disease's characteristic distribution and expression of lesions (Roberts and Manchester 2005; Ortner 2003). Non-specific infections are those which cannot be attributed to a specific disease. They might represent a minor inflammation following trauma, the early stages or an expression of a localized infection, or a general systemic infection without diagnostic pathognomonic indicators. Non-specific infection is commonly observed in archaeological populations. The lesions can involve the bone surface (periostitis/periosteal inflammatory lesions), the bone cortex, the medullary cavity of the bone (osteomyelitis), or all three bone elements (Ortner 2003).

For the purpose of the present work, the investigation of infectious diseases will primarily focus on non-specific periosteal infections (periostitis) to elucidate patterns in basic heath. In addition to periostitis, possible evidence of more specific infectious diseases was identified on several individuals at Montgomery Hill Cemetery and will be briefly discussed. Poor preservation for many comparative samples and differences in observation methodology precluded inter-site comparisons from being made.

Periostitis

Periostitis is a bony response to inflammation of the outer layer of cortical bone, the periosteum. Most periosteal lesions are the result of some sort of infection (either localized or disseminated from elsewhere via blood), however, they may also be caused from direct or indirect trauma to the bone or nearby muscles (Ortner 2003).

Of the 25 individuals recovered from Montgomery Hill Cemetery, 68 percent (17 individuals) displayed evidence of one or more active or healed periosteal lesions. In order to better understand potential patterning in the distribution of periostitis, the sample is further broken up by age category and gender. Juveniles and adults are addressed separately below.

The distribution of individuals with one or more active or healing periosteal lesions is presented in **Table 7-5**. Overwhelmingly, for juveniles the most prevalent location for periosteal reactions is the cranium. All instances of cranial periostitis were active and occurred in children who died before the age of five, with most occurring in children under the age of two. Postcranial lesions are very rare in younger juveniles (fetal through infant). Only one individual of fetal/neonate age and one infant displayed evidence of postcranial active periostitis. It appears that at some point in time around the transition between young children and older children the distribution in location of periostitis and presence of healed periostitis also shifts. Older children tend to have more active and healed periostitis on long bones, and no evidence of cranial periostosis is noted. With a few exceptions, all periosteal reactions are expressed to some extent bilaterally.

Table 7-5. Distribution of Periosteal Lesions in Juveniles.

	Fetal/Neonate (N = 5)		Infant (N = 12)		Young Child (N = 2)		Old Child (N = 2)		Total (N = 21)	
Element	# Ind. Active	# Ind. Healed	# Ind. Active	# Ind. Healed	# Ind. Active	# Ind. Healed	# Ind. Active	# Ind. Healed	Percent Active	Percent Healed
Cranium	3	0	6	0	2	0	0	0	52.3	0
Mandible	0	0	0	0	0	0	1 (1)*	0	4.77	0
Humerus	0	0	0	0	0	0	0	1 (1)*	0	4.77
Radius	1 (1)*	0	0	0	0	0	0	1 (1)*	0	0.095
Ulna	0	0	0	0	0	0	0	1 (1)*	0	4.77
Hand	0	0	0	0	0	0	0	1 (1)*	0	4.77
Femur	0	0	0	0	0	0	0	1 (1)*	0	4.77
Tibia	0	0	0	0	0	1 (1)*	1 (1)*	1	4.77	9.5
Fibula	0	0	0	0	0	1 (1)*	0	1 (1)*	0	9.5
Feet	0	0	0	0	0	0	1 (1)*	0	4.77	0
Clavicle	0	0	1 (1)*	0	0	0	0	0	4.77	0
Scapula	0	0	1 (1)*	0	0	0	1 (1)*	0	9.5	0
Ribs	0	0	1 (1)*	0	0	0	1	0	9.5	0

*(#) indicates number of individuals with bilateral periostitis

The adult individuals buried at Montgomery Hill Cemetery exhibit an interesting distribution of presence of active and healed periostitis when separated by element (**Table 7-6**). All adult individuals (100 percent) display evidence of active and healing periostitis. Overall, there appear to be only minimal differences in the distribution of lesions between sexes, with any perceived difference perhaps being an artifact of small sample size.

Both active and healed periostitis tends to be most prevalent in the thigh and lower leg, and is typically expressed to some extent bilaterally. For all individuals, the periosteal reactions observed on the lower leg (tibia and fibula) represent the most severe expression of active and healed periostitis for that individual. Previous studies have found that bone located close to the skin surface may be particularly susceptible to chronic infection following trauma (Ortner 2003). Burial 9, an adult male aged 20–25 years, has evidence of severe reactive bone deposits consistent with ossifying periostitis of the left anterior tibia as a result of a chronic skin ulcer (Ortner 2003:207–208). Although the right tibia of Burial 9 does not show direct evidence for a similar chronic skin ulcer, similar severe ossifying periostitis was present. The presence of minor to severe healed, healing, and active periosteal bone deposits in the fibula and distal half of the tibia for most individuals suggests that lower leg infections may have been a chronic issue for adult individuals buried at Montgomery Hill.

Table 7-6. Distribution of Periosteal Lesions in Adults.

	Female (N=2)		Male (N=2)		Total Adults (N=4)	
	# Ind. Active	# Ind. Healed	# Ind. Active	# Ind. Healed	Percent Active	Percent Healed
Humerus	1 (1)	1 (1)	1 (1)	0	50%	25%
Radius	0	2 (1)	0	1	0%	75%
Ulna	0	2 (1)	0	1 (1)	0%	75%
Hands	0	0	1 (1)	0	25%	0
Femur	2	2 (2)	2 (2)	2 (2)	100%	100%
Tibia	2 (2)	2 (2)	2 (1)	2 (2)	100%	100%
Fibula	1 (1)	2 (2)	1 (1)	2 (2)	50%	100%
Feet	2 (1)	0	1 (1)	1	75%	25%

*(#) indicates number of individuals with bilateral periostitis

Periostitis is less frequent in the arms for both males and females, and typically is represented by healed or sclerotic periostitis present on the entire diaphysis or small, isolated areas of active periostitis on the proximal humerus. Given the high number of antemortem fractures affecting the upper body and pectoral girdle, and the presence of predominately unilateral expression of periostitis, it is possible that some of the healed periostitis may be indirectly related to traumatic assaults on the forearm.

Maxillary Sinusitis

Evidence of possible generalized respiratory infections in the form of maxillary sinusitis, were noted in several individuals. Three juveniles between the ages of 3 and 7 years (Burials 7, 12, and 20) and a middle adult female (Burial 6) displayed evidence of maxillary sinusitis. Maxillary sinusitis forms as a result of inflammation from respiratory infection or irritation, and in skeletonized remains typically presents as porosity and new bone deposition on the in the interior surfaces of the maxillary sinuses, occasionally accompanied by porosity on the bony hard palate (Roberts and Manchester 1995:131). The maxillary sinuses can only be observed in instances of taphonomic breakage of the skull, and so is not able to be observed in all instances.

Osteolytic Lesions

Osteolytic or lytic lesions form as the result of some kind of abnormal bone destruction which results in an alteration of the shape of the bone (Ortner 2003:51). The appearance of a lytic lesion may be affected by the type of element or body area affected, the type of disease, and speed of the progression of the disease in an individual (Ortner 2003:51). Osteolytic lesions were found on all four adults and two of the children. The most frequent locations for lesions include the cranium, femora, feet, and vertebrae, however they were also observed in low numbers in clavicle, humerus, hand elements, and pelvis. Osteolytic lesions in crania and vertebrae more often tend to be pathognomonic, or indicative of a specific disease, and so will receive extra attention in the present report.

A number of osteolytic lesions were observed on Burial 9, a 20–25 year old adult male. A large lytic lesion was present on the anterior-superior aspect of the second lumbar vertebrae and was accompanied by some loss in vertebral body height. Additional lytic lesions were present on the anterior aspect of cervical lesions and notable increase in porosity and marked decrease in vertebral body trabecular bone density in the lower thoracic vertebrae and lumbar vertebrae. Lytic lesions were also noted on the sacroiliac surfaces in the pelvis, and several tarsal elements. Diffuse osteoclastic activity was observed around the distal femoral metaphyses, proximal humeral metaphyses, and medial clavicles. The distribution and occurrence of numerous osteolytic lesions in this individual suggests that the individual may have had some sort of systemic infection (in addition to the chronic leg ulcer). The presence of lytic lesions in areas of high trabecular bone may indicate the presence of a systemic bacterial infection, such as tuberculosis or brucellosis (typically obtained through contact with infected livestock), or mycotic (fungal) infection (typically obtained through contact with contaminated soils during crop agriculture) (Ortner 2003). A complete differential diagnosis may aid in further narrowing down the potential disease vectors.

Diffuse lytic lesions were also noted on the femoral head and necks of Burial 6 and 17 (both adult females), and several tarsal and/or metatarsal elements. Periarticular lytic lesions were noted on several hand elements of on individual, Burial 3. At this time the etiology of these lesions is unknown. Two burials had cranial vault lesions which may have been osteolytic in nature, however alternatively may have been taphonomic in origin (Burial 17) or healed depression fractures (Burial 3). It should be noted that the cranial lesions are not consistent with caries sicca, a cranial lesion typical of tertiary or advanced stage treponemal diseases like syphilis. Furthermore, although periostitis was common on the adult tibiae in the population, no evidence of the syphilitic "saber shin" or other adult manifestations of tertiary syphilis was noted.

Non-Specific Indicators of Childhood Stress

Enamel Hypoplasia

Developmental defects of enamel are linked to a variety of metabolic conditions and environmental stresses that occur during the formation of the deciduous and permanent tooth crowns (Hillson 1996). Frequencies of enamel hypoplasias in a study population may be used to suggest compromised nutrition or poor health for a percentage of the people within that sample (Goodman et al. 1980; Goodman and Rose 1991; May et al. 1993). Although there has been some debate regarding the accuracy of calculating the onset of a metabolic disturbance based on the metric location of an enamel hypoplasia, there is little dispute over the idea that a developmental enamel defect which can be seen easily and without magnification is an indication of a period of some type of increased level of stress (Hillson 1996). A variety of environmentally related metabolic disturbances can result in enamel hypoplasias including childhood illness, trauma, malnutrition, psychological stress, and increased pathogen load (El-Najjar et al. 1978; Hillson 1996; Larson 1999). Thus, the prevalence of enamel hypoplasias is useful as a general, non-specific gauge of stressors affecting childhood health in a population.

The present work serves as a preliminary analysis of presence/absence of enamel hypoplasia in the population. Due to the variety in types of enamel hypoplasias presented and in severity of lesion expression, all enamel defects besides single, isolated pits were considered positive for the presence of enamel hypoplasia in the deciduous or permanent dental arcade (including linear arrays of pits, localized enamel hypoplasia of the primary canine, defects resulting in significant (non-localized) reduction of enamel, pseudo-linear array of pits, and multiple defects/pits of cusp tips.) Deciduous dentition was distinguished from permanent dentition to account for differences in general time of dental development and basic tooth structure. The results are presented in **Table 7-7**.

Enamel defects were an extremely common occurrence in this skeletal sample. Dental defects could not be scored on nine juveniles and one adult due to absence of dentition or insufficient mineralization of enamel. Of those individuals for whom dentition was observable, only two individuals (one adult and one juvenile) did not show evidence of any enamel defects. Also, all individuals with enamel defects had more than one defect present. Many deciduous teeth also featured some evidence of enamel hypocalcification. Several individuals had extensive, severe enamel defects which resulted in significant loss of localized or large portions of the enamel surface creating almost a mottled appearance of the crown surface, and sometimes resulting in plane defects. These mottled defects would occur on multiple deciduous teeth and usually were bilateral to some extent. For at least one individual with multiple severe enamel defects in the deciduous dentition, the defects were present on the permanent first molars and maxillary incisor which may signify disruption occurring during cusp initialization, late in utero or around the time of birth.

The presence/absence data on enamel hypoplasias (EHP) was compared to individuals from Cedar Grove and Freedman's cemetery. Ninety-two percent of the total Montgomery Hill population has at least one enamel hypoplasia in their permanent or deciduous dentition. In comparison, only 68 percent of Freedman's and 83 percent of Cedar Grove have at least one EHP. Furthermore, the prevalence of enamel hypoplasias in deciduous dentition is dramatically higher for Montgomery Hill individuals (92 percent of individuals) than what is seen in both Freedman's (58 percent) and Cedar Grove (67 percent).

The high prevalence of severe mottled defects at Montgomery Hill Cemetery suggests that there may have been a long term systemic infection, metabolic disturbance, or environmental factor resulting in a significant disruption in enamel formation and general crown development, occurring during fetal development and continuing to the first few months of life. These severe defects were observed in six individuals (two less severe than the other four) who died between the ages of 6 months and 3 years, with the majority dying between the ages of 6 months to 1.5

years. Two diseases, fluorosis and congenital syphilis, may have caused these severe enamel disruptions and are thus worth briefly addressing.

Table 7-7. Prevalence of Porotic Hyperostosis, Cribra Orbitalia, and Enamel Hypoplasia in The Cemetery Samples.

	Fetal/ Neonate		Infant		Young Child		Old Child		Total Juvenile		Total Adult		Total	
	N	Percent observed	N	Percent observed	N	Percent observed	N	Percent observed	N	Percent observed	N	Percent observed	N	Percent observed
Montgomery Hill:														
PH*	5	0	2	16.67	2	0	2	50	21	25.00	4	50.00	25	20.00
CO**	5	40	12	33.33	2	0	2	50	21	38.10	4	25.00	25	36.00
EHP *** (Deciduous)	-	-	-	-	-	-	-	-	12	91.67	-	-	12	91.67
EHP*** (Permanent)	-	-	-	-	-	-	-	-	3	66.67	3	33.33	6	50.00
Freedman's:														
PH	-	-	-	-	-	-	-	-	-	-	-	-	652	5.7
EHP	-	-	-	-	-	-	-	-	50	58	150	72	200	68.5
Cedar Grove:														
PH	-	-	-	-	-	-	-	-	-	-	-	-	76	21.1
EHP	-	-	-	-	-	-	-	-	15	66.7	21	95.2	36	83.3

N= number of individuals able to be observed, Percent observed= Percent of N with one or more lesions,
*PH = Porotic hyperostosis; **CO = Cribra orbitalia; *** EHP = Enamel hypoplasia

(Data from Rose 1983; Tine, 2000).

Fluorosis or fluoride toxicity occurs as the result of unusually high levels of fluorine in the local water supply, or alternatively consuming food stuffs with high levels of fluorine (Ortner 2003:406; Brickley and Ives 2008:241). Although some amount of fluoride in the water (~1 mg/l) is considered important for dental health and preventing cavities, dental effects of fluorosis may begin around 2mg/l and concentrations in excess of 4mg/l are considered unsafe. A study of well water in Navarro County found fluoride concentrations to range from well below 0.05 up to 6.1 mg/l based on location and whether the well tapped the fluoride rich Woodbine Formation (Thompson 1972). Although it is evident that toxic levels of fluoride do (or did at one point in time) occur in Navarro County drinking water, it is unknown whether this was a critical concern in the area immediately surrounding Montgomery Hill.

In instances of fluorosis, dental elements are often the first location where notable effects of fluorosis are identified, and typically consist of areas of discoloration (opacities) and mottled or pitted hypoplastic defects (typically bilateral), with the cheek teeth typically affected more severely than the anterior dentition (Hillson 1996:171). Although fluoride defects have been found in permanent and deciduous dentition, teeth which grow rapidly (such as deciduous teeth) are much less likely to display the characteristic features of fluorosis than slower growing permanent teeth (Lukacs et al., 1985). Skeletal effects of fluorosis typically occur only in long-standing or severe cases and include disruptions in the normal formation and resorption of bone. This typically is manifested as a marked increase in bone deposition (including ossification of soft tissue structures) and a decrease in the structural strength of bone, something which oftentimes results in pathological fractures (Ortner 2003:406). Greenfield (1990) has reported fluorosis toxicity sustained in the womb may cause defects such as bowed legs once the child begins walking. Archaeological evidence of fluorosis is rare and often obscured by taphonomic factors (Hillson 1996; Ortner 2003). For the Montgomery Hill Cemetery, the absence of mottled defects or severe hypoplasias in most fully mineralized permanent dentitions suggest that fluorosis may not be the cause of the enamel defects, however migrations to or from the area may have affected these results. Interesting one burial, Burial 19 (a 9 month to 1.5 year old infant), features both severe enamel hypoplasias as well as bowing in both legs (femora, tibiae and fibulae). It should be noted that vitamin D deficiency or rickets may also result in similar bowing of the leg bones (Ortner 2003).

An alternative explanation for the severe dental enamel defects is a chronic, systemic disease obtained in utero, or before birth, like congenital syphilis. Congenital syphilis may cause marked enamel defects in the deciduous and permanent dentition in addition to other non-pathognomonic skeletal indicators. In the permanent dentition, congenital syphilis may result in abnormal crown and root morphology. Oftentimes these disruptions occur during permanent incisor and 1st molar cusp initialization (late fetal to around birth), and result in a unique cusp morphology (termed Hutchinson incisors or mulberry molars) which are considered pathognomonic for congenital syphilis (Ortner 2003).

Although, the lack of advanced permanent tooth development prevents the afflicted individuals permanent crown forms from being fully observed, two individuals aged between 9 months and two years at the time of death (Burials 19 and 25) both also show evidence of significant disruption to crown initialization and development of the permanent maxillary and/or mandibular incisors and molars. The impact of congenital syphilis on the deciduous dentition appears to be more variable and less documented than the permanent dentition, with most available published literature typically describing some form of severe enamel hypoplasia (Ortner, 2003).

It is not presently clear if fluorosis, congenital syphilis, or another unknown disease is responsible for one or all of the instances of severe enamel defects seen at Montgomery Hill Cemetery. Ideally a more detailed differential diagnosis should be undertaken in the future to fully explore the possibilities.

Porotic Hyperostosis and Cribra Orbitalia

Porotic hyperostosis and cribra orbitalia are commonly used gauges of general childhood stress. These terms are used to describe a series of bony changes in the cranial vault (*porotic hyperostosis*) or superior surface of the eye orbit (*cribra orbitalia*) which are characterized by a suite of traits including vertical reorganization of the traebeculae in the cranial diploë and expansion of the cranial diploë as a result of hematopoietic marrow hypertrophy. As hematopoietic marrow disappears by early childhood, both porotic hyperostosis and cribra orbitalia can only develop during infancy and early childhood (Stuart-Macadam and Kent 1992). In adults, these lesions may be present in a healed or active (if the deficiency continued to be chronic from childhood) form. Historically both porotic hyperostosis and cribra orbitalia have most commonly been tied to iron deficient anemia, developing as the result of genetics, poor nutrition, or gastrointestinal infections (Stuart-Macadam and Kent 1992; Ortner 2003). More recent research has demonstrated that the two conditions do not necessarily occur together, and further suggest that other factors, such as vitamin C and B12 deficiencies, are actually more likely the underlying cause of porotic hyperostosis and cribra orbitalia lesions in skeletal samples (Walker et al. 2009). Regardless of the specific etiology, they are well accepted as a general indicator of some sort of heightened metabolic stress during childhood (Larson 1997; Ortner 2003; Walker et al. 2009).

Both Montgomery Hill and Cedar Grove appear to have similar rate of porotic hyperostosis (~20 percent). This is much higher than the porotic hyperostosis rate identified at Freedman's cemetery (~6 percent). These differences could indicate a heightened degree of childhood stress (including inadequate nutrition or increased parasite rates) in rural communities versus more urban communities. It should be noted that differences in observation thresholds may also partially account for these deficiencies.

Congenital defects

A series of congenital defects were noted in the axial skeletons of the adult individuals interred in Montgomery Hill Cemetery. Burial 9, a 20–25 year old male, had several developmental defects of the axial skeleton including a developmental fusion defect of the occipital resulting in bilateral clefting of the posterior rim of the foramen magnum, minor sagittal clefting (butterfly vertebrae) of several thoracic and lumbar vertebrae (a result of a notochord field defect), and multiple developmental defects of the sternum resulting in an abnormally shaped sternum and a sternal aperture. Burial 3, a 35–55 year old male, had a neural arch defect of the first cervical vertebrae (atlas) resulting in bilateral aplasia, and a supernumerary thoracic vertebrae (13 thoracic vertebrae total). For this individual, it is possible that the defects in the first cervical vertebrae may be a result of some form of occipitalization of the atlas (Barnes 1994) however the lack of fusion of the atlas to the occipital makes this unlikely.

Discussion

Preliminary analyses of the human skeletal remains presented here identify high prevalence of musculoskeletal stress in the adult and older children, high rates of healed and unhealed trauma to the upper bodies of adults, high infectious disease load (manifested as high prevalence of active cranial infection in children and high prevalence of chronic and systemic infection in adults), and high prevalence of markers used to estimate childhood stress. Although periosteal lesions are non-specific indicators of infection nor trauma in children, endocranial lesions most likely were caused by meningitis or a epidural hematoma resulting from head trauma.

Ectocranial lesions would most likely have been caused by metabolic disease/deficiency or a scalp infection of some sort.

These findings identify several interesting insights into lives of those individuals who were buried at the Montgomery Hill Cemetery. First, it appears that the adult individuals lived lives marked by very high levels of biomechanical stress, particularly in their upper bodies. This manifests as both a high level of skeletal robusticity and traumatic injury, potentially suggesting heavy labor. There is evidence to suggest that these activities began at a young age and continued through adulthood. Varying combinations of high musculoskeletal stress, high instance of traumatic lesions, high instance of childhood stress, and high infectious disease load have previously been identified in archaeological investigations of tenant farmers (Craig and Larson 1993), frontier settlements (Gill 1991), and slave populations (Rathburn 1987; Kelley and Angel 1987; Shuler 2011). Interestingly, there may not have been a clear-cut sexual division of labor, as a middle adult female possessed strikingly similar musculoskeletal stress indicators, traumatic lesions, and infectious lesions as the two male individuals in the sample. For sharecroppers and tenant farmers in Texas during the latter part of the nineteenth century, it was not unheard of for women to work alongside men in fields or to tend their own (Winegarton 1996).

Furthermore, preliminary demographic and pathology comparisons indicate that Montgomery Hill Cemetery is highly unusual when compared to selected contemporaneous cemeteries. The high prevalence of these proposed markers of stress in both the juvenile and adult populations suggests that this is not just simply an issue with under numeration of adults and mortality of the sickest children. These results may indicate two possible scenarios. The first scenario is that those individuals buried at Montgomery Hill were either subjected to a much higher and more constant degree of stress, or were, for some unknown reason, markedly more frail (and thus more easily susceptible to stress from less than ideal, non-immediately fatal situations) than other populations in Texas and the greater south. Either way, those individuals who did survive to adulthood would have survived through numerous varied insults to their body. The second scenario suggests that those individuals at Montgomery Hill who survived past early infancy were particularly resilient against stressors and infection and thus would live long enough for bony evidence to be left behind. Regardless, the high prevalence of musculoskeletal stress markers and fractures typically associated with heavy labor combined with the high prevalence of lower leg lesions is consistent with work-based trauma seen in labor intensive populations (Shuler 2011). Regardless of comparisons with other cemetery populations, life along the prairie margin was not easy, particularly for enslaved and formerly enslaved black populations.

The skeletal remains excavated and analyzed from Montgomery Hill Cemetery represent a rare opportunity to gain insight into the life and death of a previously unknown and undescribed group of individuals who lived in rural Texas during the latter part of the nineteenth century.

Chapter 8

Demographics, Health, and Cultural Expression

by Rachel Feit

Dating the Cemetery

Exhumation of the Montgomery Hill Cemetery near Eureka, Texas offers a small glimpse into the lives and deaths of early post-emacipation African American community residents. The cemetery had no grave markers to identify the individuals buried in it or its period of use. Research suggests the cemetery was used between about 1865 to no later than 1885. Deed records indicate that the land was probably uninhabited before Prosper K. Montgomery bought it in November 1865. Theoretically, it is possible that the previous owner, Samuel and Jane Chambliss (Montgomery's parents-in-law) did have slaves on this property during the Civil War period. However, deed records state they lived in Ellis County (though later they did live in Navarro County) at the time they sold the land to their son-in-law. The Chambliss' had acquired the land from William M. Love, a slaveholder who did live in Navarro County, but his homestead was along Richland Creek, southwest of the Montgomery Hill Cemetery. There is no evidence suggesting he had any slaves living on the Montgomery property during his period of ownership. In fact, he only owned 10 slaves, according to the 1860 census. In any case, the land was almost certainly uninhabited prior to 1860, when William M. Love acquired it by special act of the Texas Legislature.

The terminal date of use for the cemetery is equally vague, though we have good reasons to believe that the cemetery was probably out of use well before 1885. Several lines of evidence support this. First, all of the coffins and caskets were held together with square nails. Square nails generally fell out of production and use around the turn of the century, which makes it unlikely that any of the interments occurred after 1900 (Davidson 2000). Other evidence suggests the burials occurred a good bit before then. For instance, only two burials featured any decorative coffin hardware and in both cases, the styles were those that were popular from the 1850s to the mid-1870s. Vaulting, a common burial practice of the pre-1885 period, was another aspect of the interments with temporal significance. At the Freedman's Cemetery in Dallas, many of the 1865–1884 interments exhibited vaulted burials, while none of the later interments employed this practice (Davidson 2000). Vaulting was identified on at least 11 of the interments at Montgomery Hill Cemetery providing further support for the idea that the cemetery pre-dates 1885.

Finally, oral tradition provides the most compelling evidence that the burials predate 1885. Henry Jennings and Ola Mae Calloway, who grew up in a sharecropper's home "about 50 yards from the cemetery," remembered their great-grandmother telling them about the old slave cemetery (Jennings 2012). Their great grandmother Winnie Foreman (né Cole) was born on the Montgomery farm about 1865 and lived there all her life. Had anyone been buried in the cemetery during her adult lifetime, she would have known about it and passed that information on to her children and grandchildren. The fact that she had no clear memory of the cemetery ever being actively used, suggests that all interments occurred before she was old enough to be aware of them—most likely before she was about 10 years old in 1875.

Indeed, by the 1890s, the black community of Eureka had a formal cemetery, the Friendship Baptist Cemetery, three miles west of US 287. The earliest marked grave in that cemetery is from 1897, though many unmarked graves are known to exist as well. Likely, a number of these date prior to 1897. Deed records for the Friendship Baptist Cemetery were not searched for this project, though certainly deed information might help illuminate when Eureka area residents began using it.

Identities of the Remains

While the individual identities of the people buried in the Montgomery Hill Cemetery may never be known, based on background research, oral narratives, and skeletal analysis, the remains are almost certainly those of African Americans who had been enslaved and recently manumitted. Both of the adult males exhibited strongly African American traits, while one of the adult females exhibited several African American traits, along with traits which may indicate possible Native American and/or Caucasian ancestry. The remains from a third adult male found on the surface of the island in 2009 also suggest African ancestry. Ethnic affinity was not clearly determined on the other adult female due to poor cranial preservation. Shovel shaped incisors were reported on the permanent dentition of at least three burials. This trait is another one that is most commonly observed in Native American and Asian populations (although is present in low frequencies in many other populations worldwide), and it has been documented in Texas populations of African ancestry as well (Winchell et al. 1995; Foster and Nance 2002; Peter et al. 2000; and Derrick 2001). Together with an oral tradition of this being a "slave cemetery," Montgomery Hill Cemetery is almost certainly the resting place of blacks who lived and worked on the Montgomery Farm in the early post-Civil War years.

Furthermore, the idea that some of these enslaved peoples may have had some Native American ancestry is intriguing, and not impossible to imagine. Lu Lee described how a young Indian child was left on the western Navarro county prairie after soldiers chased the rest of the tribe off. The child was brought back to the plantation and raised with the other enslaved workers, eventually marrying one of Lee's aunts (WPA 1936–1938). Other former slaves, such as Sylvester Wickliffe of Beaumont, or Spence Johnson of Waco claimed similar kinship with Native Americans. In fact, Johnson was born a free Choctaw Indian, but was captured by slavers in the 1850s and taken to the Texas-Louisiana border (WPA 1936–1938). Prior to the 1860s Navarro County was at the edge of the frontier. Native Americans frequently used the prairies as hunting grounds, and encounters with them were common. It is not unreasonable to envision that African American contact with Native Americans in the form of communication, trade, and even marriage, occurred fairly regularly.

No living descendants or family members of any of the individuals who were buried here came forward during the course of this project, in spite of attempts to locate family members. Death records during the 1860–1890 period, particularly in rural areas, are rare for Navarro County. Furthermore, cultural memory of the remains was all but lost prior to rediscovery of the cemetery in 2009. Therefore, it is impossible to reconstruct the names of people buried here. The 1870 census, however, offers some possible leads. For instance, the 1870 census lists two black Montgomery families living within a few households of the Prosper Montgomery home. The first was headed by an N. Montgomery (age 46), who was born in Mississippi (where Prosper originated along the Mississippi-Louisiana border). Two other adult males lived with him—C. and J. S. Montgomery (age 30 and 19 respectively). C. gave his birthplace as Texas; however, J. S. indicated he was born in Louisiana. A second black Montgomery household was nearby. This was headed by J. Montgomery, a 21-year old farmer born in Louisiana. He lived with his wife, also 21, and three children, two of whom were also born in Louisiana. The ages of the two oldest children, nine and seven, suggest that they might not have been offspring of the young Montgomery couple. However, the youngest child, who was just three years old, was born in Texas and may have been the biological child of J. Montgomery and his wife. A number of other black families with origins in Mississippi and Louisiana lived around the white Montgomery family. These included the See family, the Bowen family and the Reed family. Other nearby black families claimed roots in Texas, Missouri and Georgia.

The 1870 mortality schedule of Navarro County is useful in potentially illuminating the identities of the people buried in the cemetery. This was originally published in the Navarro County Genealogical Society's newsletter *Leaves & Branches* (Leaves & Branches 1979), and is now at the online TxGenWeb site. Although the mortality schedule records relatively few African American deaths, several may be linked to individuals buried in the Montgomery Hill Cemetery. For instance, A. Baley, a 12-year old boy died of fever in August 1870. There is a possible transcription error with the name. While no Baleys are listed in the 1870 census for the Eureka area, a family by the name Haley is listed, with a 12-year old son whose first name began with A. A. Baley's age at the time of death falls within the general age range (though older than osteological estimates) for Burial 12, which we assumed from grave inclusions (a black glass chain and shoes) was female, though it could well have been male. Fifteen-year old M. A. Duncan (female) and 1-year old Ellen Watson are also listed on the mortality schedule. Black families with these surnames are listed in the 1870 census for this area. However, excavations revealed no individuals in the 14-year age range. On the other hand, several of the interments could match 1-year old Emma Watson, who died of hives (Leaves & Branches 1979).

It is highly likely that a number of the individuals buried in Montgomery Hill Cemetery were related by blood. This is supported as much by skeletal traits and spatial patterns, as it is by simple historical circumstance. Unique congenital dental traits shared by at least five of the children (Burials 4, 7, 19, 21, 25) suggest some degree of relatedness. Moreover, both adult females (Burials 17 and 6) were buried in quite close proximity to infants, and this spatial proximity may reflect biological affinity. Although not undertaken for this study, future research integrating dental traits with these spatial relationships could help clarify biological relatedness. Burial 17 was close to Burials 14–16 and three of those individuals, Burials 15–17 wore beaded necklaces composed of similar sorts of beads to the ones worn by Burial 17. Burial 6 was in close proximity to Burials 5, 7 and 8, as well as Burials 14–16. Notably, Burials 5 and 8 were among the youngest in the cemetery, and could have been stillborn, or died soon after birth before Christening could take place, less than a month post-partum (Burial 5's head was the only burial situated to the east).

Demographics

The demographics of the cemetery offer little help in illuminating who is buried there. The cemetery contained only four adult burials (possibly six counting the remains found on the surface in 2009 and 2011), and 21 children. Death in childhood is almost always an indicator of disease or infection, and it should be no surprise that the children of the Montgomery Hill farm area showed signs of infections and various pathologies. The individuals buried here probably suffered from poor nutrition, poor sanitation, and likely had almost no access to formal medical treatment. However, the child mortality rate is exceptionally high even for rural black cemeteries and plantation cemeteries.

Indeed the unusually high number of children represented among the burial population is something of a puzzle. Several explanations have been brought forth to explain the high ratio of children to adults, including overall poor health and material conditions (resulting in high child mortality), or cultural practices which spatially separated children from adult burials. However, the most likely explanation is one initially suggested by Whitley (Whitley and Skinner 2012) in her initial survey report for this site. The high number of children is likely the result of extreme transience and mobility on the part of the people who lived in this area during the post-bellum years. High transience is fairly well documented historically. Following emancipation, many blacks picked up and left the plantations where they had been formerly enslaved in order to start new lives elsewhere. Former slaves went in search of lost family members; others gathered together to form small all black "freedom colonies"; and still others simply sought work with new employers (McDavid et al. 2013). In the diary he kept from 1861–1866, Jacob Eliot of Corsicana recorded a number of recently manumitted African Americans who came to his home looking for work. His entries for the year 1866 are illuminating:

> "July 2—a negro woman named Cynthicana and her daughter Jenny, came from Kaufman looking for work…..August 4—a colored woman named Lucy and her boy came and offered to work….Nov 20—Booker move his family in to my cabin….Book to feed himself….Dec 24—Eliza, a negro woman who came here to work for her food has her baby born in our kitchen (Taylor 1965)."

Former slave narratives also document the same sort of transience after the Civil War. Sarah Benjamin of Corsicana commented, "De day we was freed, de slaves jus' scattered (WPA 1936–1938)." Describing news of emancipation on Juneteenth 1865, Smith Wilson stated, "some was so glad to get away that they never even stayed to hear him read all the paper (WPA 1936–1938)." Vagrancy laws and the "black codes" passed following the Civil War also encouraged black migration, as they liberally allowed for blacks to be arrested for joblessness and homelessness. In response to these laws, freedmen often moved frequently in search of better lives and opportunities.

The Eureka community was probably no different. It is reasonable to imagine that the period between 1865 and 1870 was highly unstable for Eureka area blacks. While several freed black families stayed in the area and became sharecroppers for white families such as the Davidsons, Johnstons (aka Johnson), and the Montgomerys, just as many probably left the community. The names that appear on the 1870 and 1880 census records for this area support that. While some black families, such as the Davidsons, Foremans, Johnsons, Williams and Calhouns, appear year after year. Others appear only once and never again. It was probably not until 1880s that the black community around Eureka began to stabilize. By the 1890s, the community was established enough to have its own church and dedicated cemetery. Even then, the very nature of sharecropping and the precariousness of African American life in the Jim Crow south undoubtedly created a higher level of migration that would normally be seen in a community of owner-occupied households.

Given this, it is likely that during the volatile early post-bellum years, families whose young children died, buried them in the Montgomery Hill Cemetery, but then moved on to new places later. This would account for the very high number of children buried in the cemetery and the low number of adults. It would also explain the lack of historical memory about who was buried there. The parents and subsequent descendant relations of the children who died there moved to other places long ago. Ultimately the black sharecropping and tenant farm system that prevailed across the South created communities with limited control over their homes and burial places. These circumstances are critical not just for understanding the demographics of the cemetery, but also for understanding the processes by which a cemetery became an archaeological site.

Health

Although elevated mobility explains the high number of children in the cemetery, nonetheless, skeletal analysis also indicates that a very high rate of pathology and trauma prevailed throughout the entire burial population. Adult remains showed evidence of extreme and repeated bodily trauma, some of which may have given the individuals a distinctive appearance. For instance, Burial 17, a 30–45-year old female, had suffered antemortem dislocation of the right hip joint and fracture and dislocation of the pectoral girdle which may have given her a slouched or asymmetrical appearance. She also suffered perimortem fractures to the cranium, mandible and cervical vertebrae which may have resulted in death. Fractures to these areas could have been the result of a fall or kick to the head of some sort. Burial 9, a 20–25-year old male, had a severe chronic osteolytic ulcer (the result of an infection) on the left tibia and fibula which would likely have caused severe leg swelling as well as manifestations on the skin itself. This infection may have contributed to his premature death. Burial 3, a 35–55-year old male, exhibited antemortem healed fractures on his spine, and both forearms, as well as hands and feet. Musclulor-skeletal stress markers on the femora as well as other skeletal indicators suggest a habitual activity like from horseback riding. Meanwhile, Burial 6, a 35–45-year old female, exhibited healed antemortem fractures on the right radius and ulna as well as periosteal lesions and trauma throughout legs, hips, hands and feet.

Where trauma was not noted, evidence of extremely developed muscular attachments were present, suggesting that the adult individuals routinely engaged in hard labor, and in particular, work involving arm, back, and leg muscles. Evidence of habitual squatting and bending was also noted. While it is not uncommon even for white residents of the frontier to exhibit high levels of biomechanical stress and physical trauma (Larsen 1999, Gill 1991), clearly heavy labor took a toll on them and probably influenced the likelihood that they would suffer trauma. Three adults (3, 6, 9) had as acromiale, a skeletal nonunion of part of the scapula which essentially indicates habitual use of the pectoral girdle from a young age. Even several children (Burials 20 and 12) exhibited very robust muscular attachments suggesting that physical labor began early.

Among the children in the cemetery, 38 percent exhibited varying degrees of active *cribra orbitalia* (See Table 7-7) indicating either persistent poor diet and nutrition or extensive infection and parasitism. Probably high childhood mortality was a combination of both. The immediate post-bellum period was a time of intense social upheaval in the south, and Navarro County was no exception. Freed blacks frequently found themselves without homes, clothing or food. Here again, WPA slave narratives offer a treasury of detail about life after slavery. Over and over again, former slaves commented to interviewers that conditions after slavery were much harder than during it. This is not to say that blacks preferred slavery to freedom, only that the paternalistic institution of slavery at least guaranteed minimally necessary food, clothing and shelter. Calvin Moye, who lived on the Ingram Plantation south of Eureka offered this assessment of post-Civil War life: "People den had a better time dan dey does now. Nobody goes hungry like we does now and goin half naked, tryin to save enough money to pay de rent, dar wasn't any rent den (WPA 1936–1938.)" In fact, food is a common theme running through many of the WPA slave narratives. Most of the people interviewed commented repeatedly about how well they ate while enslaved, juxtaposing that to the meager rations and starvation of the emancipation period.

Enamel hypoplasia was present in 91.67 percent of the children's deciduous dentition and 66.67 percent of the permanent dentition. Many children had severe enamel defects creating a unique appearance to the dentition. Poor health and nutrition was probably a factor in a number of cases. However, the prevalence of severe enamel defects suggests that the population suffered from long term systemic infections, metabolic disturbances or some other environmental factor not just during the first few months of life but also potentially during fetal development for many of infants and children. Two possible systemic causes of these enamel defects could be congential syphilis, flourosis, or an unknown systematic infaction. While none of the adults in the cemetery exhibited any strong indicators of syphilis, this was a common disease afflicting both poor blacks and whites in the nineteenth century. Flourosis or flouride toxicity occurs as a result of high levels of fluorine in a water supply. There is some evidence to suggest that isolated/localized areas of Navarro County did historically have abnormally high levels of fluorine (see Chapter 7) and therefore, it is conceivable that many young children drinking water from these wells on a regular basis were adversely affected.

Here again, the 1870 mortality schedule is illuminating with regard to the types of diseases people suffered and died from (Leaves & Branches 1979). Pneumonia, typhoid fever, tuberculosis, malaria, diarrhea, and meningitis were commonly fatal. Diseases such as diarrhea, typhoid, meningitis, and malaria are generally caused or spread by poor sanitation and living conditions. People also died from croop, child birth, heart disease, and cancer. Other trauma, such as murder, burns, and being killed by a horse are recorded on the 1870 mortality schedule. These sicknesses seem to have afflicted blacks and whites equally.

Burial Practices

Burial practices corroborate the idea that residents of Montgomery Hill experienced hardship and privation during the early post-bellum years. Overall, very little fuss appears to have gone into the procurement and construction of burial containers at the Montgomery Hill Cemetery. While many burial containers from other cemeteries of this same time period were constructed with showy hardware and decorative plates, this was not the case for those of Montgomery Hill Cemetery. All of the burial containers at the Montgomery Hill Cemetery were home-made with local lumber, probably pine or oak. Slave narratives describe burial practices as simple: that people were buried in plain wooden caskets, often covered with a sheet and interred in a burial ground in unmarked graves (WPA 1936–1938). This is certainly the case for the Montgomery Hill Cemetery where the overwhelming majority of containers were held together with simple cut nails, were probably unpainted, and unlined. One child burial container was held together with plain gimlet screws and only two containers featured decorative hardware.

Burials 3 and 17, offered evidence of greater care and elaboration. These featured white metal coffin screws, coffin tacks (dummy screws), upholstery lining, and possibly paint. Burial 3 was a middle-aged adult male (35–55 yrs.), while Burial 17 was a middle-aged adult female (30–45 yrs.). Due to their age, these two individuals were possibly community leaders or elders, and their coffin furnishings reflect their probable importance. Worth noting is that several of the coffin tacks decorating Burial 17's coffin were actually placed in a line down the center of the lid, clearly marking them as decorative rather than functional. While coffin tacks were never manufactured to be functional, people typically placed them around the edges of the coffin to mimic functional screws, which were generally more expensive than the dummy screws. The clearly decorative aspect to the coffin tacks with Burial 17 seems to be unique, and represents one of the small ways in which the residents of this area expressed themselves culturally. Burial 17 also wore an intricate blue glass pendant, a beaded necklace and a wedding ring, all of which could indicate heightened social status among the community.

Despite physical hardship, members of the community probably shared deeply rich spiritual and cultural traditions. Cultural expression and belief systems were strongly evident in a number of the interments at the cemetery. Six individuals wore glass and shell beaded necklaces. These beads were all quite typical of the types of beads found at other African American cemeteries of the seventeenth through early nineteenth centuries, as well trade beads found at frontier settlements that traded with Native Americans. Based on type, the Montgomery Hill beads appear to have also been heirloom items handed down from previous generations.

It is remotely possible that some of the individuals were, in fact, of partial Native American ancestry and that the beads came to them through frontier traders.

Beads were primary forms of cultural expression for Africans and enslaved blacks of African descent in the Americas. Beads were worn as charms, for luck and health, as well as for simple aesthetic expression. The spiritual belief systems of enslaved blacks took on a unique form. Though nominally Christian, enslaved African American beliefs manifested an "animistic orientation in which the world was inhabited by both benign and malign spirits….Individuals could benefit and suffer from the whims of these forces, and conjurers were seen as powerful people who could control the supernatural" (Stine et al. 1996:59–60). Stine et al. (1996) argue that personal charms were one way of controlling these supernatural forces and beads were among the charms that had power. Use of beads to adorn the dead at the Montgomery Hill Cemetery may have been intended to protect them from harm in the afterlife, or to facilitate the journey there. Other types of artifacts that were likely charms of some sort were a pierced coin (Burial 1), a pig incisor pendant (Burial 21), a black glass chain, and shoes worn by a 7–10-year old child (Burial 12). Though not abundantly represented, these types of items have been found with other enslaved black and African burials on both sides of the Atlantic, as well as in domestic contexts. Ultimately, people buried the dead with items that were important to them in life, or that were perceived to be useful in the transition to the afterlife. In either case, personal items such as these have intense individual and/or cultural meaning.

Buttons are another item that, while largely functional, also convey information about material circumstance, and in a few cases, possible spiritual practices. Buttons were overwhelmingly the plain 4-hole white porcelain variety. These were inexpensive and common in the mid to late nineteenth century. This type of button was probably readily available at local stores. Larger plain bone buttons were worn by the adult males on their clothing and could have been homemade or also purchased at area stores. The fact that few highly decorative buttons were found probably is attributable to poverty and lack of resources among the inhabitants of the Montgomery farm area. It is possibly meaningful, therefore, that the only large metal buttons found among the burials were associated with a 2–6-month old child (Burial 15) and these were placed in an overlapping line under its body. While these could be expedient clothing items, they would have been quite large for a child of that size. An alternate consideration is that they were some sort of charm intended to protect the child in the afterlife. Use of metal buttons and metal discs in this way has been documented in African American domestic assemblages as well as in African cultural expression (Brown 2012). Brown discusses the symbolism of the Minkisi (also *Nkisi*) in African art and spirituality. This is a hollow figurine filled with earth, ash or some other spiritually charged substance, then covered with metal objects, such as metal plates or nails. Graves themselves can sometimes be considered *Minkisi,* and among their purposes, *Minkisi* are used for healing, spirit protection, or as charms against others. Worth noting in this context, is that all of the interments at Montgomery Hill Cemetery, surrounded as they were by many iron nails, in some way resembled *Minkisi* figurines. There is little evidence to indicate this aspect of interment was consciously intentional among the people who buried their loved ones in the cemetery, though the idea is worth exploring in future research.

Suffice to say, on the whole the artifacts from burials reflect a set of uniquely African American beliefs and forms of expression. These beliefs were neither wholly African nor wholly Christian but a syncretic hybrid. The intention and meaning behind various forms of cultural expression are still not fully understood. However, the data resonate with and build upon findings from similar projects, not just in Texas, but across the country. The relatively small window in which the cemetery was used is like a time capsule of the emancipation period. This was a period of immense change and social transition for blacks and whites. In this sense, the Montgomery Hill Cemetery has much to offer by way of research and comparative data. The authors of this report hope that data from this project will further illuminate the material conditions and practices of African Americans in this still poorly understood period in Texas.

Management Recommendations

In 2011, 25 burial shafts were identified at a previously unknown cemetery (41NV716) in Navarro County Texas (Whitley and Skinner 2012). AmaTerra exhumed all 25 burials over the course of December 2011 and January 2012. Each shaft identified during the initial survey contained an intact burial. AmaTerra removed the burials in accordance with the scope of work outlined by the property's controlling agency, TRWD. With a few exceptions, excavated remains were analyzed within 24 hours of exhumation in an on-site lab, per the court order for disinterment, and were then transferred to the Corsicana police department. All remains were eventually reburied in the Woodland Cemetery in Corsicana, Texas.

No additional human remains were noted on the surface of the exposed beach on Chambers Creek Island, nor were any additional grave shafts observed during the course of AmaTerra's investigations. Subsequent to removal of the human remains, water levels in Richland-Chambers reservoir rose, covering the exposed portion of beach surrounding the Montgomery Hill Cemetery. Although we believe that all human remains from the cemetery have been fully exhumed, it is conceivable that further unmarked graves could be present closer to the waterline that were not identified during the 2012 survey and subsequent excavations.

This project was conducted under Antiquities Permit No. 6103. While the site was not assessed as a State Antiquities Landmark, the exhumation of all 25 of the known interments at the cemetery has essentially mitigated the effects of subsequent land use and previous reservoir construction on this particular resource. Furthermore, exhumation of the 25 burials complied with the Texas Health and Safety Code (Title 8, Subtitle C, Chapter 711.04 and 711.0105) which outline the requirements for unknown or abandoned cemeteries (Chapter 711.04) and the method of removal of remains (Chapter 711.0105). No further work is warranted at present. However, should water levels drop again and expose additional interments, further coordination with the Texas Historical Commission under the ACT, and the County Clerk's office under the Texas Heath and Safety Code would be required.

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Appendix A

Brief Analysis of Burial Container Hardware

Brief Analysis of Burial Container Hardware Recovered from Burial Excavations in Montgomery Hill Cemetery, Richland-Chambers Reservoir, Navarro Couty, Texas

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Abstract:

In September of 2012, Rachel Feit of AmaTerra Environmental, Austin, Texas, contacted the author to provide analysis of historic burial container hardware recovered from the excavations of 19th century burials from the October, 2008, and January, 2009, excavations of twelve burials within a 19th century, African-American cemetery, known as Montgomery Hill Cemetery in Navarro County, Texas. Excavations revealed a small sample of burial container hardware consisting of nails, utilitarian gimlet screws, lining tacks, two coffin screw types, and at least one types of ornamental coffin tack. Through analysis and targeted comparison of this hardware collection to United States patent records, period manufacturers' trade catalogs, and archaeological cemetery excavation literature, these artifacts suggest that all interments occurred in the 19th century, likely occurring sometime between 1853 and the 1870s.

Introduction to Burial Container Hardware

The analysis and historical study of burial container hardware is crucial in establishing a useful discourse between of multiple lines of evidence recorded and recovered in historical cemetery investigations. Burial container hardware imbibe multiple social and aesthetic meanings. For some affluent members of society, ornate and expensive burial container hardware were used as a marker of social status (Burgess et al. 2007). Others used ornate hardware as a means of masking social realities and presenting the illusion of wealth (Little et al. 1992). These various types of hardware in and of themselves held religious and ideological symbolic value in the development of the outward expression of the Victorian Beautification of Death movement (Bell 1987, 1990). The 19th and early 20th century perspective viewed the ornamentation of the funeral and the coffin or casket as an extremely important part in the expression of sentiment and community re-structuring.

Burial container hardware holds great value for the archaeologists just as they did for the mourners who chose to include decorative hardware on a coffin or casket. Exact identification of types and styles of burial container hardware is vital in defining the chronology of burial, particularly in the absence of dated grave markers. Moreover, variations in styles, hardware forms and materials of manufacture, in tandem with temporality speak volumes about economic expenditure and therefore indirectly reflect aspects of socio-economic class, status, and/or community involvement in the funeral process (Bell 1987, 1990; Davidson 1999, 2004; Little et al. 1992; Pye 2007, 2010a, 2010b, 2011a, 2011b). Nearly all reports of historic cemetery investigations utilized burial container hardware as a means to place undated burials within a temporal context. However, as Buchner et al. (1999:28), Davidson (1999), and Mainfort and

Davidson (2006) note, there are serious dangers and limitations in the uncritical application of past hardware analyses to newly excavated materials.

Prior to the work by Mainfort and Davidson (2006) and Davidson (1999), the most widely used "authoritative manuals" on dating coffin hardware were Hacker-Norton and Trinkley (1984) and Trinkley and Hacker-Norton (1984). These reports were among the first to employ period hardware catalogs to establish their chronologies. While this was innovative for the time, the numbers of hardware catalogs used for comparison were few. These works did succeed in illustrating one very important point—that various types of coffin hardware were stocked by stores throughout the country, and may have sat on the shelf for some time before being used. Therefore, just because one hardware type appears and declines in appearance in the hardware catalogs very early does not mean that it cannot be introduced into the archaeological record at a later time period. Buchner et al. (1999:28) equates this type of lag to the demonstration of local cultural sequences, which should be independently researched in each region independent of possibly inaccurate dates from other areas of the country. Because of the aforementioned problems, the *terminus post quem* is much more reliable in burial chronology than is the *terminus ante quem.*

Typology Methodology

The methods established by Davidson (1999) for the classification of hardware from the Freedman's Cemetery Project, Dallas, Texas, have been applied to the present materials with slight modifications. Essentially, a new type is designated when a new hardware form/style (or combination of elements) is encountered. Davidson (2006:120-121) give the example, "the first thumbscrew…was given the type designation Thumbscrew Type 1…if the next burial excavated uncovered a thumbscrew with an even *slightly* different design motif, [then] it was assigned a new type number (e.g., Thumbscrew Type 2)." Size variants (i.e., adult sized handles versus child sized handles) were designated by numerical suffixes (e.g., Handle Type 12.1).

Following Davidson (1999) and Davidson (2006:121), it is acknowledged that these pieces of hardware should be dated and contextualized through three lines of evidence: patent dates, dates derived from period hardware catalogs, and known dates of cemetery use. A fourth line of evidence can be included, but must be critically analyzed based on the previous lines of evidence—the estimated interment ranges of burials from previously excavated cemeteries.

Hardware Descriptions and Typology

An attempt will not be made in this report to describe the history and various iterations of all hardware forms, nor will an attempt be made to systematically list all appearances of Montgomery Hill Cemetery hardware types in period merchandise catalogs or archaeological cemetery excavations. For more descriptive information about each general hardware type, see Davidson (1999; 2004) and Mainfort and Davidson (2006). However, for general purposes, a brief contextual discussion of each hardware form encountered during the cemetery excavations will be presented followed by descriptive discussions of each hardware type as constructed within the current typology.

Nails

Nails are an essential and ubiquitous form of construction hardware used in the production of burial containers in the nineteenth and early twentieth centuries. There were three general types of nails in use in various regions and times in the nineteenth century: hand wrought, square cut, and wire. Hand wrought nails were commonly used during the seventeenth and eighteenth centuries until the introduction of the cut nail around 1800 (Davidson 2006:115–

116) (Figure 1). Cut nails declined in use toward the end of the nineteenth century as wire nails became available on the market and became more widely used in the casket industry.

Based on Edgerton (1897), Fontana (1965), Fontana and Greenleaf (1962), and other reliable sources like Davidson (2006) have placed the introduction of wire nails to common usage in the funeral industry between 1890 and 1900. In estimates of burial chronology, this date has been conventionalized to ca. 1895, and prior to that characterized as the exclusive use of cut nails, or the absence of wire nails. This dating has held true for comparable burials accurately dated by other artifact associations or historical record from Arkansas (Cande 1995:161–168, 249–251), Freedman's Cemetery in Dallas, Texas (Peter et al. 2000), and Meadowlark Cemetery, Kansas (Pye 2007).

The archaeological literature suggests that the most common sizes of nails used in the construction of coffins and caskets were smaller nails (i.e., 4d, 6d, and 8d), whereas larger nails (i.e., 10d and above) were more likely to be used in shipping containers for the transport of mass-produced burial containers (Davidson 1999; Davidson 2006). It is reasonable to expect that there would be a certain degree of uniformity in the sizes of nails used for mass-produced coffins and caskets, and in fact, the most common nails listed in the archaeological literature have been 6d and 8d cut nails with a bias toward the use of 6d nails in both the cut and wire varieties through time (Davidson 2006:101).

The term "clinched" refers to nails that have been intentionally bent at roughly a 90-degree angle toward the distal end. Nails are often intentionally bent in this manner when used to secure bracing or runners connecting multiple boards or when securing external hardware. The nail is driven through the required boards and then the protruding end is bent over. Davidson (2006:101) suggests that clinched nails would not have been used in the construction of primary burial containers. Instead, clinched nails would have been more commonly used in the construction of an outer shipping crate, or sometimes in a vaulted lid (Davidson 2006:101). Although the roughness of outer shipping crates would typically require this type of construction, the presence of clinched nails alone should never be used as a proxy for an outer box or commercial manufacture. Their presence can only be indicative of the functional aspect of their use in the construction of a container.

Feit (personal communication) reports that all burials at Montgomery Hill Cemetery contained nails. All of these were square cut nails. This indicates that the interments took place prior to the introduction of wire nails into the national market. It was not mentioned whether any of the nails in the collection had been clinched.

Lining Tacks

The primary function of lining tacks was to affix cloth lining, either within the interior of the burial container or covering to the exterior of the container, or sometimes the tacks were arranged in a decorative pattern on the surface of the container. These tacks are typically small, with an iron shank and head (flat iron, domed iron, domed brass, domed china, or domed lead/white metal, Figure 2). Often the iron shank deteriorates or becomes detached and only the heads remain (Davidson 1999).

Since the presence or absence of lining or cloth covering is a basic economic indicator, the ability to identify lining tacks is important. Linings do not typically preserve except when lying in association with cuprous hardware, and even then it is difficult to distinguish cloth lining from clothing remnants; therefore, the recovery of lining tacks provides a more concrete indicator (Davidson 2004:418).

Simple flat-headed ferrous lining tacks were found in burials at Montgomery Hill Cemetery according to Feit (personal communication). This is a ubiquitous form of lining tack and is present in trade catalogs dating between 1865 and 1912. It is unknown when these tacks were first marketed, but they likely have a very long history intimately connected with the history of the nail. In most archaeological cemetery excavation reports, limited attention is given to lining tacks, particularly simple iron tacks that are often mistaken for nail fragments; therefore, it is very difficult to determine with certainty the frequency with which this type of tack appears in the archaeological record.

Screws

Davidson (2006:144–145) reports that wood screws in some form have been around since the time of the ancient Greeks; however, prior to the nineteenth century, most screws had blunt points and could not self-start. The introduction of the gimlet wood screw, a screw that has a tapered body and a pointed tip, has been attributed to Thomas J. Sloan, who was issued a U.S. Utility Patent (No. 4,704) in 1846 (Figure 3). The mass production of these gimlet screws was initiated the same year by Sloan's introduction of the machine capable of producing said screws (U.S. Utility Patent No. 4,864). Even though, technically, a gimlet form had been introduced 10 years earlier by Thomas W. Harvey of Poughkeepsie Screw Company, as well as a machine capable of producing wood screws in 1834, most early gimlet and blunt-tip forms had to be hand-turned and therefore were more costly to consumers than later machine-made screws (Davidson 2006:145).

Plain gimlet screws were commonly employed as burial container lid closures in the nineteenth century, though the earliest mention of some type of screw being used in mortuary contexts dates to 1748 (Davidson 2006:145; Tharp 1996:226). In the known sample of general hardware and mortuary catalogues available for comparison, flat, round, oval, and fillister-headed gimlet screws were prominently advertised for sale (Figure 4). Davidson (2006:145) concludes after critical examination of archaeological literature of pre-1850 cemeteries that the presence of screws, particularly gimlet screws, was relatively rare during this period. Additionally, in those burial containers where utilitarian gimlet screws were used as primary means of lid closure, there was an absence of formal coffin hardware such as coffin screws or thumbscrews. Forms of ornamental tacks (i.e, coffin tacks, also known as dummy screws), however, were often utilized to mask the use of ordinary screws (Davidson 2006:146).

Plain gimlet wood screws were used in the construction of one burial container in Montgomery Hill Cemetery (see Figure 5). Burial 8 contained the remains of a young child whose burial container was constructed using eight gimlet screws. This suggests that this burial dates later than 1846.

Coffin Screws

The general hardware category of coffin screws consists of a form of hardware with a white metal screw cap affixed to a ferrous screw shaft. The top of the white metal cap typically has a slot to accept a screw-driver for mounting (Davidson 1999; 2004:400). Davidson (2006:141) suggests that coffin screws were commonly used in sets of four or six, with one screw placed at each corner of the coffin, with the possibility of an extra set being mounted at either the shoulder or waist of the coffin. It should be noted, however, that in cases where only a set of two is present, these screws are often mounted at the head and the foot ends of the coffin (Pye 2007).

Coffin screws were in common usage by the 1850s; they make their first known appearance in the 1853 Peck and Walter Manufacturing Company catalog. A U.S. patent was granted to W.H. Nichols for this type of screw on July 26, 1859 (U.S. Letter Patent #24911, see Figure 6). Coffin screws were replaced by thumbscrew forms in large part in the 1870s and 1880s and by the late 1880s were carried only by general hardware suppliers and jobbers (Davidson 2006:141). The overall temporal range of coffin screws, however, runs from about 1850 to 1910.

Identification of stylistic variation in this artifact class is problematic both from the historical perspective and from the archaeological. Illustrations are often not great in period catalogs, thus confusing variation. Additionally, with few exceptions, the size ranges of coffin screw heads are not given in catalogs. Similarly, many archaeological reports do not give measurement data and do not show profile views, further inhibiting progress in identification. Future analyses of these artifacts will depend on careful comparison of measurements with other well-documented archaeological materials and useful trade catalogs.

Coffin Screw Type 1

Coffin Screw Type 1 (Figure 7) is represented by four artifacts from Burial 17 at Montgomery Hill Cemetery. This screw type consists of a double filigreed, domed, cylindrical, slotted, non-ferrous, white metal head with a ferrous screw shaft. The sides of the dome were slanted slightly and the dome was gently curved. The filigreed collar is relatively short and is not excessively prominent in most of the artifact images provided to the author. Because only pictures are available from which to conduct analysis, it was not possible to make exact measurements reducing the ability to make comparisons to other archaeologically excavated samples.

Early appearances of similar styles of this screw were in the 1853 and 1857 Peck and Walter & Sargent Bros. illustrated price lists. A variety of sizes were available in these two early catalogs. Prices were based on diameter of head and length of screw shaft. From the supplies images, Coffin Screw Type 1 appears to be a 1 ¼ in. screw with a ½ in. head diameter, which would mean that a gross of this type of screw would have cost $0.85 in 1857.

Coffin Screw Type 2

Coffin Screw Type 2 (Figure 8) is represented by four artifacts from Burial 3 in Montgomery Hill Cemetery. This screw type consists of a domed, cylindrical, slotted, non-ferrous, white metal head with a flanged brim and a ferrous shaft. The sides of the dome were relatively straight curving slightly at the interface with the brim, and the dome was gently curved. Screws of this type could have a brim with a filigreed decorative band around the entire width of the brim, only along the outer one half of the brim, or may have an undecorated brim. The image of this group of artifacts was poor and therefore it was not possible to determine whether the brim was decorated. Also, because of the same reason, it is not possible to make definitive matches to period catalogs or archaeological examples. As mentioned previously, coffin screws were popular between the early 1850s through to the 1880s, but were still sold well into the 20th century.

Coffin Tacks (Dummy Screws)

The term coffin tack refers to a specific kind of ornamental tack with a white metal screw head affixed to a small ferrous tack shaft. They are commonly used in conjunction with true coffin screws to give the illusion that more true screws were used in the construction of the coffin. For this reason, coffin tacks are often referred to as dummy screws (Davidson 1999; 2004:402-403). Coffin tacks were available for sale in some locations from the 1850s well into the 1900s, but were most popular between the 1850s and the 1880s. While the exact introduction date of this type of artifact is unclear, it is known that W.H. Nichols was granted a U.S. patent for this type of tack on July 26, 1859 (U.S. Letter Patent #24911, see Figure 6).

The same problems associated with the identification and analysis of coffin screws mentioned above apply to coffin tacks as well. Coffin tacks were typically produced in the exact same styles as coffin screws so they could be used together. Because less material was required, coffin tacks were cheaper. It was, therefore, common for people to use limited numbers of coffin screws but then fill out the perimeter of the burial container with many coffin tacks. Archaeologically, corroded and dirt-packed coffin tacks sometimes look like coffin screws with broken shafts. Many archaeological reports of cemetery excavations misidentify coffin tacks. Greater care should be taken by artifact analysts to make the distinction between these two classes of artifacts because there is a subtle, yet important, economic implication in their use.

Coffin Tack Type 1

Coffin Tack Type 1 (Figures 9 and 10) is represented by 15 artifacts from Burial 17 in Montgomery Hill Cemetery. This tack type consists of a domed, cylindrical, slotted, non-ferrous, white metal head with a ferrous tack shaft. It had a double filigree decorative form with the sides of the dome being slightly slanted and the lower filigreed collar mirroring the very slight slant of the side. While no specific design patent is known to exist for this tack type, the Nichols patent (Figure 6) mentioned above shows a similar type of tack. Much like Coffin Screw Type 1, similar types of tacks appear in the 1853 and 1857 Peck and Walter & Sargent Bros. catalogs. Prices varied based on the diameter of the heads. While exact measurements of these tacks are not obtainable from the supplied images, the size appears to be close to ½ in. If that is the case, these tacks would have cost $0.72 per gross in 1857.

Conclusion

This report has briefly described several general classes of mortuary hardware and specific descriptions of those represented in the burials recovered from the Montgomery Hill Cemetery, in Navarro County, Texas. The analyzed artifacts suggest that all interments occurred in the 19th century because of the exclusive presence of cut nails. Burial 8, which contained gimlet screws must date later than 1846. Burials 3 and 17, which contained coffin screws, coffin tacks, or both, could have occurred between 1853 and 1910. Given the total absence of other types of hardware popular in the 1870s and 1880s (i.e, thumbscrews), however, the data suggest that all burials likely do not date later than the 1870s.

This research should not be an end unto itself. As mentioned in the introduction to this work, mortuary hardware held significant meaning and value for the people who purchased these items for deceased loved ones. As mortuary archaeologists, it is our job to try to put enough of the pieces back together from the analysis of material and skeletal remains that we can shed light on the articulations of the larger puzzle, that is, the social, religious and ideological interrelationships of past communities.

Figure 1. Selection of cut nails offered for sale on page 251 of the 1865 Russell & Erwin Company general catalog.

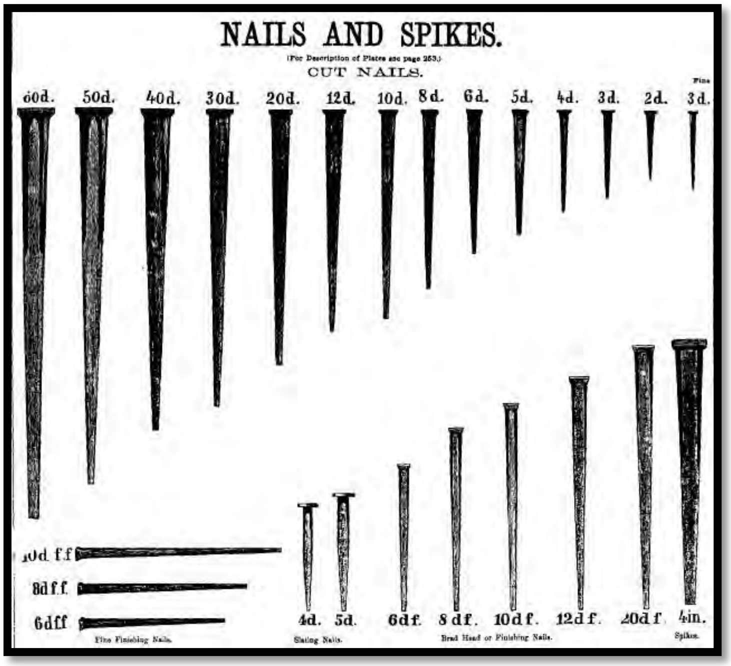

Figure 2. Selection of lining tacks illustrated on page 105 of the 1901 Gate City Coffin Company catalog.

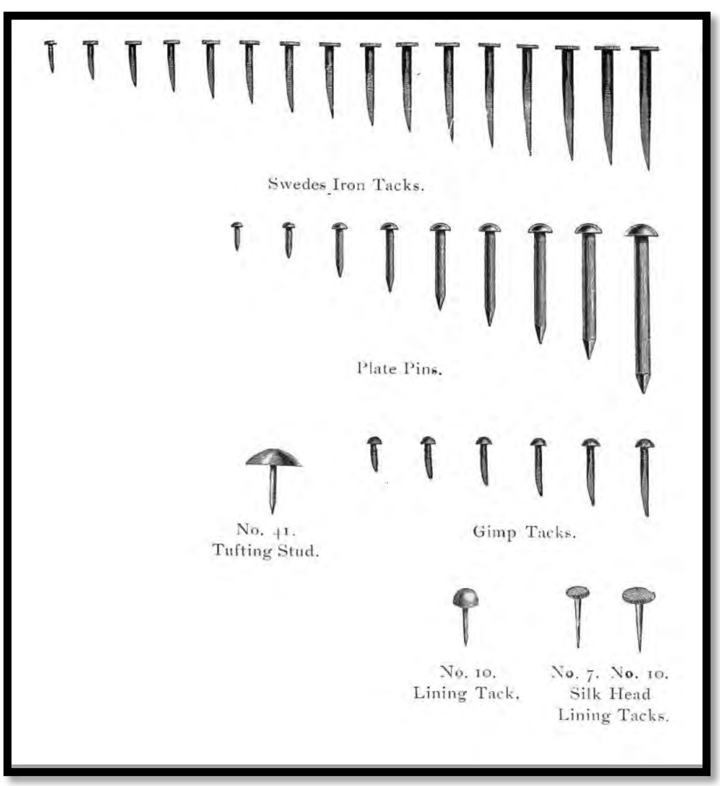

Figure 3. U.S. Utility Patent No. 4,704 assigned to T. J. Sloan for wood screws in 1846.

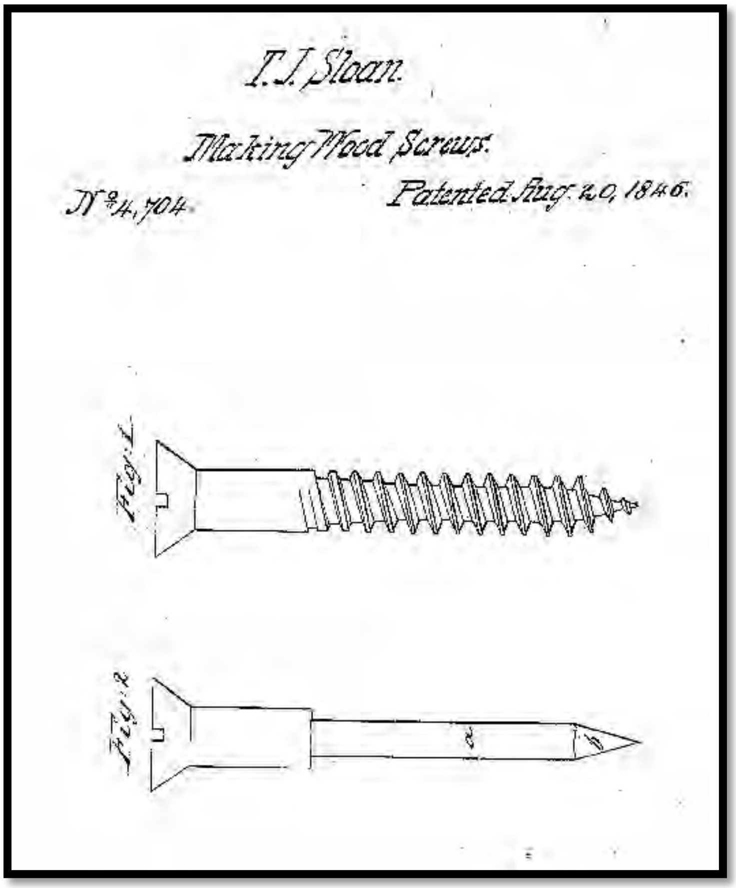

Figure 4. Selection of American gimlet screws offered for sale on page 126 of the 1865 Russell & Erwin Company general catalog.

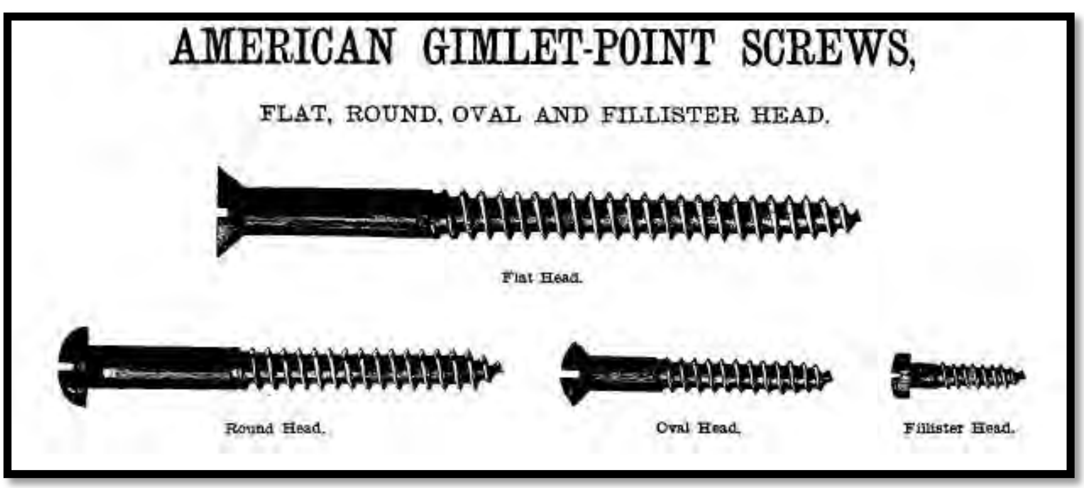

Figure 5. Gimlet screws recovered from Burial 8.

Figure 6. W.H. Nichols 1859 Patent No. 24,911 for Coffin Screws and Coffin Tacks.

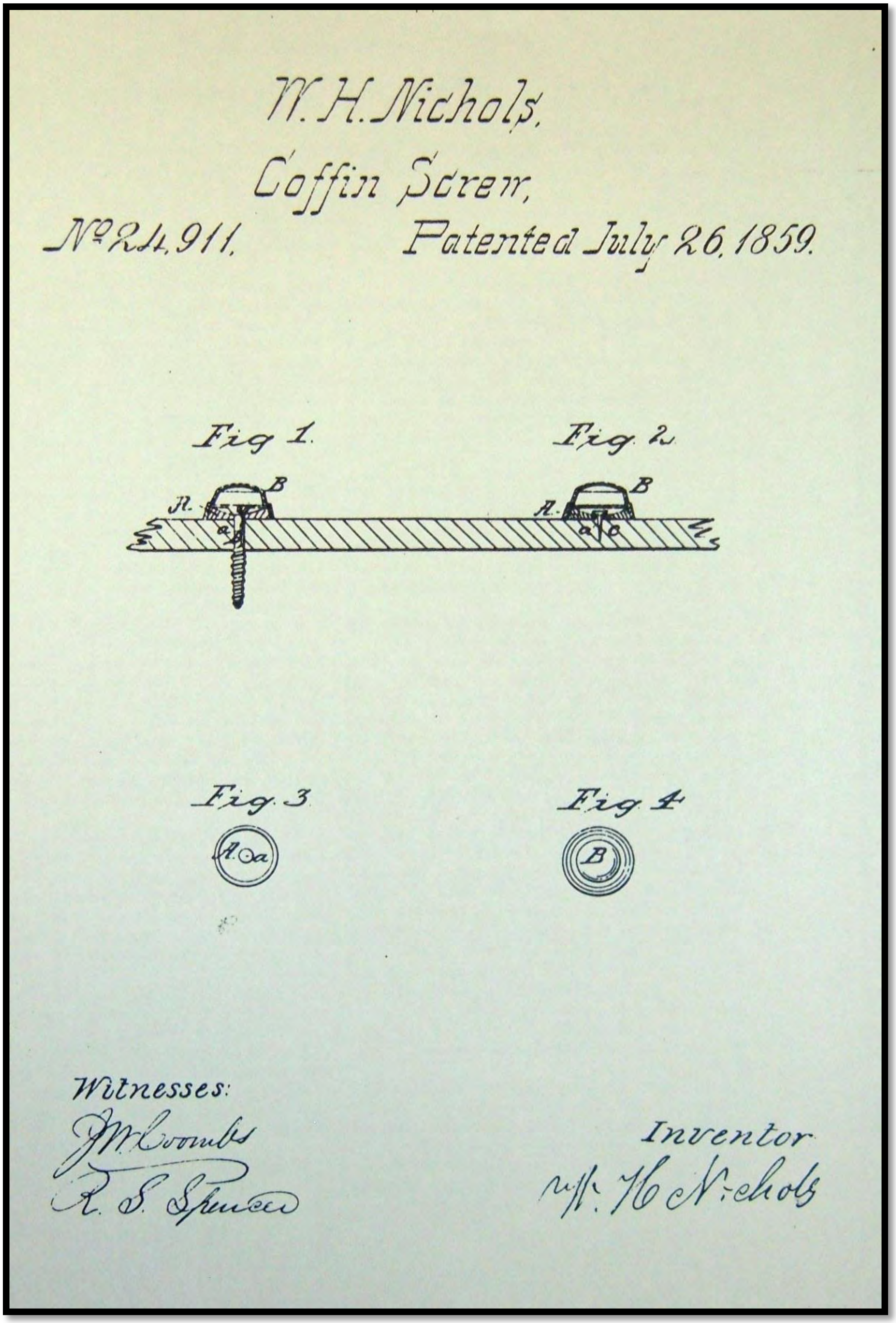

Figure 7. Coffin Screw Type 1.

Figures 8. Coffin Screw Type 2.

Figures 9 and 10. Ornamental Tack Type 1.

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Appendix B

Field and Analysis Forms

EComm 220-001 **BURIAL RECORDING FORM A** Page ___ of ___

TRWD Richland Chambers Cemetery Mitigation

Date ___________ Site 41NV716 Navarro County Excavator _____

Burial Number ______ Individual _____ Page: ____ of ____ Photo #: ______ Sample: Y/N

Cell: ________Depth (cmbd): W) ______ E) ______

Vessel Type: Coffin/Box/Basket/Ceramic/

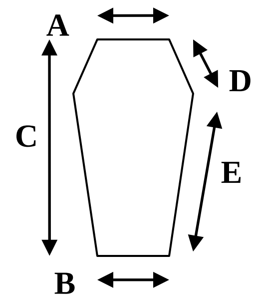
Other: ______________________________________

Coffin Lid Shape: Rectangular/ Hexagonal/ Vaulted/

Unknown/ Other: _____________

Coffin Lid Intact? Y/N

Coffin Length (cm):
Head (A): _______
Foot (B): ___________
Side/Midline (C): ________
Shoulder: D) _____ E) _____



Coffin Hardware: ______________________________

____

Grave Offerings: ______________________________

____

Fill Inclusions: ______________________________

____

Disturbances: ________________________________

____

Soil Texture: ______________________ Wet/Dry

Munsell: _______

pH Reading Locus (UTM or cm)

1) ______ X: ____________ Y: ____________

2) ______ X: ____________ Y: ____________

3) ______ X: ____________ Y: ____________

4) ______ X: ____________ Y: ____________

5) ______ X: ____________ Y: ____________

6) ______ X: ____________ Y: ____________

7) ______ X: ____________ Y: ____________

8) ______ X: ____________ Y: ____________

9) ______ X: ____________ Y: ____________

10) ______ X: ____________ Y: ____________

KEY

Scale ___ : ___

North

EComm 220-001 **BURIAL RECORDING FORM B** **Page ___ of ___**

TRWD Richland Chambers Cemetery Mitigation

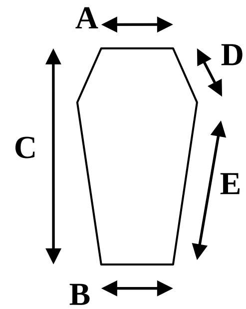
Date __________ **Site 41NV716 Navarro County** **Excavator _____**

Burial Number ______ Individual _____ E/A/T/C/I/F Page: ____ of ____ Photo #: ______ Sample: Y/N

Cell: ______ Depth (cmbd): W) ______ E) ______

Coffin Shape: Rectangular/ Hex/ Unknown/ Other: ____________

Coffin Base Intact? Y/N



Coffin Length (cm):

Head (A): _______

Foot (B): ___________

Side/Midline (C): ________

Shoulder: D) _____ E) _____

Number, Age, & Gender (est.): _________________

Silhouette? Y/N **Length: ____Width: ____ pH: ___**

Skeleton Length: ______ (cm) Width: _______ (cm)

Completeness: _____ % of elements

Preservation: *Good* 1 2 3 4 5 *Poor*

Head Orientation: W E N S

Body Position: Extended/ Flexed/ Crouched/ Prone/

Unknown/Other: ______________________________

Body Orientation: Right/ Left/ Back/ Stomach/

Unknown/ Other: ______________________________

R Hand: Side/Pelvis/Stomach/ (R) (L) Shoulder/

Unknown/ Other: ______________________________

L Hand: Side/Pelvis/Stomach/ (R) (L) Shoulder/

Unknown/ Other: ______________________________

Ankles: RxL/LxR/ Parallel/ Other: ________________

Prostheses: ___________________________________

Coffin Hardware: ______________________________

____

Grave Goods: _________________________________

____

Grave Offerings: ______________________________

____

KEY

Scale ___ : ___

North

Soil Texture: ____________Wet/Dry Munsell: _______

Disturbances: __________________________________

____

EComm 220-001 BURIAL RECORDING NOTES Page ___ of ___

TRWD Richland Chambers Cemetery Mitigation

Date __________ Site 41NV716 Navarro County Excavator _____

Burial Number ______ Individuals _____ Photos: ______ Page: ____ of ____

Sample? Y/N Contents: ____

Sample Depth (cmbs): _______ Locus) X: __________ Y: __________ pH: ________

Removal Plan: ____

____

____

____

____

Taphonomy: Gnawing/Disarticulation/Mold/Root/Crushing/Tool Damage

____

____

____

____

Artifacts from Sieving: ____

____

Skeletal Elements from Sieving: ______________________________________

____

Notes on Gender and Socioeconomic Status from Grave Goods: ________________

____

____

____

____

____

Cleaning Plan: ____

____

____

Handling of Artifacts: ____

____

____

ECOMM 220-001 **BURIAL RECORDING NOTES** Page ___ of ___

TRWD Richland Chambers Cemetery Mitigation

Date __________ Site 41NV716 Navarro County Excavator _____

Burial Number ______ Individuals _____ Photos: ______ Page: ____ of ____

Notes: ____

EComm 220-001 SKELETAL RECORDING FORM Page ___ of ___

TRWD Richland Chambers Cemetery Mitigation

Date __________ Site 41NV716 Navarro County Recorder _____

Cell: _______ Burial Number: ______ Individual: _____

HUMAN SKELETAL REMAINS CHECKLIST

Cell: _______ Burial Number: ______ Individual: _____ Field Photos:_____

Lab Photos: ________

General

SEX __________ **AGE ______________**

☐ Juvenile MNI ___________ collection type _________________

☐ Adult MNI Form ___________

Taphonomy

Yes	No	Unobservable	
☐	☐	☐	Weathering (describe severity and which elements affected) ____ ____
☐	☐	☐	Discoloration ____________________________________ ____
☐	☐	☐	Cutmarks, gnaw marks ____

Form List - indicate forms used

- ☐ 1A, B Skeletal Inventory
- ☐ 2A Adult Age and Sex Assessment
- ☐ 2B Juvenile Age Assessment
- ☐ 3A, B Dental Visual Recording Form
- ☐ 3C, D Dental Inventory
- ☐ 3E, F Dental Pathology
- ☐ 3G, H Dental Metrics
- ☐ 3J, K Permanent Teeth Morphology
- ☐ 3L, M Deciduous Teeth Morphology
- ☐ 4A Cranial Measurements
- ☐ 4B Postcranial Measurements
- ☐ 5A-5E Epigenetic Traits
- ☐ 5F Ancestry Determination
- ☐ 6 Cranial Deformation
- ☐ 7 Pathology Checklist
- ☐ 8 Spinal Osteophytosis
- ☐ 9 Degenerative Joint Disease
- ☐ 10 Adult Skeleton
- ☐ 11A, B Infant Skeleton
- ☐ 12A-C Child / Subadult Skeleton
- ☐ 13A Adult Skull
- ☐ 13B Endocranium
- ☐ 14A, B Ilium, Scapula, and Clavicle
- ☐ 15A, B Humerus
- ☐ 16A, B Radius
- ☐ 17A, B Ulna
- ☐ 18A, B Femur
- ☐ 19A, B Tibia
- ☐ 20A, B Fibula
- ☐ 21A, B Hand
- ☐ 22A, B Foot
- ☐ 23 Isolated Bone
- ☐ 24A, B Cremated Bone
- ☐ Photogrammetry

EComm 220-001 **SKELETAL RECORDING FORM** **Page ___ of ___**

TRWD Richland Chambers Cemetery Mitigation

Date __________ **Site 41NV716** **Navarro County** **Recorder _____**

Cell: _______ Burial Number: ______ Individual: _____

Form 1A

SKELETAL INVENTORY
CRANIAL & AXIAL

CRANIAL

element	unsided	left		right
Frontal			____	
Parietal	☐	____		____
Temporal	☐	____		____
Occipital			____	
Lacrimal	☐	____		____
I.N.C	☐	____		____
Nasal	☐	____		____
Maxilla	☐	____		____
Zygomatic	☐	____		____
Palatine	☐	____		____
Sphenoid			____	
Ethmoid			____	
Vomer			____	
Mandible			____	
Hyoid			____	
Thyroid			____	
Crycoid			____	
Malleus	☐	____		____
Incus	☐	____		____
Stapes	☐	____		____

RIBS

left	#	right
____	1	____
____	2	____
____	3	____
____	4	____
____	5	____
____	6	____
____	7	____
____	8	____
____	9	____
____	10	____
____	11	____
____	12	____

Unk. Ribs	Left	Unsided	Right
#	____	____	____
condition	____	____	____

Codes: c = ≥ 75% complete p = 25% - 75% complete f = < 25% u = unobservable – = absent	Unsided = Check box and use “Left” Segments = Check box if present

AXIAL

element	#	condition
1st Cervical		____
2nd Cervical		____
3rd Cervical		____
4th Cervical		____
5th Cervical		____
6th Cervical		____
7th Cervical		____
Unk. Cervical	___	____
1st Thoracic		____
2nd Thoracic		____
3rd Thoracic		____
4th Thoracic		____
5th Thoracic		____
6th Thoracic		____
7th Thoracic		____
8th Thoracic		____
9th Thoracic		____
10th Thoracic		____
11th Thoracic		____
12th Thoracic		____
Unk. Thoracic	___	____
1st Lumbar		____
2nd Lumbar		____
3rd Lumbar		____
4th Lumbar		____
5th Lumbar		____
Unk. Lumbar	___	____
Sacrum		____
S1	☐	
S2	☐	
S3	☐	
S4	☐	
S5	☐	
Coccyx		____
C1	☐	
C2	☐	
C3	☐	
C4	☐	
Sternum		
manubrium		____
body		____
xiphoid		____

EComm 220-001 SKELETAL RECORDING FORM Page ___ of ___

TRWD Richland Chambers Cemetery Mitigation

Date __________ Site 41NV716 Navarro County Recorder _____

Cell: _______ Burial Number: ______ Individual: _____

Form 1B

SKELETAL INVENTORY
APPENDICULAR & EXTREMITIES

LEFT SIDE

element	unsided	cond.	epi-p	prox	mid	dist	epi-d
Humerus	☐	___	☐	☐	☐	☐	☐
Radius	☐	___	☐	☐	☐	☐	☐
Ulna	☐	___	☐	☐	☐	☐	☐
Femur	☐	___	☐	☐	☐	☐	☐
Tibia	☐	___	☐	☐	☐	☐	☐
Fibula	☐	___	☐	☐	☐	☐	☐

RIGHT SIDE

element	unsided	cond.	epi-p	prox	mid	dist	epi-d
Humerus	☐	___	☐	☐	☐	☐	☐
Radius	☐	___	☐	☐	☐	☐	☐
Ulna	☐	___	☐	☐	☐	☐	☐
Femur	☐	___	☐	☐	☐	☐	☐
Tibia	☐	___	☐	☐	☐	☐	☐
Fibula	☐	___	☐	☐	☐	☐	☐

element	unsided	left	right
Scapula	☐	____	____
Clavicle	☐	____	____
Ilium	☐	____	____
Pubis	☐	____	____
Ischium	☐	____	____
Patella	☐	____	____

Unknown Metacarpals
____ Cond. ____

Unknown Metatarsals
____ Cond. ____

element	unsided	left	right
Scaphoid	☐	____	____
Lunate	☐	____	____
Trapezium	☐	____	____
Trapezoid	☐	____	____
Capitate	☐	____	____
Hamate	☐	____	____
Triquetral	☐	____	____
Pisiform	☐	____	____
Calcaneus	☐	____	____
Talus	☐	____	____
Cuboid	☐	____	____
Navicular	☐	____	____
Med Cuneiform	☐	____	____
InterCuneiform	☐	____	____
Lat Cuneiform	☐	____	____

element	left	right
Metacarpals		
1st	____	____
2nd	____	____
3rd	____	____
4th	____	____
5th	____	____
Sesamoids	____	____
Metatarsals		
1st	____	____
2nd	____	____
3rd	____	____
4th	____	____
5th	____	____
Sesamoids	____	____

PHALANGES

Left Hand	**Right Hand**	**Left Foot**	**Right Foot**
Distal	Distal	Distal	Distal
___ ___ ___ ___ ___	___ ___ ___ ___ ___	___ ___ ___ ___ ___	___ ___ ___ ___ ___
Middle	Middle	Middle	Middle
___ ___ ___ ___	___ ___ ___ ___	___ ___ ___ ___	___ ___ ___ ___
Proximal	Proximal	Proximal	Proximal
___ ___ ___ ___ ___	___ ___ ___ ___ ___	___ ___ ___ ___ ___	___ ___ ___ ___ ___
1 2 3 4 5	5 4 3 2 1	1 2 3 4 5	5 4 3 2 1

UNIDENTIFIED PHALANGES

Carpal	Left#	Right#	Unsided	cond.
Distal	____	____	____	____
Middle	____	____	____	____
Proximal	____	____	____	____

Tarsal	Left#	Right#	Unsided	cond.
Distal	____	____	____	____
Middle	____	____	____	____
Proximal	____	____	____	____

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TRWD Richland Chambers Cemetery Mitigation

Date __________ Site 41NV716 Navarro County Recorder _____

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TRWD Richland Chambers Cemetery Mitigation

Date __________ Site 41NV716 Navarro County Recorder _____

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Form 2A

ADULT AGE AND SEX ASSESSMENT

Age Criteria

Os Coxa

Pubic Symphysis	Left	Right	Auricular Surface	Left	Right
01 Todd (1-10)	____	____	***03*** (1-8)	____	____
02 Suchey-Brooks (1-6)	____	____			

Suture Closure & Epiphyseal Union: — = unobservable, 0 = open, 1 = minimal, 2 = significant, 3 = complete

Cranium

External Cranial Vault	***04*** Midlambdoid	____	Palatine	***14*** Incisive Suture	____
	05 Lambda	____		***15*** Anterior Median Palatine	____
	06 Obelion	____		***16*** Posterior Median Palatine	____
	07 Anterior Sagittal	____		***17*** Transverse Palatine	____
	08 Bregma	____	Internal Cranial Vault	***18*** Sagittal	____
	09 Midcoronal	____		***19*** Left Lambdoid	____
	10 Pterion	____		***20*** Left Coronal	____
	11 Sphenofrontal	____			
	12 Inferior Sphenotemporal	____			
	13 Superior Sphenotemporal	____			

Vertebral Annular Epiphyses	***__Cervical__***	***25*** superior	____
		26 inferior	____
	__Thoracic__	***27*** superior	____
		28 inferior	____
	__Lumbar__	***29*** superior	____
		30 inferior	____
Sternal Rib Ends		***31*** ***__3rd rib__***	____
		31 ***__4th rib__***	____
		31 ***__5th rib__***	____

__Clavicle__	***21*** Sternal epiphysis	____
__Sacrum__	***22*** S1/S2 fusion	____
__Os coxa__	***23*** Iliac crest	____
__Cranium__	***24*** Spheno-occipital synch.	____

Estimated Age:
- Subadult (12-18 years) ____
- Young Adult (18-35 years) ____
- Middle Adult (35-50 years) ____
- Old Adult (50+ years) ____

Comments:____

____

Adult Sex Criteria

__Os coxa__	Left	Right	***__Cranium__***	
01 Ventral Arc (1-3)	____	____	***06*** Nuchal Crest (1-5)	____
02 Subpubic Concavity (1-3)	____	____	***07*** Mastoid Process (1-5)	____
03 Ischiopubic Ramus Ridge (1-3)	____	____	***08*** Supraorbital Margin (1-5)	____
			09 Glabella (1-5)	____
04 Greater Sciatic Notch (1-5)	____	____	***__Mandible__***	
05 Preauricular Sulcus (0-4)	____	____	***10*** Mental Eminence (1-5)	____

Estimated Sex, Pelvis (1-5) _____ = ____ Estimated Sex, Skull (1-5) _____ = ____

Comments: ____

____

____

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Form 2B

JUVENILE AGE ASSESSMENT

Epiphyseal Union

element		epiphysis	stage of union left	right
Scapula	***01***	coracoid	____	____
	02	acromium	____	____
Clavicle	***03***	sternal	____	____
Humerus	***04***	head	____	____
	05	distal	____	____
	06	med. epicondyle	____	____
Radius	***07***	proximal	____	____
	08	distal	____	____
Ulna	***09***	proximal	____	____
	10	distal	____	____
Os coxa	***11***	iliac crest	____	____
	12	ischial tuberosity	____	____
Femur	***13***	head	____	____
	14	greater troch.	____	____
	15	lesser troch.	____	____
	16	distal	____	____
Tibia	***17***	proximal	____	____
	18	distal	____	____
Fibula	***19***	proximal	____	____
	20	distal	____	____
Metacarpals	***34***	proximal (1st)	____	
	35	distal (2-5)	____	
Metatarsals	***36***	proximal (1st)	____	
	37	distal (2-5)	____	
C. Phalanges proximal	***38***		____	
T. Phalanges proximal	***39***		____	

Primary Ossification Centers

element		area of union	stage of union
Os coxa	***21***	ilium-pubis	____
	22	ischium-pubis	____
	23	ischium-ilium	____
Sacrum	***24***	1-2	____
	25	2-3	____
	26	3-4	____
	27	4-5	____
Cervical vertebrae			
	28	neural arches to each other	____
	29	neural arches to centrum	____
Thoracic vertebrae			
	30	neural arches to each other	____
	31	neural arches to centrum	____
Lumbar vertebrae			
	32	neural arches to each other	____
	33	neural arches to centrum	____
Cranium			
	40	spheno-occipital synchondrosis	____
	41	occipital: lateral – squama	____
	42	occipital: basilar – lateral	____
Mandible			
	43	mandibular symphysis	____
Cranium			
	44	metopic suture	____

Stage of union: — = unobservable, 0 = open, 1 = partial union, 2 = complete union

Age Assessment:

	Age class	Age range in months or years	
Fetus	____	lunar months	____
Infant (birth – 2 yr)	____	months/years	____
Child (2 – 12 yr)	____	years	____
Subadult (12-18yr)	____	years	____

Comments (criteria used for age assessment):____

____

____

____

____

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Date __________ Site 41NV716 Navarro County Recorder _____

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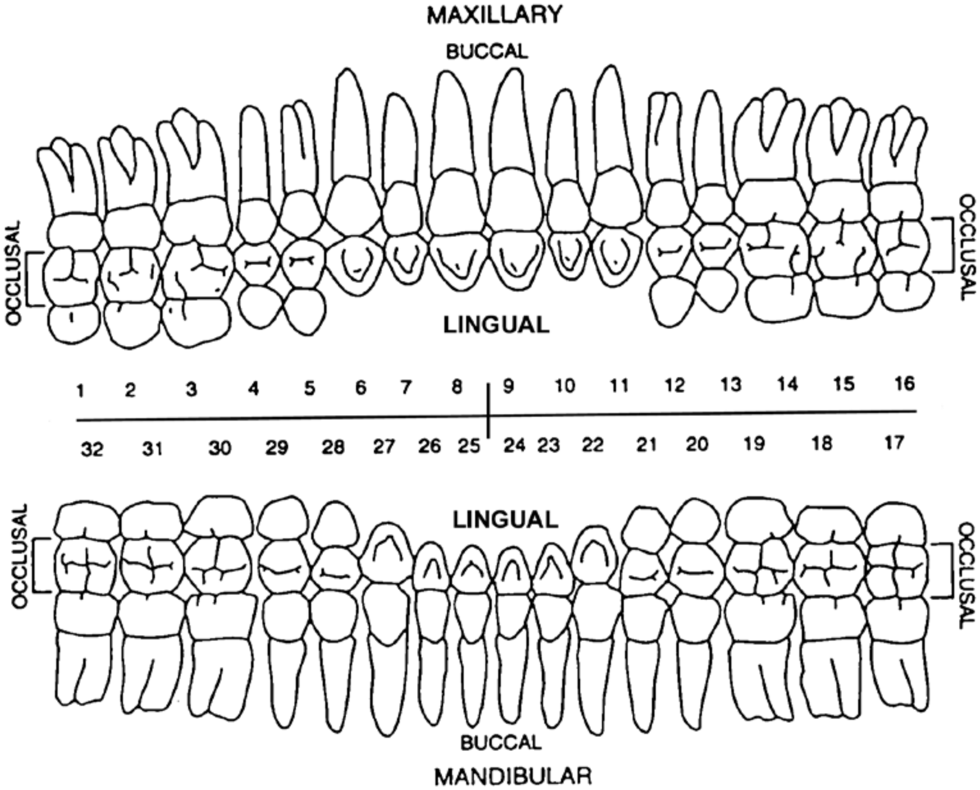
Form 3A

PERMANENT TEETH VISUAL RECORDING FORM

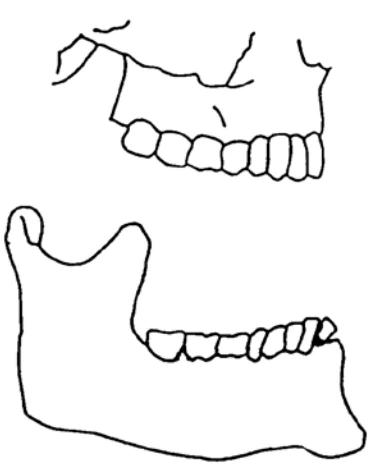
RIGHT

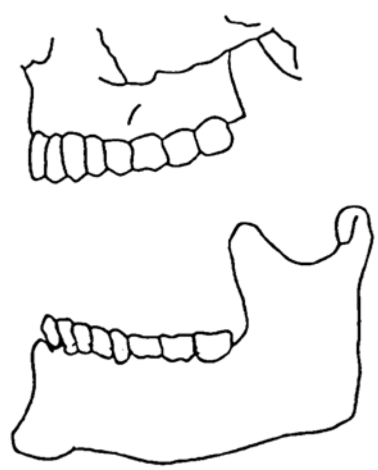


LEFT

Indicate missing alveolar bone on drawings below with cross-hatching

RIGHT Buccal View





LEFT Buccal View

Note: Indicate dental pathologies on the drawings above. Use codes per *Standards.*

Checklist:	Caries	Abscesses	Hypoplasia	Calculus	Periodontal Disease	Hypocalcification	Chipping
present	____	____	____	____	____	____	____
absent	____	____	____	____	____	____	____
unobservable	____	____	____	____	____	____	____

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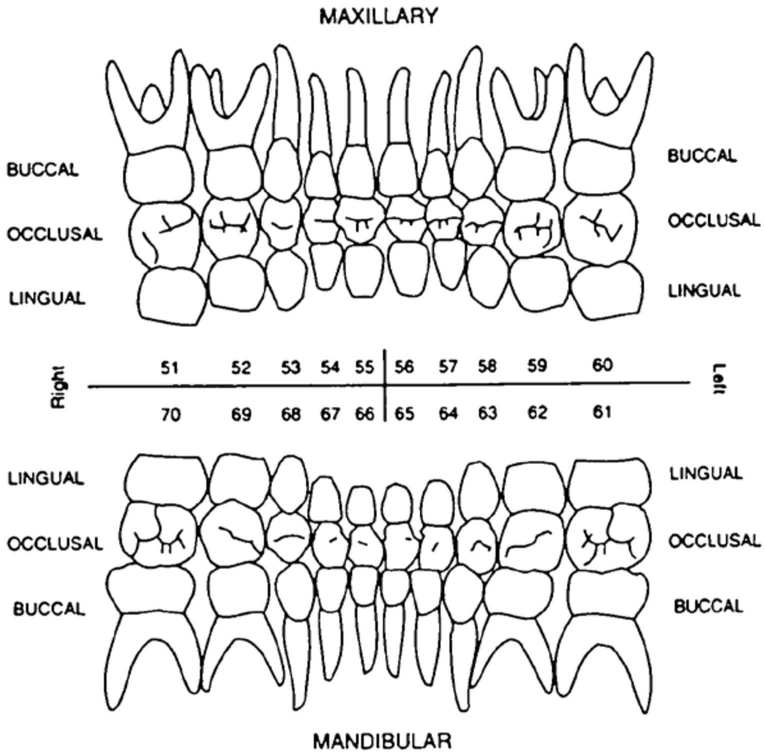
Form 3B

DECIDUOUS TEETH VISUAL RECORDING FORM

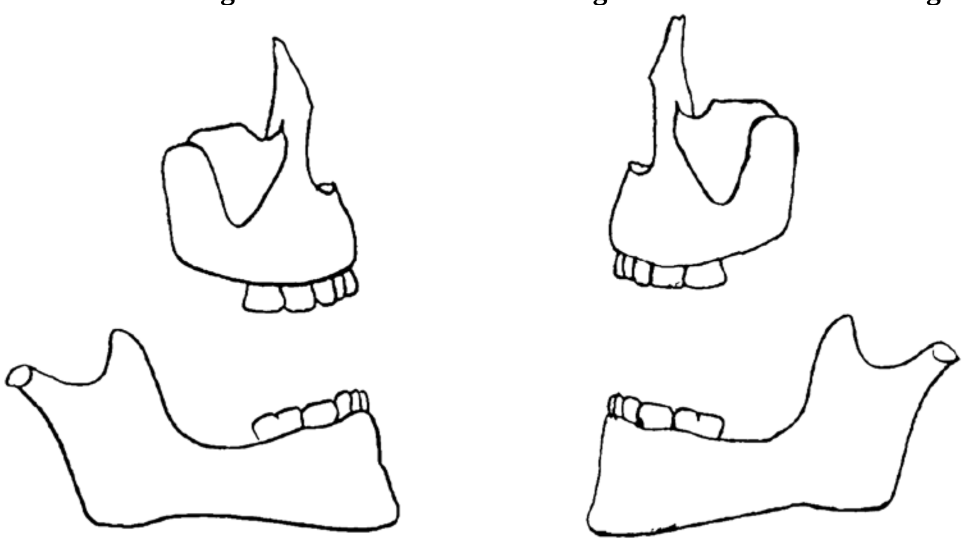
RIGHT



LEFT

Indicate missing alveolar bone on the drawing below with cross-hatching

RIGHT
Buccal View



LEFT
Buccal View

Note: Indicate dental pathologies on the drawings above. Use codes per *Standards*.

Checklist:	Caries	Abscesses	Hypoplasia	Calculus	Periodontal Disease	Hypocalcification	Chipping
present	____	____	____	____	____	____	____
absent	____	____	____	____	____	____	____
unobservable	____	____	____	____	____	____	____

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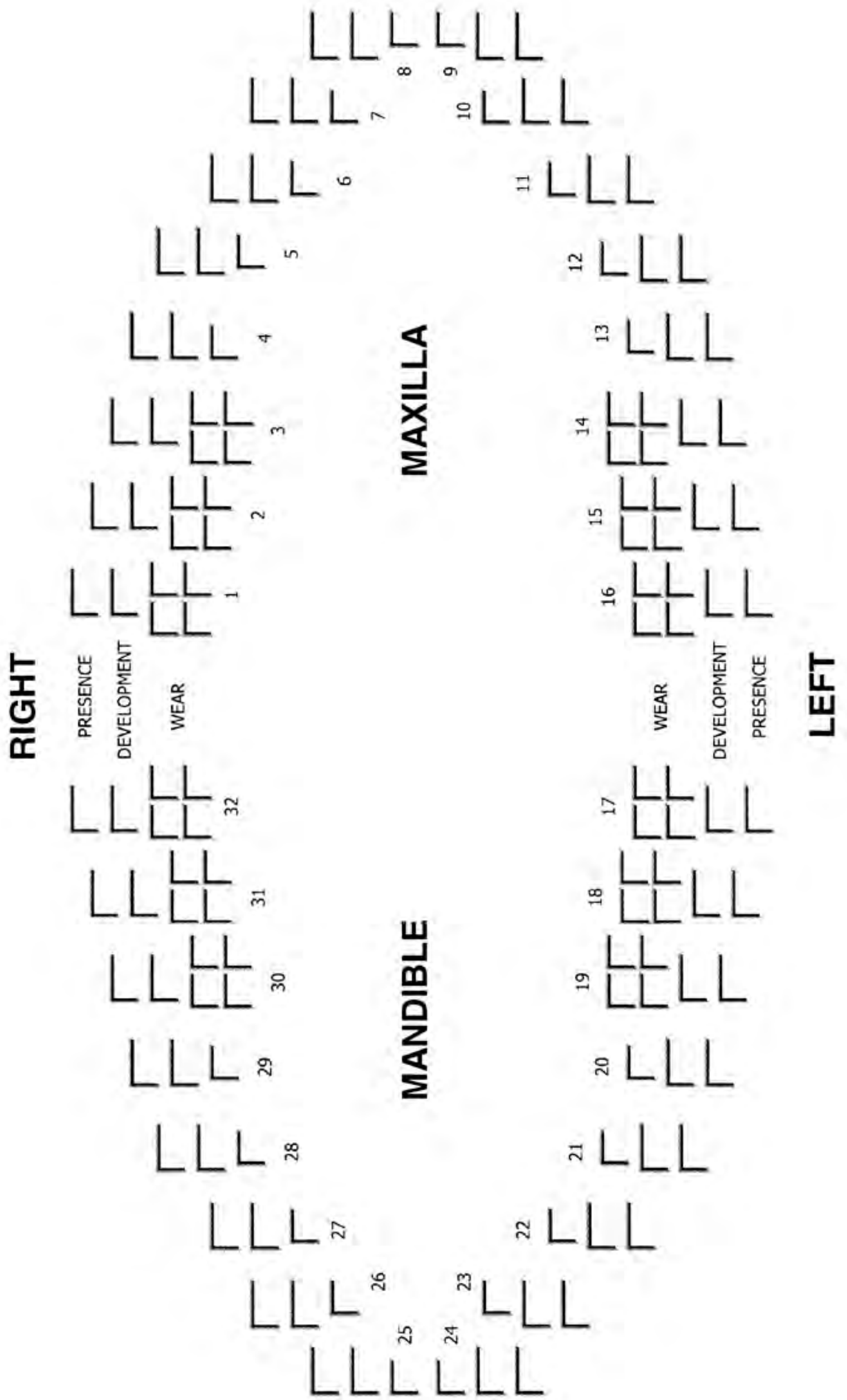
Form 3C

PERMANENT TEETH INVENTORY

Presence, Development, and Wear



OCCLUSION:

CROWDING:

USE WEAR:

GENERAL NOTES:

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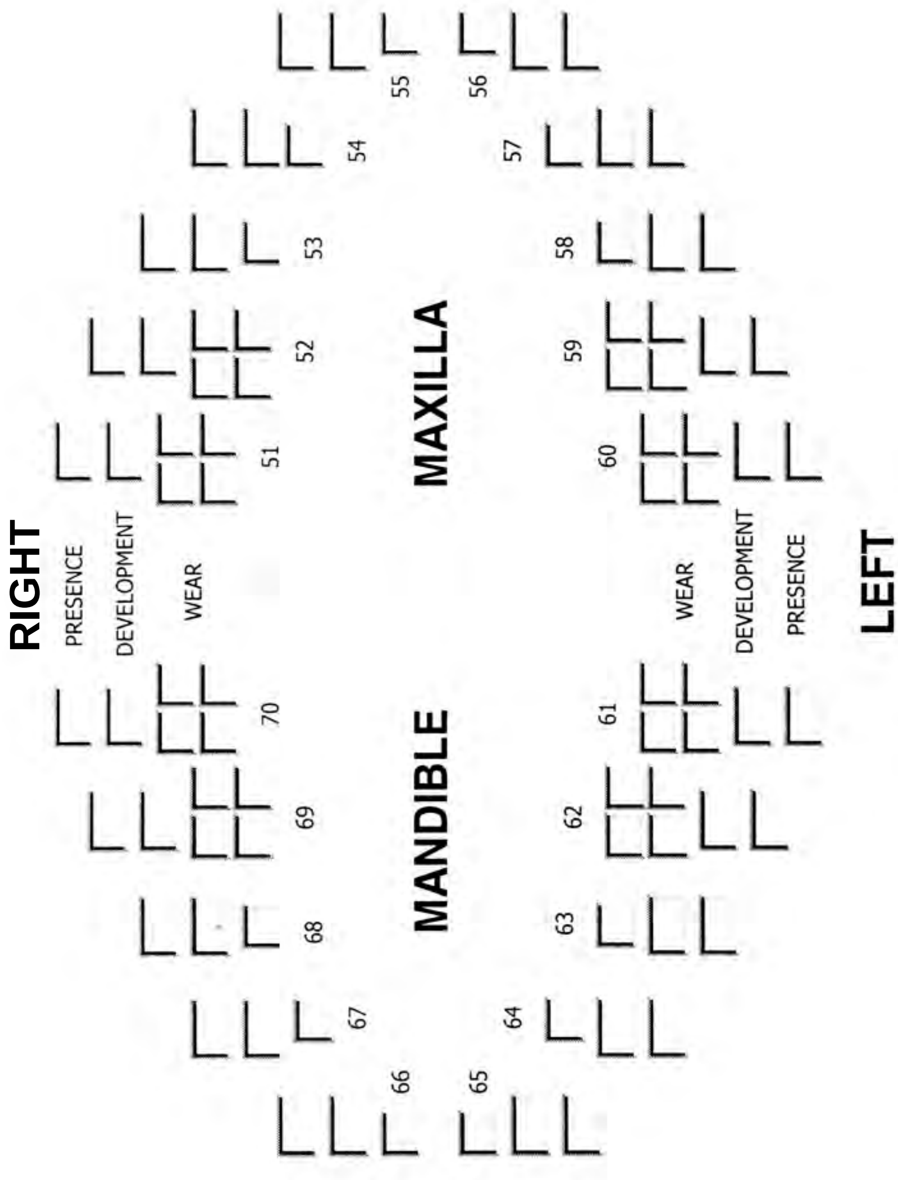
Form 3D

DECIDUOUS TEETH INVENTORY

Presence, Development, and Wear



OCCLUSION:

USE WEAR:

GENERAL NOTES:

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TRWD Richland Chambers Cemetery Mitigation

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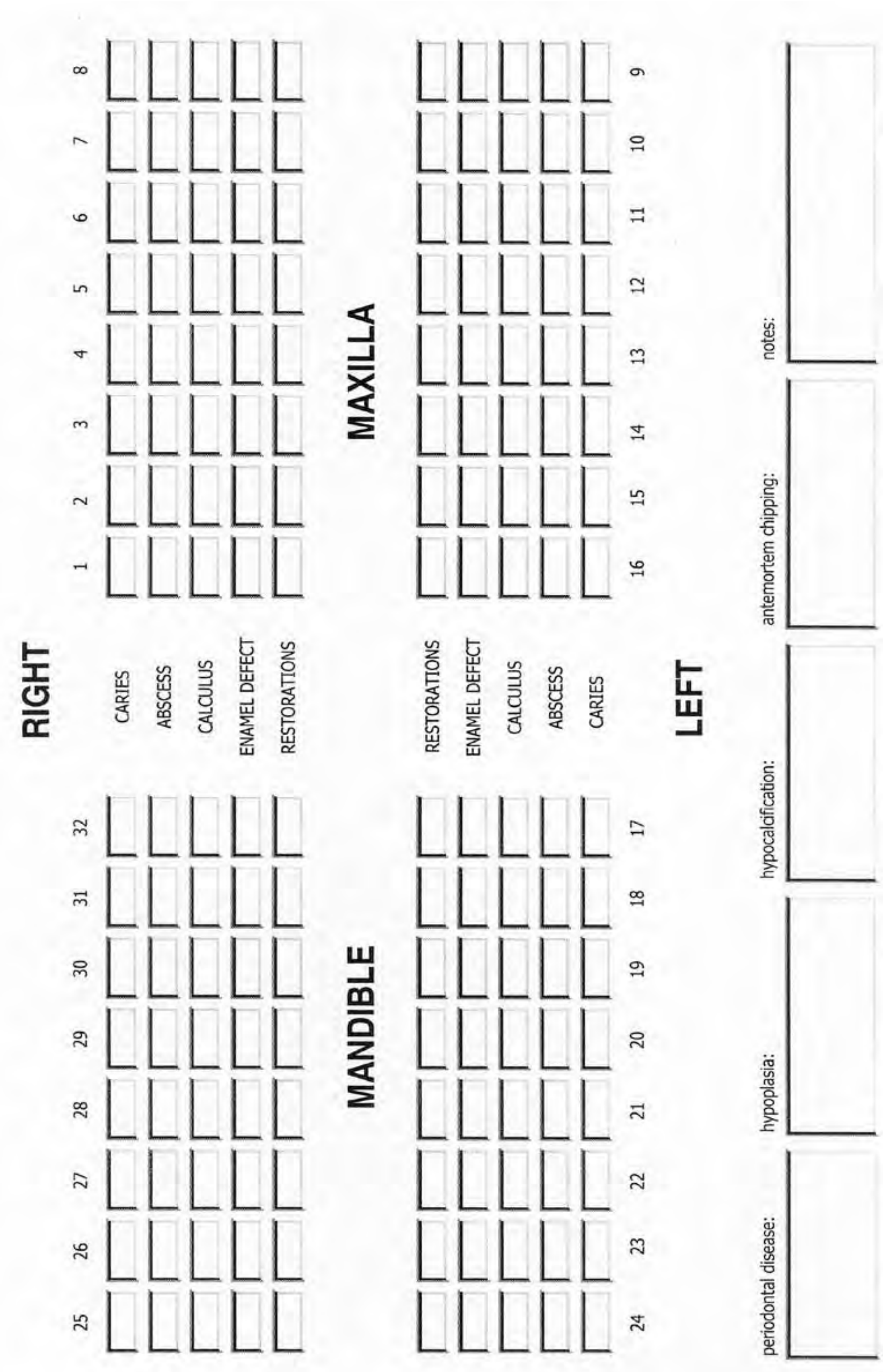
Form 3E

PERMANENT TEETH PATHOLOGY



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Form 3F

DECIDUOUS TEETH PATHOLOGY

RIGHT

MAXILLA

	55	54	53	52	51
CARIES					
ABSCESS					
ENAMEL DEFECT					
RESTORATIONS					

MANDIBLE

	70	69	68	67	66
CARIES					
ABSCESS					
ENAMEL DEFECT					
RESTORATIONS					

LEFT

MAXILLA

	56	57	58	59	60
RESTORATIONS					
ENAMEL DEFECT					
ABSCESS					
CARIES					

MANDIBLE

	61	62	63	64	65
RESTORATIONS					
ENAMEL DEFECT					
ABSCESS					
CARIES					

notes:

antemortem chipping:

hypocalcification:

hypoplasia:

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Form 3G

PERMANENT TEETH METRICS

RIGHT

Maxilla

8 7 6 5 4 3 2 1

9 10 11 12 13 14 15 16

MD MD CERV BL BL CERV HT CEJ

CEJ HT BL CERV BL MD CERV MD

Mandible

32 31 30 29 28 27 26 25

17 18 19 20 21 22 23 24

LEFT

NOTES:

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TRWD Richland Chambers Cemetery Mitigation
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Form 3H

DECIDUOUS TEETH METRICS

RIGHT

Maxilla

	MD	MD CERV	BL	BL CERV	HT
55					
54					
53					
52					
51					

Mandible

	MD	MD CERV	BL	BL CERV	HT
70					
69					
68					
67					
66					

LEFT

Maxilla

	HT	BL CERV	BL	MD CERV	MD
56					
57					
58					
59					
60					

Mandible

	HT	BL CERV	BL	MD CERV	MD
61					
62					
63					
64					
65					

NOTES:

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Form 3J

PERMANENT TEETH MORPHOLOGY

Mandible

RIGHT

32
32 torsomolar ang
32 torsomo dir
32 cong abs
32 groove
32 cusp #
32 dist trig
32 mid trig
32 protostylid
32 cusp 5
32 cusp 6
32 cusp 7
32 root #
32 radical

31
31 groove
31 cusp #
31 dist trig
31 mid trig
31 protostylid
31 cusp 5
31 cusp 6
31 cusp 7
31 root #
31 radical

30
30 ant fovea
30 defl wrink
30 groove
30 cusp #
30 dist trig
30 mid trig
30 protostylid
30 cusp 5
30 cusp 6
30 cusp 7
30 root #
30 radical

29
29 ling cusp
29 odontome
29 radical
29 cong abs

28
28 ling cusp
28 odontome
28 radical
28 Tome's

27
27 DAR
27 root #
27 radical

26
26 shovel
26 dbl shovel
26 radical

25
25 shovel
25 dbl shovel
25 radical
25 cong abs

ectopic eruption

notes

LEFT

24
24 cong abs
24 radical
24 dbl shovel
24 shovel

23
23 radical
23 dbl shovel
23 shovel

22
22 radical
22 root #
22 DAR

21
21 Tome's
21 radical
21 odontome
21 ling cusp

20
20 cong abs
20 radical
20 odontome
20 ling cusp

19
19 radical
19 root #
19 cusp 7
19 cusp 6
19 cusp 5
19 protostylid
19 mid trig
19 dist trig
19 cusp #
19 groove
19 defl wrink
19 ant fovea

18
18 radical
18 root #
18 cusp 7
18 cusp 6
18 cusp 5
18 protostylid
18 mid trig
18 dist trig
18 cusp #
18 groove

17
17 radical
17 root #
17 cusp 7
17 cusp 6
17 cusp 5
17 protostylid
17 mid trig
17 dist trig
17 cusp #
17 groove
17 cong abs
17 torsomo dir
17 torsomolar ang

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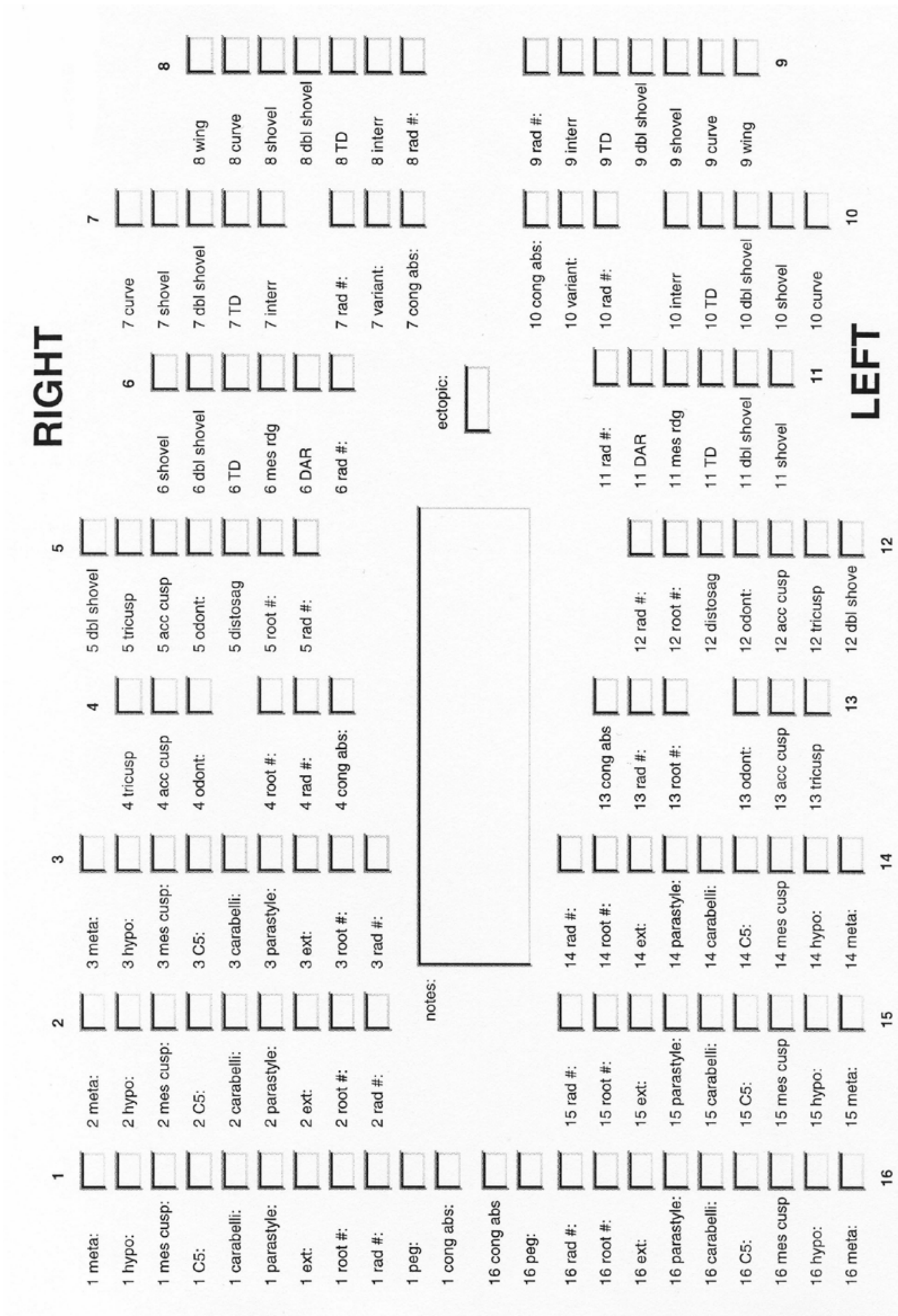
Form 3K

PERMANENT TEETH MORPHOLOGY

Maxilla



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Form 3L

DECIDUOUS TEETH MORPHOLOGY
Mandible

RIGHT

70
70 groove:
70 cusp #:
70 deflect:
70 mid trig:
70 dist trig:
70 protostylid:
70 C5:
70 C6:
70 C7:
70 root #:

69
69 delta:
69 protostylid:

68
68 shovel:
68 root groove:
68 labial deflect
68 double teeth:
68 dist acc:
68 TD:
68 canine form

67
67 shovel:
67 root groove:
67 labial deflect
67 double teeth:

66
66 shovel:
66 root groove:
66 labial deflect
66 double teeth:

notes:

LEFT

65
65 double teeth:
65 labial deflect
65 root groove:
65 shovel:

64
64 double teeth:
64 labial deflect
64 root groove:
64 shovel:

63
63 canine form:
63 TD:
63 dist acc:
63 double teeth:
63 labial deflect
63 root groove:
63 shovel:

62
62 protostylid:
62 delta:

61
61 dist trig:
61 mid trig:
61 deflect:
61 cusp #:
61 groove:
61 root #:
61 C7:
61 C6:
61 C5:
61 protostylid:

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Form 3M

DECIDUOUS TEETH MORPHOLOGY

Maxilla

RIGHT

55
- 55 wing ☐
- 55 shovel ☐
- 55 dbl shovel ☐
- 55 interr gr ☐
- 55 TD ☐
- 55 double teeth ☐
- 55 root groove ☐
- 55 labial deflect ☐

54
- 54 shovel ☐
- 54 dbl shovel ☐
- 54 interr gr ☐
- 54 TD ☐
- 54 double teeth ☐
- 54 root groove ☐
- 54 labial deflect ☐

53
- 53 double teeth ☐
- 53 canine form ☐
- 53 root groove ☐
- 53 labial deflect ☐
- 53 root number ☐
- 53 shovel ☐
- 53 dbl shovel ☐
- 53 DAR ☐
- 53 TD ☐
- 53 c mes rdg ☐

52
- 52 parastyle ☐
- 52 c pattern: ☐
- 52 en ext ☐
- 52 root sheath ☐
- 52 root number ☐

51
- 51 metacone ☐
- 51 hypocone ☐
- 51 C5 ☐
- 51 carabelli ☐
- 51 parastyle ☐
- 51 en ext ☐
- 51 root sheath ☐
- 51 root number ☐

notes

LEFT

56
- 56 labial deflect ☐
- 56 root groove ☐
- 56 double teeth ☐
- 56 TD ☐
- 56 interr gr ☐
- 56 dbl shovel ☐
- 56 shovel ☐
- 56 wing ☐

57
- 57 labial deflect ☐
- 57 root groove ☐
- 57 double teeth ☐
- 57 TD ☐
- 57 interr gr ☐
- 57 dbl shovel ☐
- 57 shovel ☐

58
- 58 root number ☐
- 58 labial deflec ☐
- 58 root groove ☐
- 58 canine form ☐
- 58 double teeth ☐
- 58 c mes rdg ☐
- 58 TD ☐
- 58 DAR ☐
- 58 dbl shovel ☐
- 58 shovel ☐

59
- 59 root number ☐
- 59 root sheath ☐
- 59 en ext ☐
- 59 c pattern: ☐
- 59 parastyle ☐

60
- 60 root number ☐
- 60 root sheath ☐
- 60 en ext ☐
- 60 parastyle ☐
- 60 carabelli ☐
- 60 C5 ☐
- 60 hypocone ☐
- 60 metacone ☐

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Form 4A

CRANIAL MEASUREMENTS

All measurements are in **millimeters**. * indicates that measurement is approximate

ADULTS:

Cranium

01	max. cranial length	_____
02	max. cranial breadth	_____
03	bizygomatic diameter	_____
04	basion-bregma height	_____
05	cranial base length	_____
06	basion-prosthion length	_____
07	maxillo-alveolar breadth	_____
08	maxillo-alveolar length	_____
09	biauricular breadth	_____
10	upper facial height	_____
11	minimum frontal breadth	_____
12	upper facial breadth	_____
13	nasal height	_____
14	nasal breadth	_____
15	orbital breadth	_____
16	orbital height	_____
17	biorbital breadth	_____
18	interorbital breadth	_____
19	frontal chord	_____
20	parietal chord	_____
21	occipital chord	_____
22	foramen magnum length	_____
23	foramen magnum breadth	_____
24	mastoid length	_____

Mandible

25	chin height	_____
26	mandibular body height	_____
27	mandibular body breadth	_____
28	bigonial width	_____
29	bicondylar breadth	_____
30	minimum ramus breadth	_____
31	maximum ramus breadth	_____
32	maximum ramus height	_____
33	mandibular length	_____
34	mandibular angle	_____

NONSTANDARD INTERORBITAL FEATURES

Cranium

01A	naso-maxillo frontal subtense	_____
01B	maxillofrontal breadth	_____
01C	maxillofrontal index ($^{1A}/_{1B}$) =	_____
02A	naso-zygoorbital subtense	_____
02B	zygoorbital breadth	_____
02C	zygoorbital index ($^{2A}/_{2B}$) =	_____
03A	naso-alpha subtense	_____
03B	alpha chord	_____
03C	alpha index ($^{3A}/_{3B}$) =	_____

JUVENILES: Cranium

		left	**mid**	**right**
01a	lesser wing of ***sphenoid*** length	_____		_____
01b	lesser wing of ***sphenoid*** width	_____		_____
02a	greater wing of ***sphenoid*** length	_____		_____
02b	greater wing of ***sphenoid*** width	_____		_____
03a	body of ***sphenoid*** length		_____	
03b	body of ***sphenoid*** width		_____	
04a	***temporal*** petrous portion length	_____		_____
04b	***temporal*** petrous portion width	_____		_____
05a	basilar part of ***occipital*** length		_____	
05b	basilar part of ***occipital*** width		_____	

		left	**right**
06a	***zygomatic*** length	_____	_____
06b	***zygomatic*** width	_____	_____
07a	***maxilla*** length	_____	_____
07b	***maxilla*** height	_____	_____
07c	***maxilla*** width	_____	_____
08a	***mandible*** body length	_____	_____
08b	***mandible*** width of arc	_____	_____
08c	½ ***mandible*** full length	_____	_____

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TRWD Richland Chambers Cemetery Mitigation

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Form 4B

POSTCRANIAL MEASUREMENTS

All measurements are in **millimeters**. * indicates that measurement is approximate

ADULTS:

		left	right			left	right
35	Clavicle: maximum length	____	____	***57***	Os Coxa: iliac breadth	____	____
36	Clavicle: A-P dia. at midshaft	____	____	***58***	Os Coxa: pubis length	____	____
37	Clavicle: Sup-Inf dia. at midshaft	____	____	***59***	Os Coxa: ischium length	____	____
38	Scapula: height	____	____	***60***	Femur: maximum length	____	____
39	Scapula: breadth	____	____	***61***	Femur: bicondylar length	____	____
40	Humerus: maximum length	____	____	***62***	Femur: epicondylar breadth	____	____
41	Humerus: epicondylar breadth	____	____	***63***	Femur: max. dia. of head	____	____
42	Humerus: vertical dia. of head	____	____	***64***	Femur: A-P subtrochanteric	____	____
43	Humerus: max. dia. at midshaft	____	____	***65***	Femur: M-L subtrochanteric	____	____
44	Humerus: min. dia. at midshaft	____	____	***66***	Femur: A-P midshaft dia.	____	____
45	Radius: maximum length	____	____	***67***	Femur: M-L midshaft dia.	____	____
46	Radius: A-P dia. at midshaft	____	____	***68***	Femur: midshaft circum.	____	____
47	Radius: M-L dia. at midshaft	____	____	***69***	Tibia: length	____	____
48	Ulna: maximum length	____	____	***70***	Tibia: max. prox. epi. breadth	____	____
49	Ulna: A-P diameter	____	____	***71***	Tibia: max. dist. epi. breadth	____	____
50	Ulna: M-L diameter	____	____	***72***	Tibia: max. dia. at foramen	____	____
51	Ulna: physiological length	____	____	***73***	Tibia: med-lat. dia. at foramen	____	____
52	Ulna: minimum circumference	____	____	***74***	Tibia: circum. at foramen	____	____
53	Sacrum: anterior length	____		***75***	Fibula: maximum length	____	____
54	Sacrum: anterior superior breadth	____		***76***	Fibula: max midshaft dia.	____	____
55	Sacrum: max. trans. dia. of base	____		***77***	Calcaneus: maximum length	____	____
56	Os Coxa: height	____	____	***78***	Calcaneus: middle breadth	____	____

JUVENILES:

		left	right			left	right
09a	Clavicle length	____	____	***15a***	Ulna length	____	____
09b	Clavicle diameter	____	____	***15b***	Ulna diameter	____	____
10a	Scapula length (ht)	____	____	***16a***	Radius length	____	____
10b	Scapula width	____	____	***16b***	Radius diameter	____	____
10c	Scapula spine length	____	____	***17a***	Femur length	____	____
11a	Ilium length	____	____	***17b***	Femur width	____	____
11b	Ilium width	____	____	***17c***	Femur diameter	____	____
12a	Ischium length	____	____	***18a***	Tibia length	____	____
12b	Ischium width	____	____	***18b***	Tibia diameter	____	____
13a	Pubis length	____	____	***19a***	Fibula length	____	____
14a	Humerus length	____	____	***19b***	Fibula diameter	____	____
14b	Humerus width	____	____	***14c***	Humerus diameter	____	____

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Form 5A

EPIGENETIC TRAITS

Cranium

	L	M	R
***01* Metopic suture:** 0 = absent; 1 = partial; 2 = complete; 9 = unobservable		___	
***02* Supraorbital structures:**			
***a.* Supraorbital notch:** 0 = absent; 1 = present, < ½ occluded by spicules; 2 = present, > ½ occluded by spicules; 3 = present, degree of occlusion unknown; 4 = multiple notches; 9 = unobservable	___		___
***b.* Supraorbital foramen:** 0 = absent; 1 = present; 2 = multiple foramina; 9 = unobservable	___		___
***03* Infraorbital suture:** 0 = absent; 1 = present; 2 = complete; 9 = unobservable	___		___
***04* Multiple infraorbital foramina:** 0 = absent; 1 = internal division only; 2 = two distinct foramina; 3 = more than two distinct foramina; 9 = unobservable	___		___
***05* Zygomatico-facial foramina:** 0 = absent; 1 = 1 large; 2 = 1 large plus smaller f.; 3 = 2 large; 4 = 2 large plus smaller f.; 5 = 1 small; 6 = multiple small; 9 = unobservable	___		___
***06* Parietal foramen:** 0 = absent; 1 = present, on parietal; 2 = present, sutural; 9 = unobservable	___		___
***07* Sutural bones:** 0 = absent, 1 = present, 9 = unobservable			
***a*. epipteric bone**	___		___
***b*. coronal ossicle**	___		___
***c*. bregmatic bone**		___	
***d*. sagittal ossicle**		___	
***e*. apical bone**		___	
***f*. lambdoid ossicle**	___		___
***g*. asterionic bone**	___		___
***h*. ossicle in occipito-mastoid suture**	___		___
***i*. parietal notch bone**	___		___
***08* Inca bone:** 0 = absent; 1 = complete, single bone; 2 = bipartite; 3 = tripartite; 4 = partial; 9 = unobservable		___	
***09* Condylar canal:** 0 = not patent; 1 = patent; 9 = unobservable	___		___
***10* Divided hypoglossal canal:** 0 = absent; 1 = partial, internal surface; 2 = partial, within canal; 3 = complete, internal surface; 4 = complete, within canal; 9 = unobservable	___		___
***11* Flexure of superior sagittal sulcus:** 1 = right; 2 = left; 3 = bifurcate; 9 = unobservable		___	
***12* Foramen ovale incomplete:** 0 = absent; 1 = partial formation; 2 = no definition of foramen; 9 = unobservable	___		___
***13* Foramen spinosum Incomplete:** 0 = absent; 1 = partial formation; 2 = no definition of foramen; 9 = unobservable	___		___

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Form 5B

EPIGENETIC TRAITS (cont.)

L M R

14 **Pterygo-spinous bridge:** ___ ___
- 0 = absent
- 1 = trace (spicule only)
- 2 = partial bridge
- 3 = complete bridge
- 9 = unobservable

15 **Pterygo-alar bridge:** ___ ___
- 0 = absent
- 1 = trace (spicule only)
- 2 = partial bridge
- 3 = complete bridge
- 9 = unobservable

16 **Tympanic dehiscence:** ___ ___
- 0 = absent
- 1 = foramen only
- 2 = full defect present
- 9 = unobservable

17 **Auditory exostosis:** ___ ___
- 0 = absent
- 1 = < 1/3 canal occluded
- 2 = 1/3-2/3 canal occluded
- 3 = > 2/3 canal occluded
- 9 = unobservable

18 **Mastoid foramen:**

***a*. Location:** ___ ___
- 0 = absent
- 1 = temporal
- 2 = sutural
- 3 = occipital
- 4 = both sutural and temporal
- 5 = both occipital and temporal
- 9 = unobservable

***b*. Number:** ___ ___
- 0 = absent
- 1 = 1
- 2 = 2
- 3 = more than 2
- 9 = unobservable

Mandible

19 **Mental foramen:** ___ ___
- 0 = absent
- 1 = 1
- 2 = 2
- 3 = more than 2
- 9 = unobservable

20 **Mandibular torus:** ___ ___
- 0 = absent
- 1 = trace (can palpate but not see)
- 2 = moderate: elevation between 2-5 mm.
- 3 = marked: elevation greater than 5 mm.
- 9 = unobservable

21 **Mylohyoid bridge:**

***a*. Location:** ___ ___
- 0 = absent
- 1 = near mandibular foramen
- 2 = center of groove
- 3 = both bridges described in 1) and 2), with hiatus
- 4 = both bridges described in 1) and 2), no hiatus
- 9 = unobservable

***b*. Degree:** ___ ___
- 0 = absent
- 1 = partial
- 2 = complete
- 9 = unobservable

1st Cervical Vertebra

22 **Atlas Bridging:**

***a*. Lateral bridging:** ___ ___
- 0 = absent
- 1 = partial
- 2 = complete
- 9 = unobservable

***b*. Posterior bridging:** ___ ___
- 0 = absent
- 1 = partial
- 2 = complete
- 9 = unobservable

7th Cervical Vertebra

23 **Accessory Transverse Foramina in 7th cervical vertebra:** ___ ___
- 0 = absent
- 1 = partial
- 2 = complete
- 9 = unobservable

Humerus (Left element & Right element)

24 **Septal aperture:** ___ ___
- 0 = absent
- 1 = small foramen (pinhole) only
- 2 = true perforation
- 9 = unobservable

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Form 5C

EPIGENETIC TRAITS (cont.)

Cranium

25 **Keeling:** _____
0 = absent
1 = present
9 = unobservable

26 **Post bregmatic depression:** _____
0 = absent
1 = present
9 = unobservable

27 **Inion hook:** _____
0 = absent
1 = present
9 = unobservable

28 **Base chord:** _____
1 = ba-op < ba-pr
2 = ba-op = ba-pr
3 = ba-op > ba-pr
9 = unobservable

29 **Base angle:** _____
1 = high
2 = low
9 = unobservable

30 **Venous markings (frontal):** _____
0 = absent
1 = present
9 = unobservable

31 **Sutures:** _____
1 = simple
2 = medium
3 = complex
9 = unobservable

32 **Vault height:** _____
1 = high
2 = low
9 = unobservable

33 **OsJaponicum:** _____
0 = absent
1 = present
9 = unobservable

34 **Orbital shape:** _____
1 = rounded
2 = rectangular
3 = sloping
9 = unobservable

35 **Projection of lower border of orbit:** _____
1 = projecting
2 = vertical
3 = retreating
9 = unobservable

36 **Zygomatic projection (at nasal aperture):** _____
1 = projecting
2 = intermediate
3 = retreating
9 = unobservable

37 **Inferior projection of zygomatic/maxilla:** _____
0 = absent
1 = present
9 = unobservable

38 **Zygomatic posterior tubercle:** _____
0 = absent
1 = present
9 = unobservable

39 **Canine fossa:** _____
0 = absent
1 = present
9 = unobservable

40 **Alveolar prognathism:** _____
0 = none
1 = medium
2 = large
9 = unobservable

41 **Nasal aperture:** _____
1 = narrow
2 = medium
3 = wide
9 = unobservable

42 **Nasal depression:** _____
1 = straight
2 = depressed
3 = deeply depressed
9 = unobservable

43 **Nasal form:** _____
1 = steeple
2 = tented
3 = “quonset hut”
9 = unobservable

44 **Nasal overgrowth:** _____
0 = absent
1 = present
9 = unobservable

EPIGENETIC TRAITS (cont.)

***45* Nasal spine:**
0 = absent _____
1 = small
2 = large
9 = unobservable

***46* Nasal sill:**
0 = guttered _____
1 = blurred
2 = shallow
3 = high
9 = unobservable

***47* Palatine torus:**
0 = absent _____
1 = slight
2 = marked
9 = unobservable

***48* Palatine suture:**
1 = straight _____
2 = anterior convexity
3 = posterior convexity
9 = unobservable

***49* Dental arcade:**
1 = parabolic _____
2 = elliptic
3 = hyperbolic
9 = unobservable

Mandible

***50* Chin shape:**
1 = pointed _____
2 = blunt
3 = bilobate
9 = unobservable

***51* Mandible lower border:**
1 = straight _____
2 = rocker
3 = undulating
9 = unobservable

***52* Ascending ramus shape:**
1 = wide _____
2 = pinched
9 = unobservable

***53* Gonion:**
1 = inverted _____
2 = straight
3 = everted
9 = unobservable

Cranium

***54* External auditory meatus shape:**
1 = round _____
2 = elliptic
9 = unobservable

***55* Oval window:**
0 = not visible _____
1 = visible
9 = unobservable

***56* Inferior collar:**
0 = absent _____
1 = present
9 = unobservable

***57* Zygomaticomaxillary suture:**
1 = curved _____
2 = angled
9 = unobservable

***58* Face shape:** _____
1 = broad
2 = intermediate
3 = narrow
9 = unobservable

5th Metatarsal (left element & Right element)

***59* Persistent 5th metatarsal apophysis:**
0 = absent ___ ___
1 = present
9 = unobservable

Navicular (Left element & Right element)

***60* Accessory navicular (os tibiale externum):**
0 = absent ___ ___
1 = Type I
2 = Type II
3 = Type III
9 = unobservable

Calcaneus (Left element & Right element)

61 Os calcaneus secundarius:
0 = absent ___ ___
1 = present
9 = unobservable

Talus (Left element & Right element*)*

62 Os trigonum:
0 = absent ___ ___
1 = present
9 = unobservable

EPIGENETIC TRAITS (cont.)

Scapula (Left element & Right element)

63 Os acromiale:

0 = absent ___ ___
1 = present
2 = partial
9 = unobservable

3rd Metatarsal and 3rd Cuneiform (L & R elements)

***64* Tarsal coalition (3rd metatarsal–cuneiform):**

0 = absent ___ ___
1 = present non-osseus
2 = present osseus
9 = unobservable

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Form 5F

ANCESTRY DETERMINATION

(check all that apply):

☐ **EUROPEAN** ☐ **AFRICAN**
☐ **ASIAN** ☐ **HISPANIC**
☐ **NATIVE AMERICAN** ☐ **INDETERMINATE**

NOTES: ____

CRANIAL DEFORMATION

GENERAL CATEGORY: ___________
1. Tabular
2. Circumferential
3. Other (describe)

POSTERIOR ASPECT

Cranial deformation present: ___________________
1. yes
2. no

Pressure was centered at: _____________________
1. Lambda
2. Squamous portion of occipital
3. Below inion

Plane of pressure in relationship to transverse plane: _______________________
1. Perpendicular (90°)
2. Obtuse (>90°)

Are any of the following present? ________________
1. Sagittal elevation
2. Lambdic elevation
3. Lambdic depression

Pad impressions: ___________________________
0. No pad impressions
1. One pad
2. Two pads
3. More than two pads

Pad location: ______________________________
1. Midline
2. Symmetrically lateral to midline
3. Asymmetrically left
4. Asymmetrically right

Pad shape: _______________________________
1. Circular or oval
2. Donut-shaped
3. Triangular
4. Irregular form
5. Not observable

Impression of bindings visible: ________________
1. Yes (describe below)
2. No

ANTERIOR ASPECT

Cranial deformation present: __________________ 1. Yes
2. No

Pad location: ______________________________
1. High, near coronal suture
2. Low, near or below frontal boss

Symmetrical reshaping? _____________________
1. Yes
2. No, right side more deformed
3. No, left side more deformed

Bregmatic elevation? _______________________
1. Yes
2. No

Pad impressions: ___________________________
0. No pad impressions
1. One pad
2. Two pads
9. Not observable

Pad location: _____________________________
1. Midline
2. Symmetrically lateral to midline
3. Asymmetrically left
4. Asymmetrically right

Pad shape: _______________________________
1. Circular or oval
2. Donut-shaped
3. Triangular
4. Irregular form
5. Not observable

Impression of bindings visible: _______________
1. Yes (describe below)
2. No

Post-coronal depression present? ____________
1. Yes
2. No

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Form 7

PATHOLOGY CHECKLIST

Cranial	present	absent	unobservable
Porotic hyperostosis	____	____	____
Cribra orbitalia	____	____	____
Premature synostosis	____	____	____
osteomas	____	____	____
periosteal reaction	____	____	____
lytic reactions	____	____	____
proliferative reactions	____	____	____
trauma	____	____	____
cultural modifications	____	____	____

Axial	present	absent	unobservable
ankylosis	____	____	____
arch defects	____	____	____
compression fractures	____	____	____
Schmorl’s nodes	____	____	____
periosteal reactions	____	____	____
lytic reactions	____	____	____
osteoporosis	____	____	____
proliferative reactions	____	____	____
trauma	____	____	____
reaction on visceral aspect of ribs	____	____	____
accessory facets	____	____	____

Appendicular	present	absent	unobservable
periosteal reaction	____	____	____
lytic reactions	____	____	____
proliferative reactions	____	____	____
osteoporosis	____	____	____
trauma	____	____	____
cultural modifications	____	____	____
osteomyelitis	____	____	____
exostoses	____	____	____
accessory facets	____	____	____

Extremities	present	absent	unobservable
lytic reactions	____	____	____
proliferative reactions	____	____	____
periosteal reactions	____	____	____
trauma	____	____	____
exostoses	____	____	____
accessory facets	____	____	____

All			
devel. defect	____	____	____
heritable trait	____	____	____
unknown etiology	____	____	____

Notes: ____

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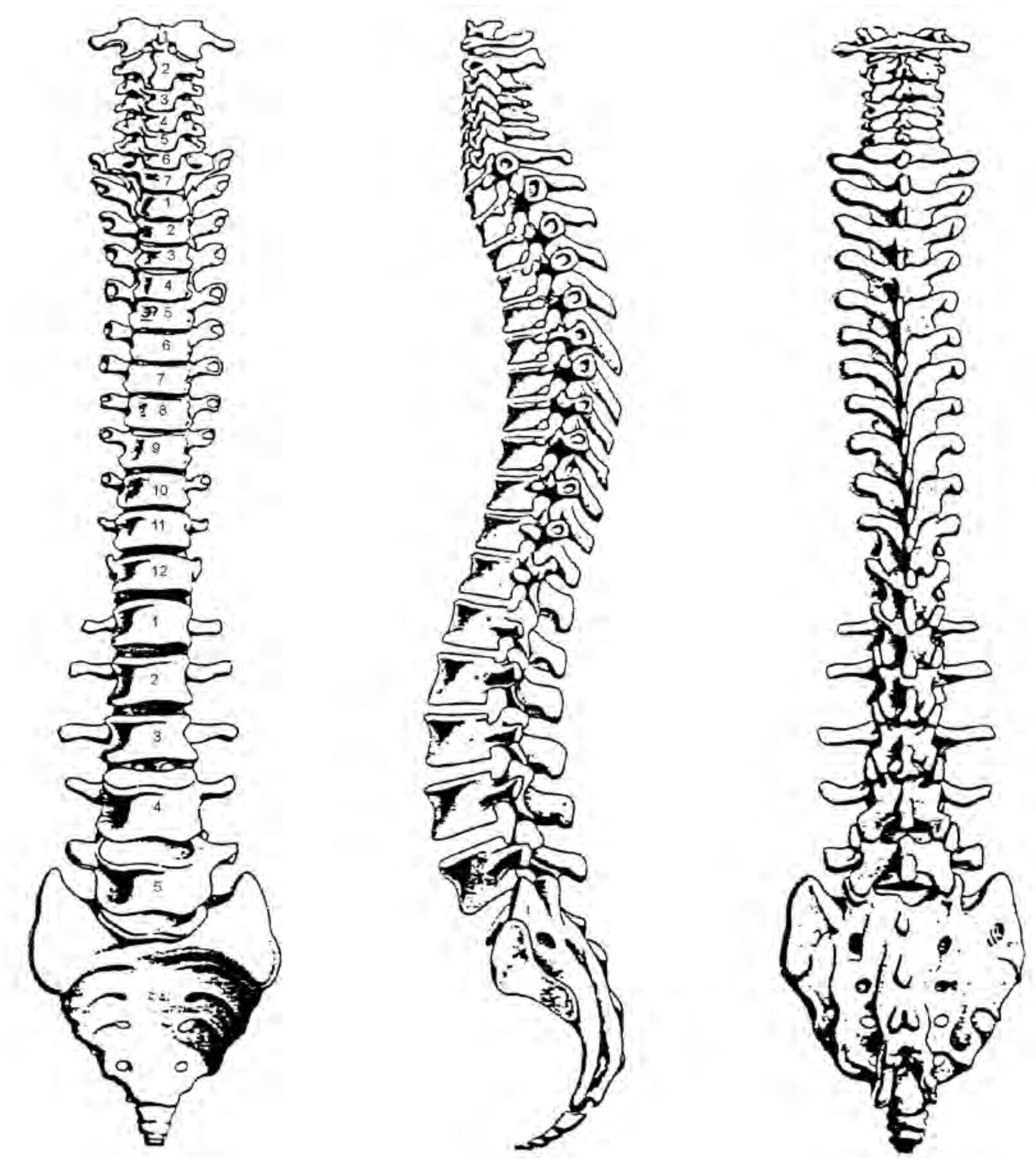
Form 8

SPINAL OSTEOPHYTOSIS



Osteophytosis - stages 0-4 (Ubelaker 1999)

Category	Superior Surface	Inferior Surface
Cervical	________	________
Thoracic	________	________
Lumbar	________	________

Notes: ____

____

____

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Form 9

DEGENERATIVE JOINT DISEASE

SKULL

element	left	right
TMJ	____	____
Mand. condyles	____	____
Occip. Condyles	____	____

SHOULDER

Scapula		
glenoid	____	____
acromium	____	____
Clavicle		
medial	____	____
lateral	____	____
Prox. Humerus	____	____

FINGERS AND TOES

element	L prox.	L distal /	R prox	R distal
C. proximal	____	____	____	____
C. middle	____	____	____	____
C. distal	____		____	
T. proximal	____	____	____	____
T. middle	____	____	____	____
T. distal	____		____	

KNEES

element	left	right
Dist. Femur	____	____
Prox. Tibia	____	____
Prox. Fibula	____	____
Patella	____	____

ELBOW

element	left	right
Dist. Humerus	____	____
Prox. Radius	____	____
Prox. Ulna	____	____

WRIST

element	left	right
Dist. Radius	____	____
Dist. Ulna	____	____
Carpals	____	____
Metacarpals	____	____

HIP

element	left	right
Acetabulum	____	____
Femoral head	____	____

ANKLES

element	left	right
Dist. Tibia	____	____
Dist. Fibula	____	____
Calcaneus	____	____
Other tarsals	____	____
Metatarsals	____	____

Stages of DJD from Ubelaker (1999): a = normal articular surface; b= appearance of small deposits of bone on articular margins; c= small pits; d= polishing/eburnation; e= other (describe below)

Add an asterisk (*) if the joint surface is fragmentary

____

____

____

VERTEBRAL ARTICULAR FACETS

DJD - stages a-d (Ubelaker 1999)

Category	Superior Left	Superior Right	Inferior Left	Inferior Right
Cervical	____	____	____	____
Thoracic	____	____	____	____
Lumbar	____	____	____	____
Sacral	____	____		

Remodeling – stages 0–3 (Deverenski 2000)

Category	Superior Left	Superior Right	Inferior Left	Inferior Right
Cervical	____	____	____	____
Thoracic	____	____	____	____
Lumbar	____	____	____	____
Sacral	____	____		

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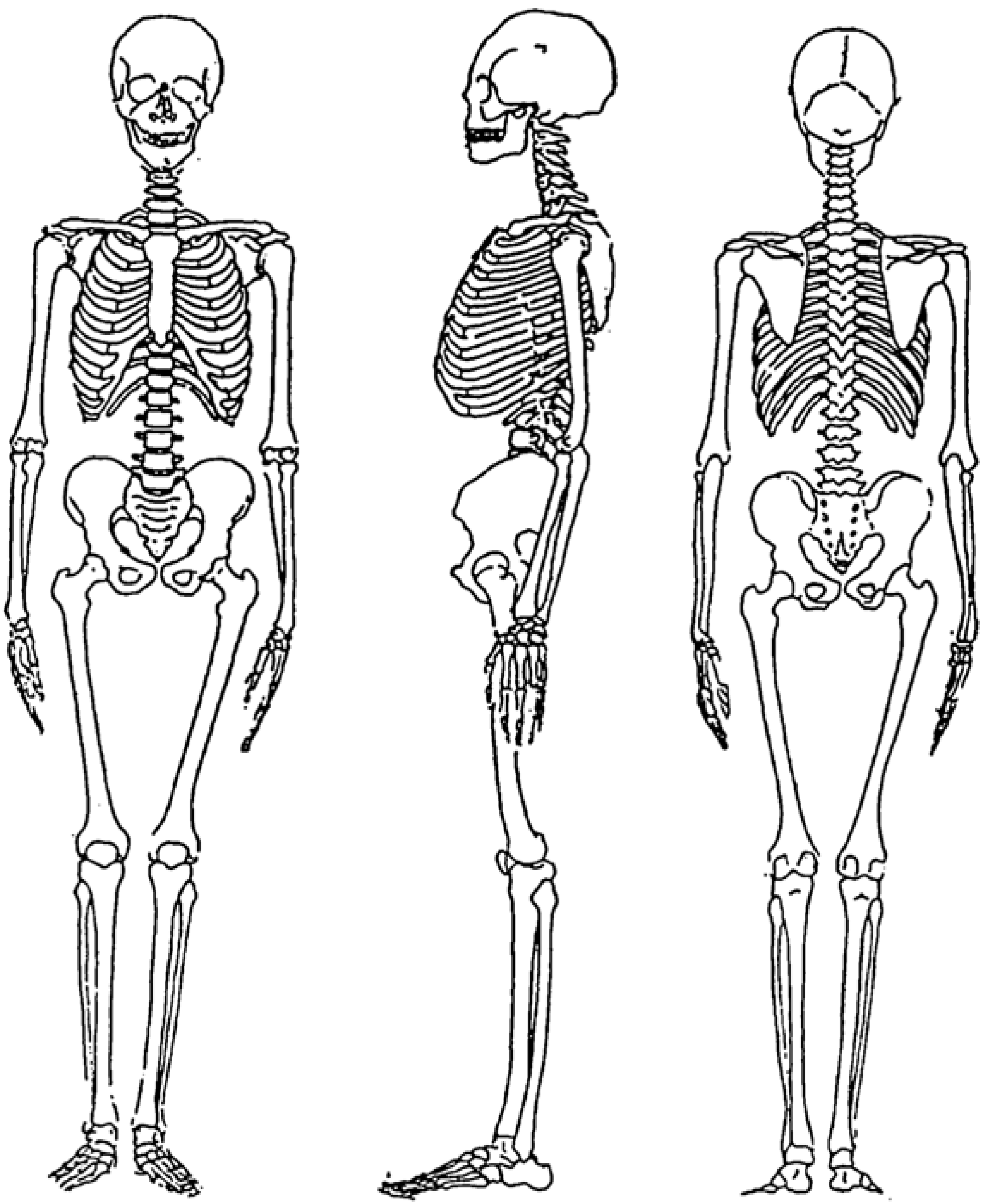
Form 10

ADULT SKELETON



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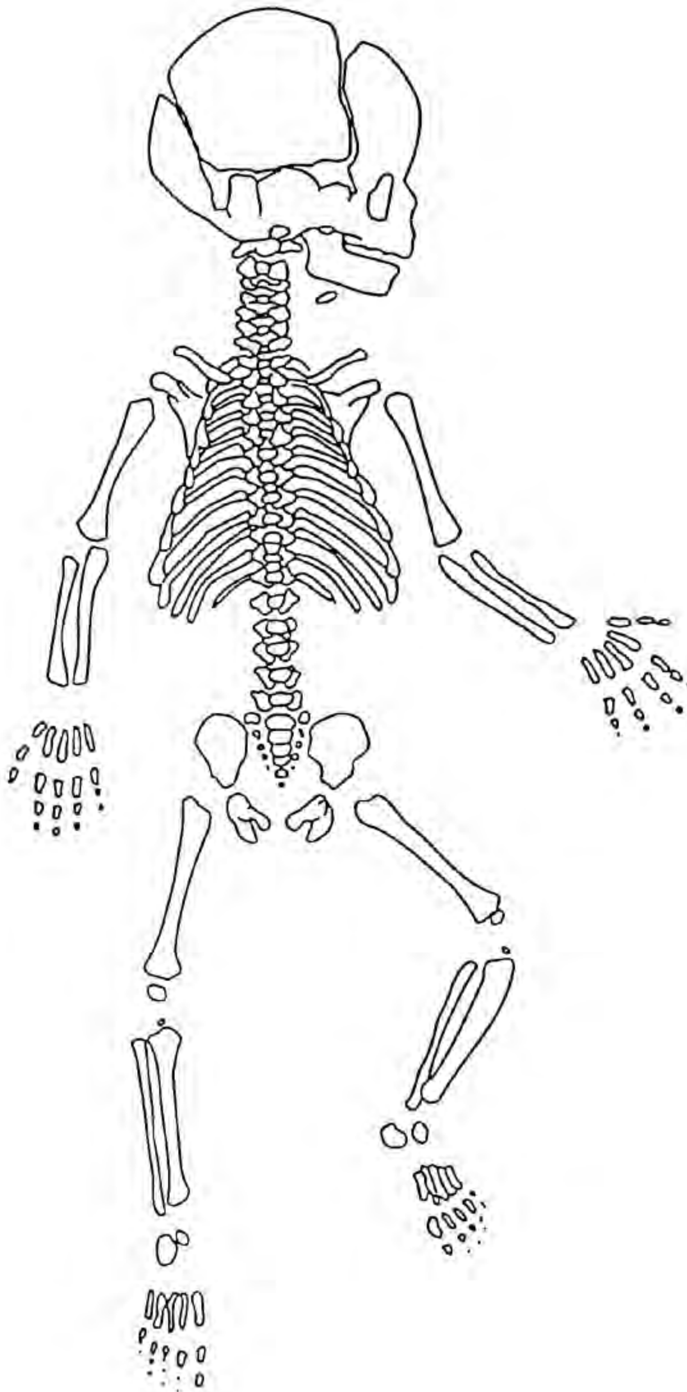
Form 11A

INFANT SKELETON



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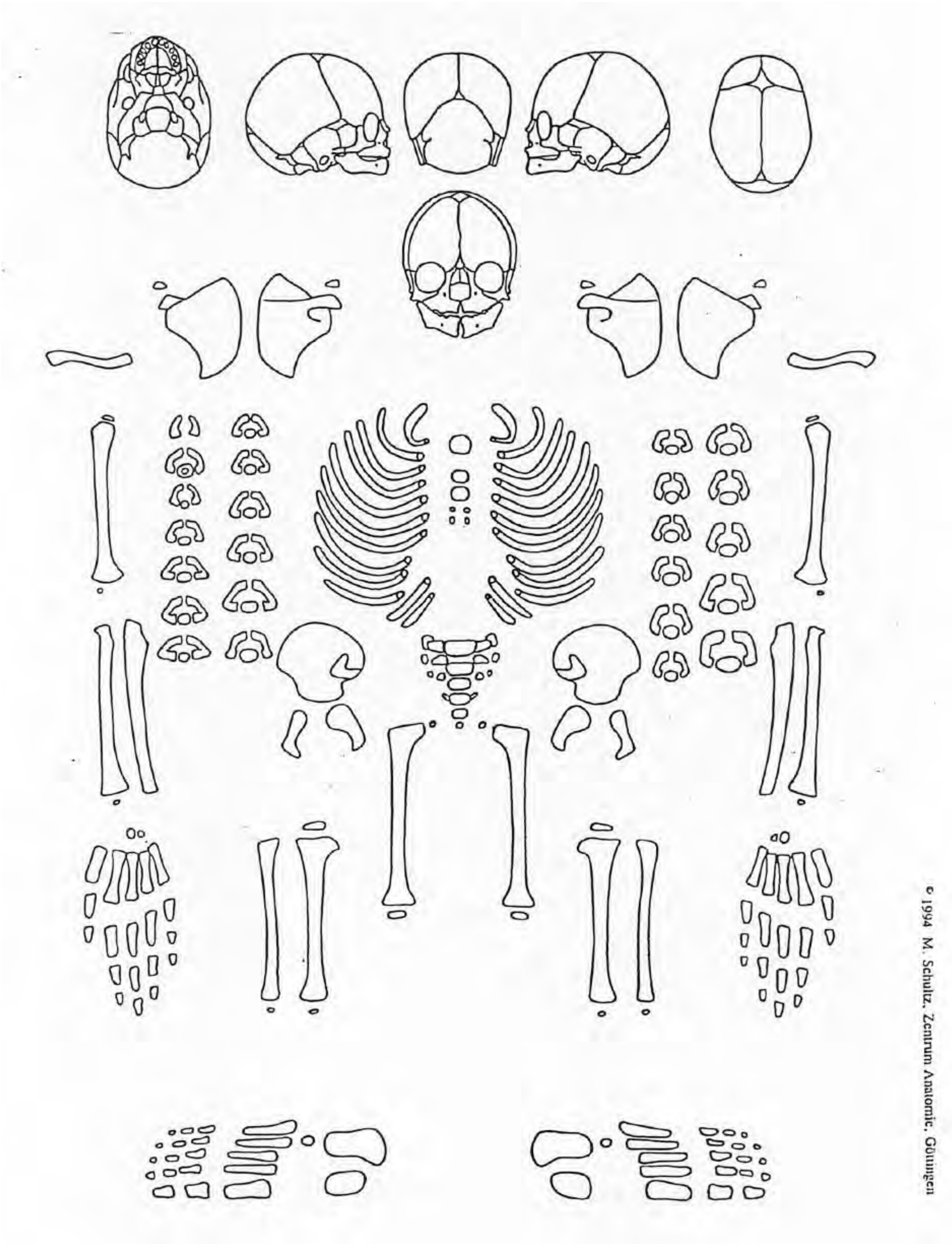
Form 11B

INFANT SKELETON



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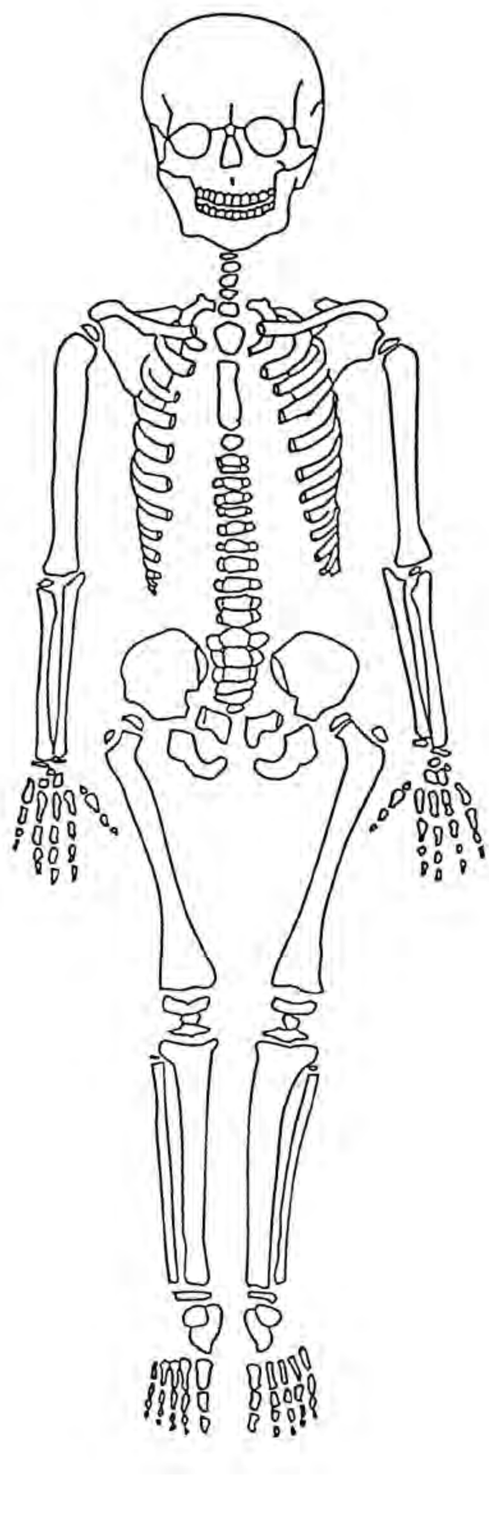
Form 12A

CHILD SKELETON



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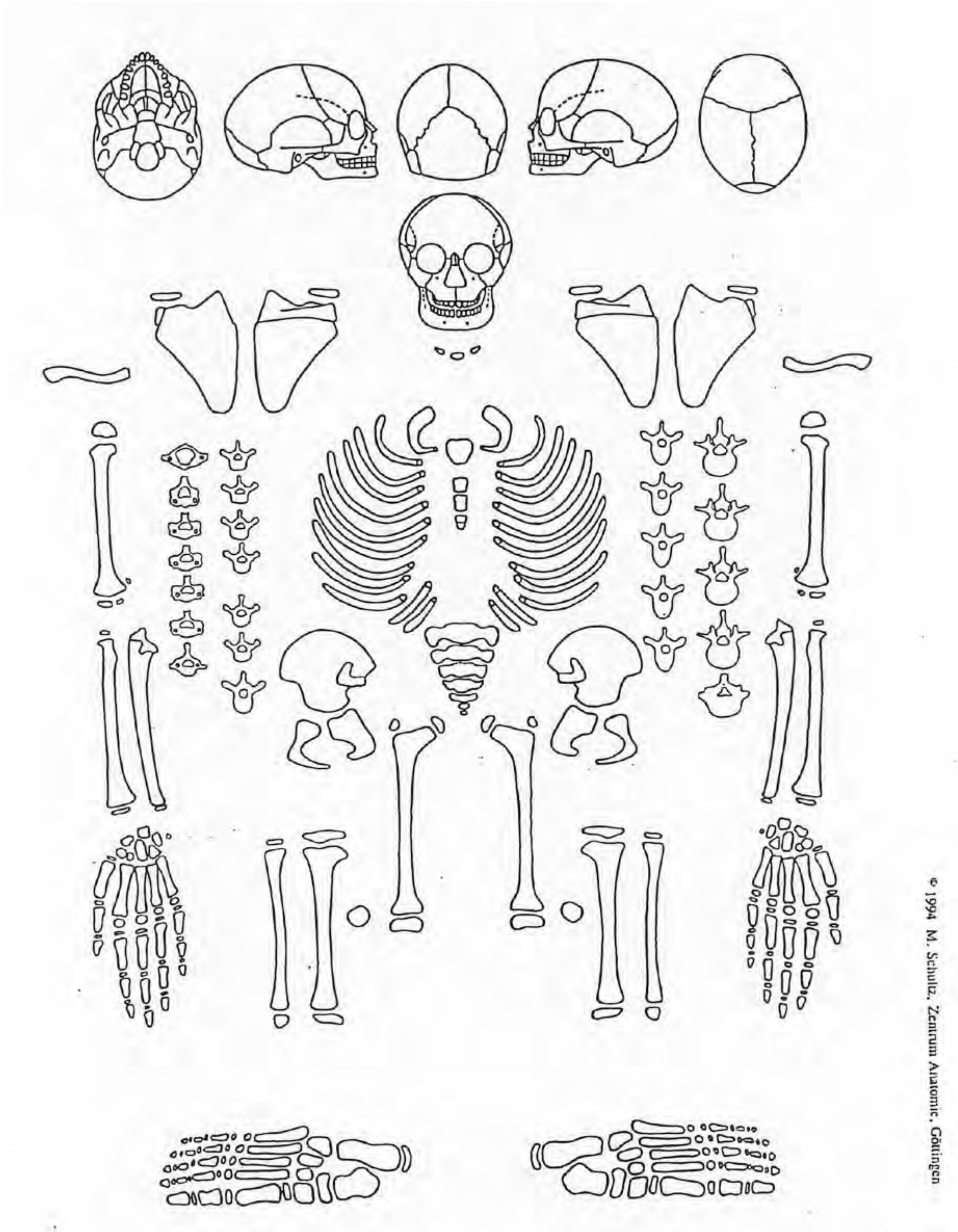
Form 12B

CHILD SKELETON



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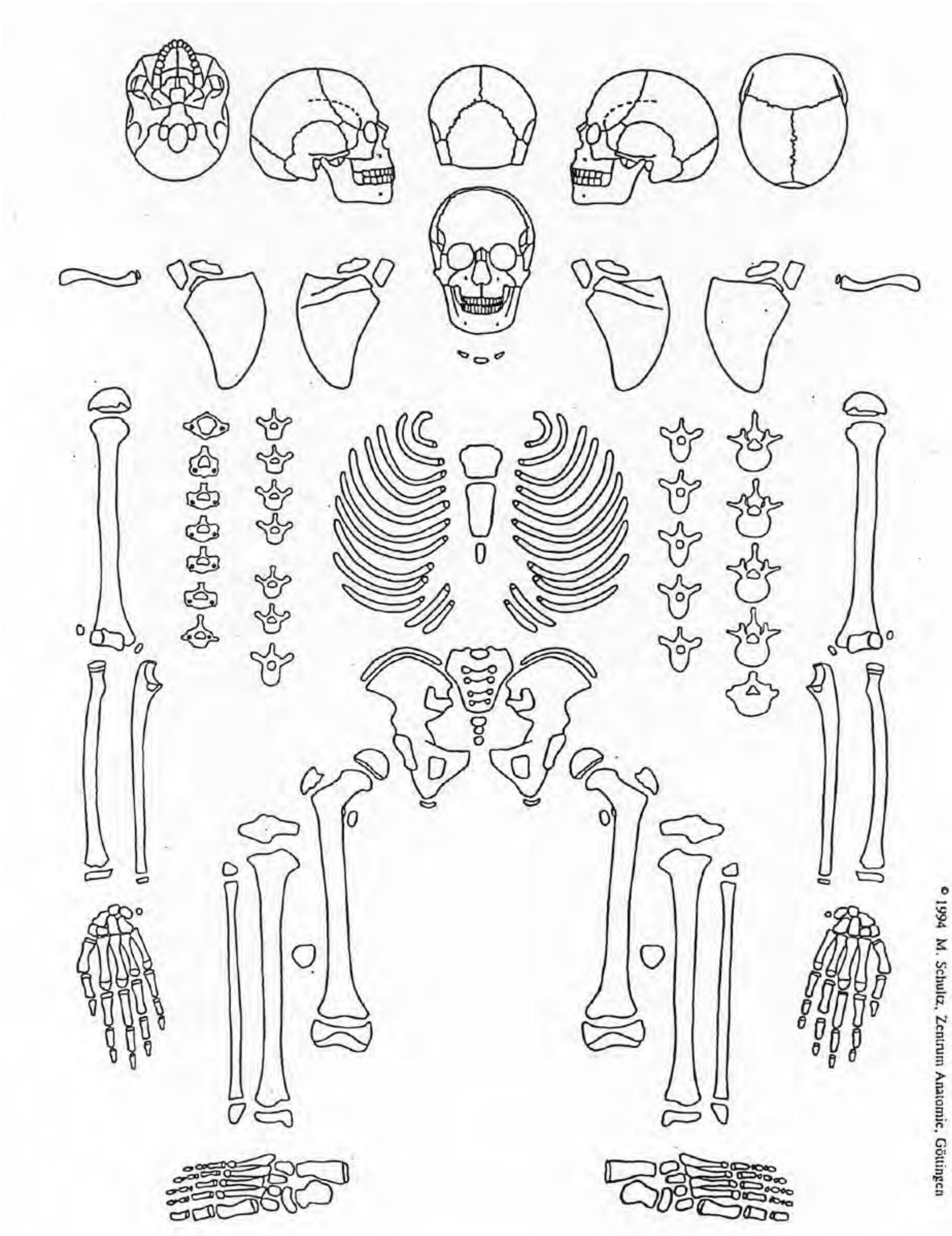
Form 12C

SUBADULT SKELETON



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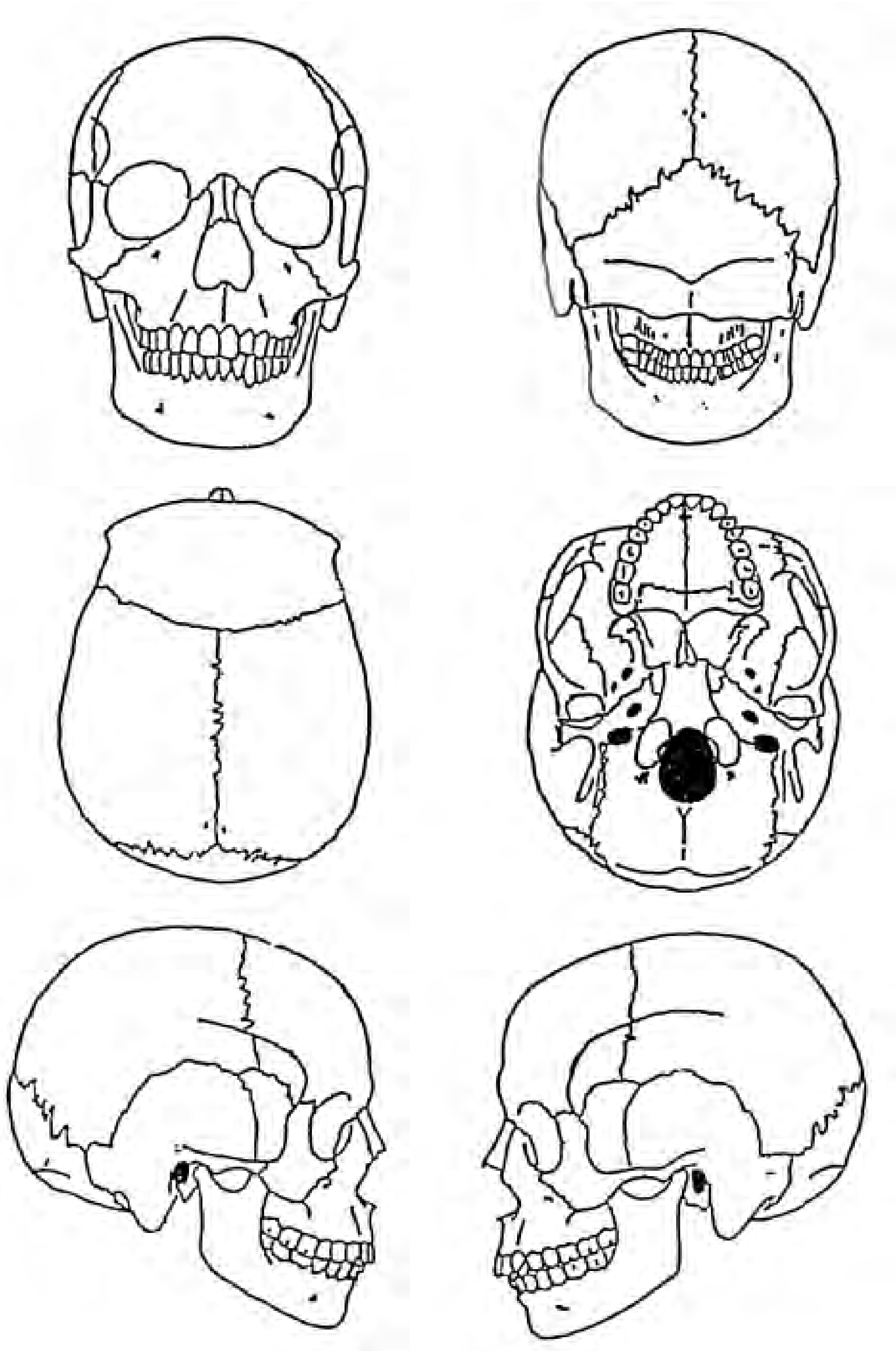
Form 13A

ADULT SKULL



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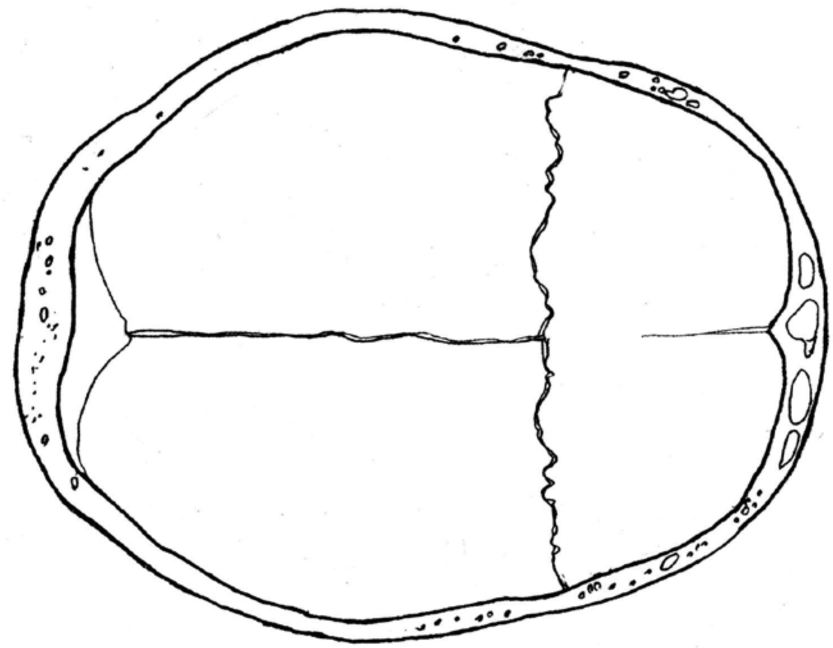
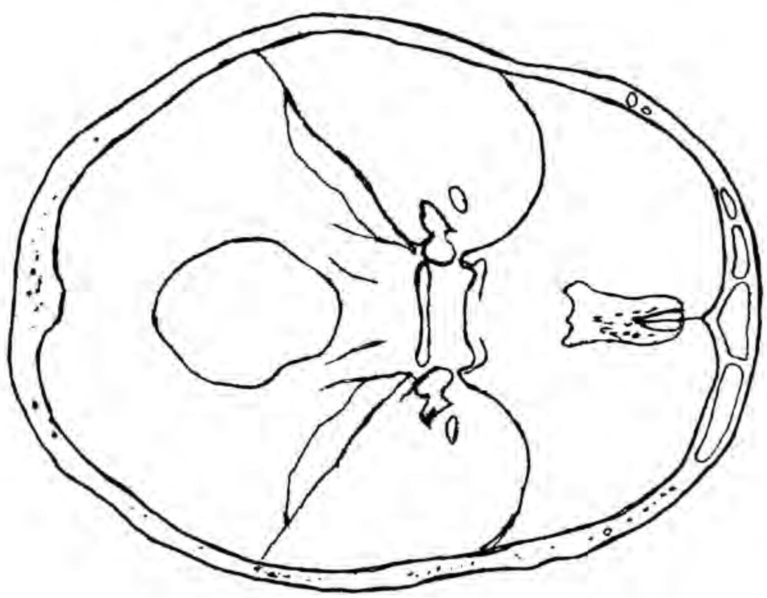
Form 13B

ENDOCRANIUM





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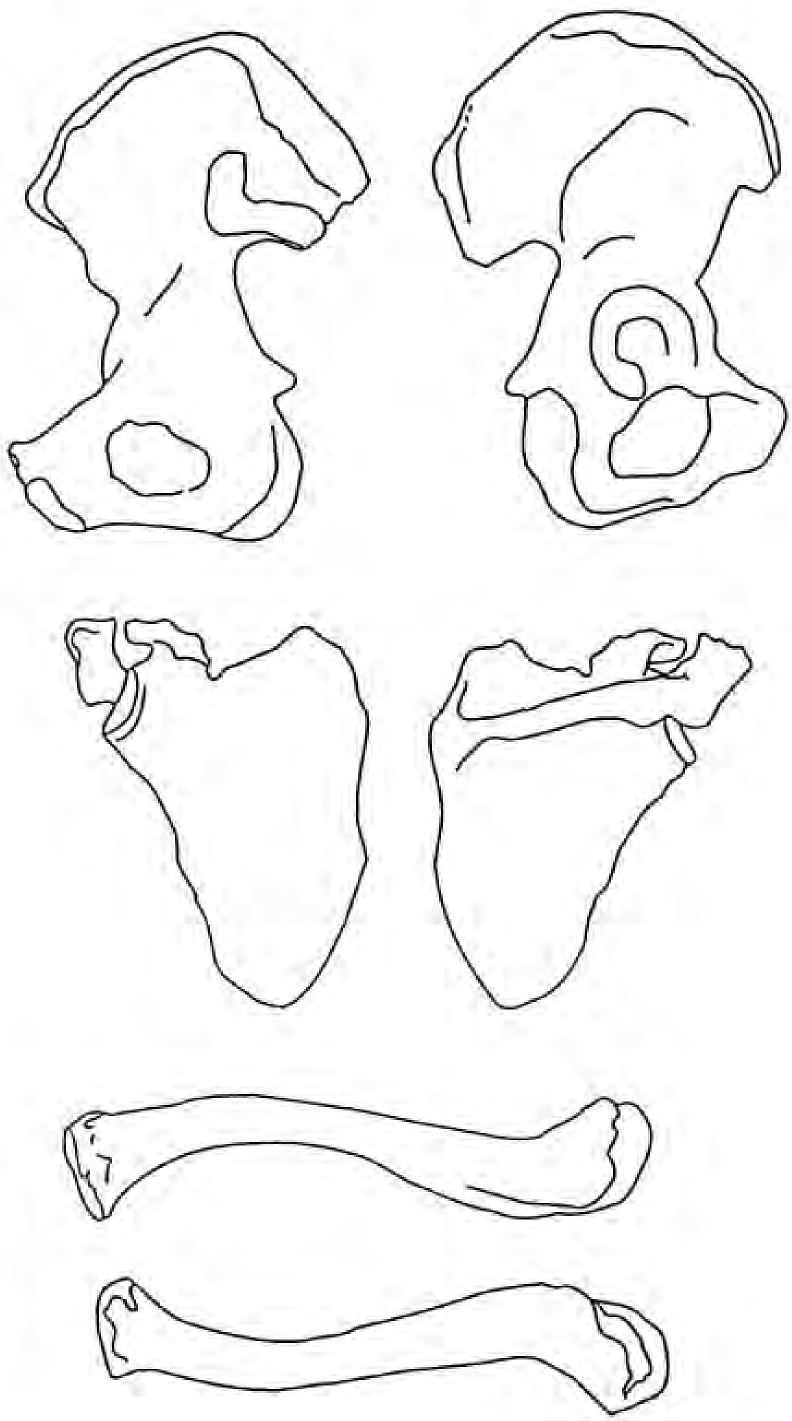
Form 14A

RIGHT INNOMINATE, SCAPULA, CLAVICLE



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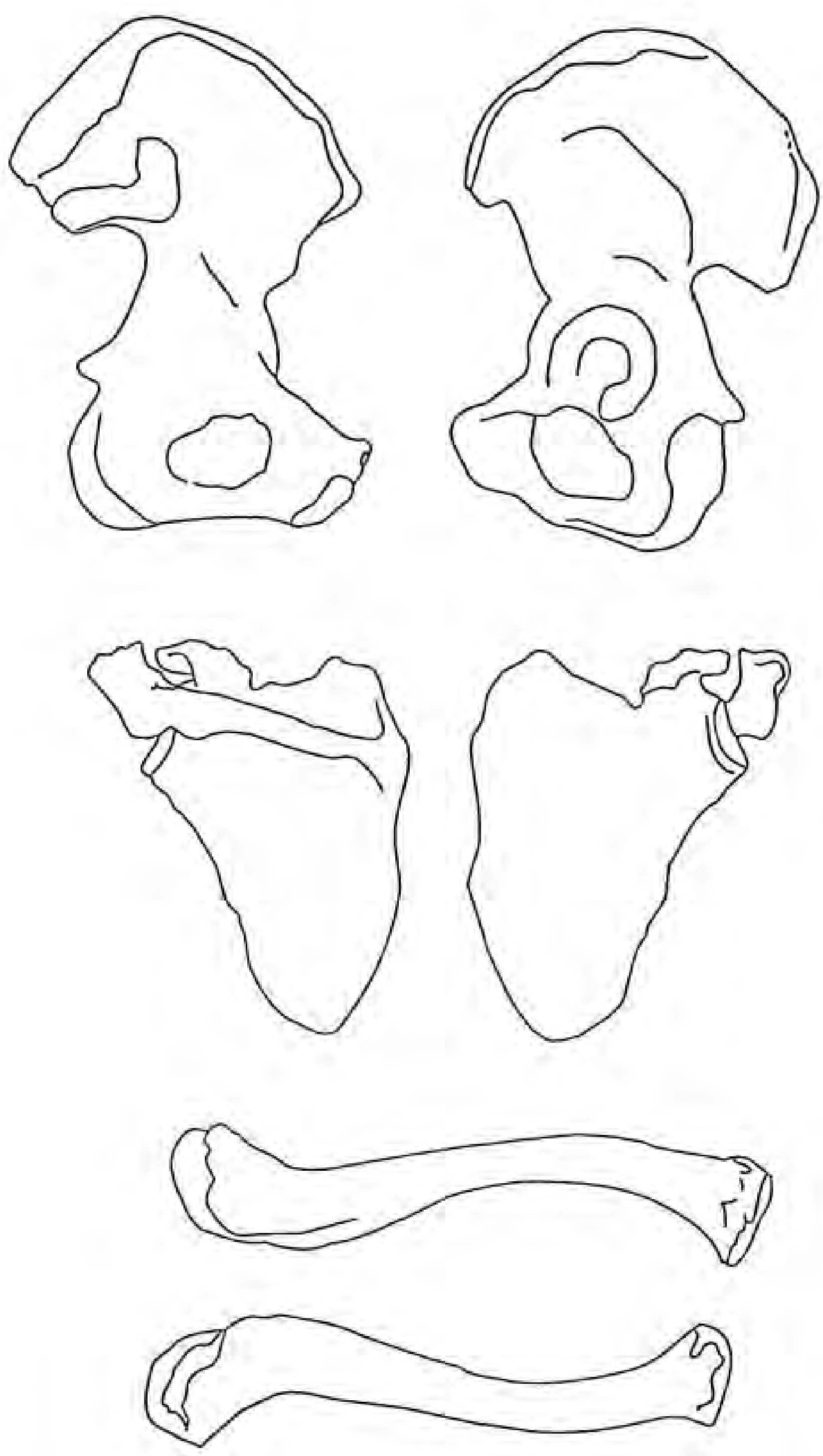
Form 14B

LEFT INNOMINATE, SCAPULA, CLAVICLE



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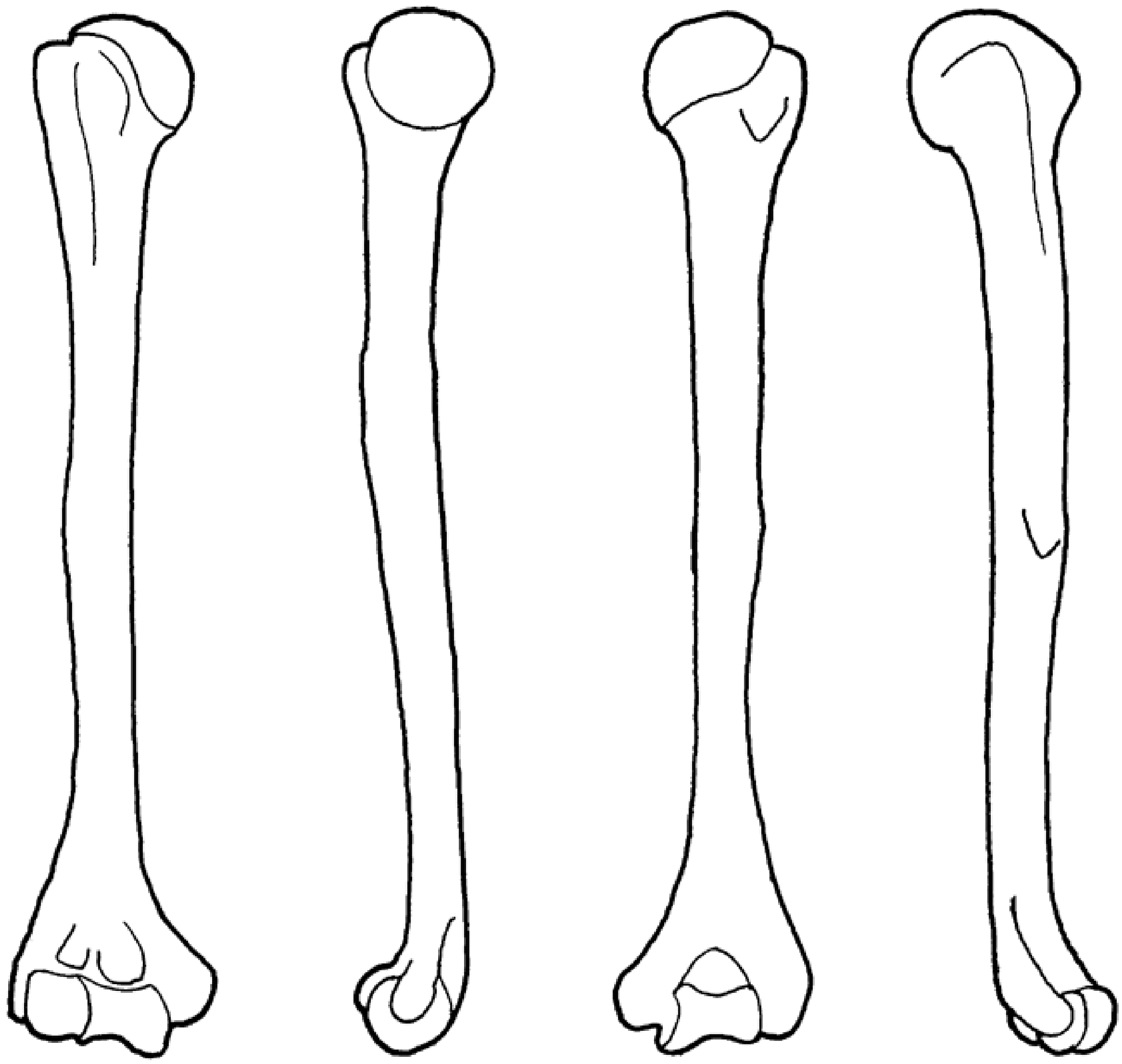
TRWD Richland Chambers Cemetery Mitigation

Date __________ Site 41NV716 Navarro County Recorder _____

Cell: _______ Burial Number: ______ Individual: _____

Form 15A

RIGHT HUMERUS



Notes: ____

____

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____

EComm 220-001 SKELETAL RECORDING FORM Page ___ of ___

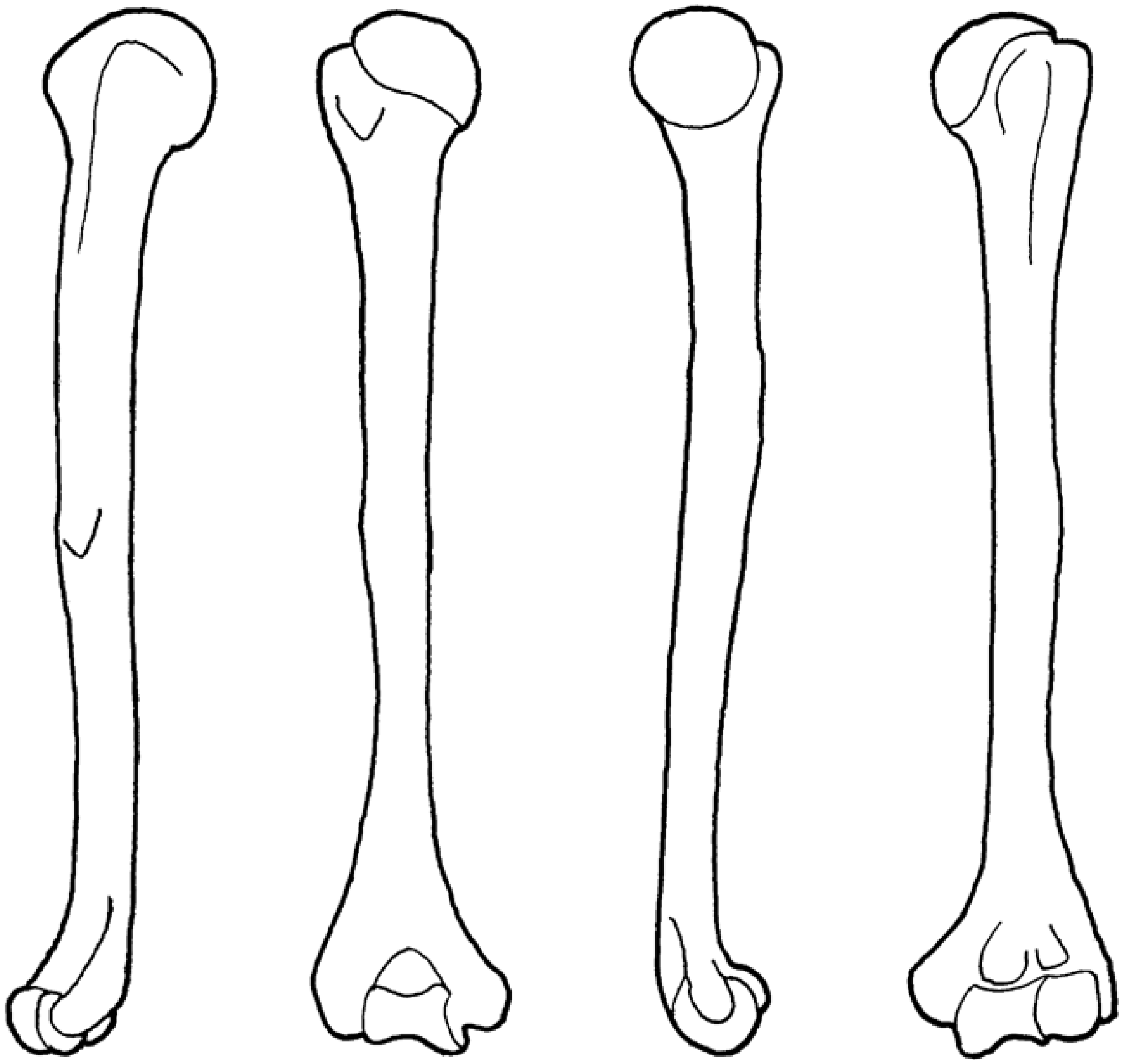
TRWD Richland Chambers Cemetery Mitigation

Date __________ Site 41NV716 Navarro County Recorder _____

Cell: _______ Burial Number: ______ Individual: _____

Form 15B

LEFT HUMERUS



lateral **posterior** **medial** **anterior**

Notes: ____

____

____

____

EComm 220-001 SKELETAL RECORDING FORM Page ___ of ___

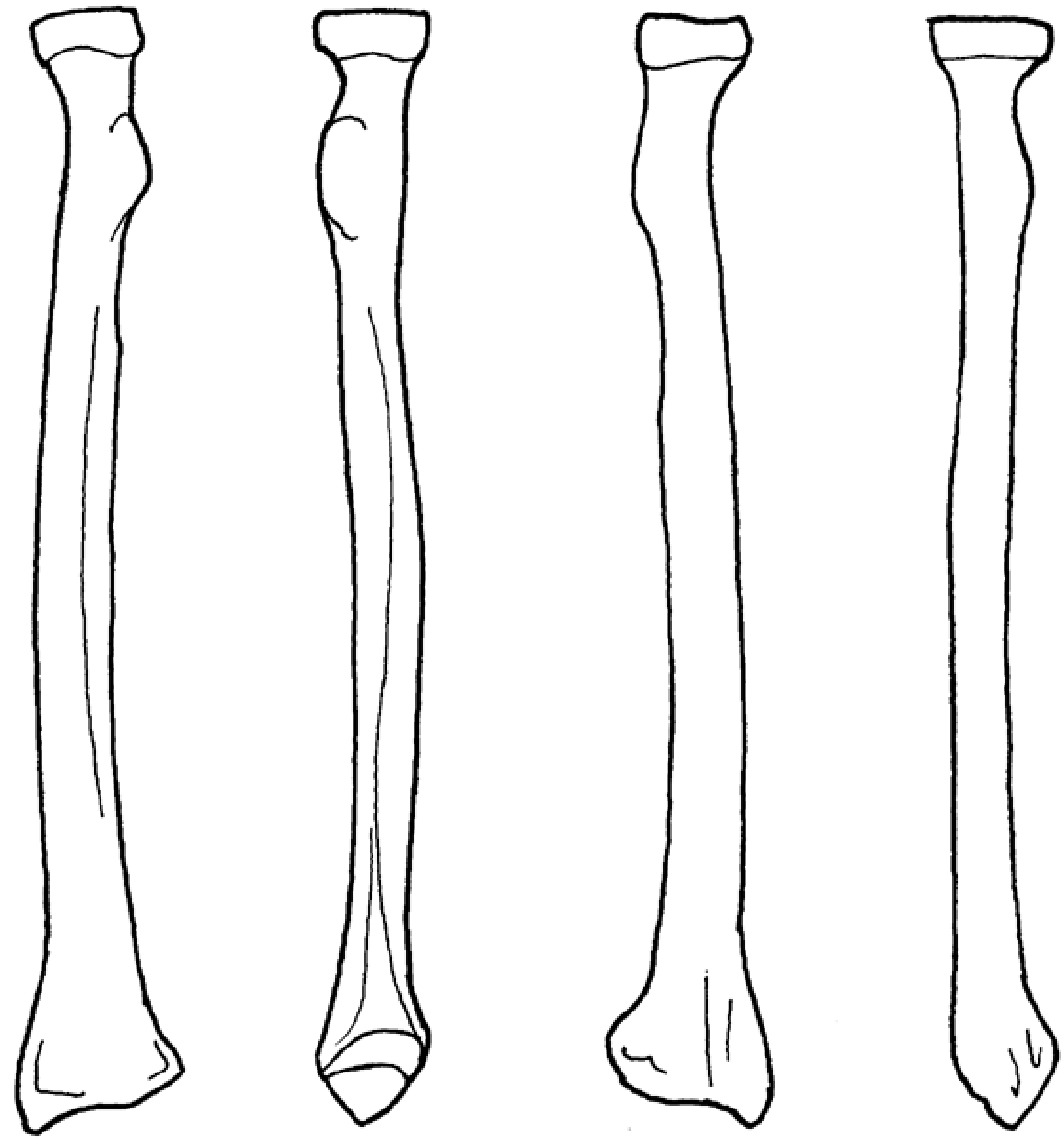
TRWD Richland Chambers Cemetery Mitigation

Date __________ Site 41NV716 Navarro County Recorder _____

Cell: _______ Burial Number: ______ Individual: _____

Form 16A

RIGHT RADIUS



anterior **medial** **posterior** **lateral**

Notes: ____

____

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EComm 220-001 SKELETAL RECORDING FORM Page ___ of ___

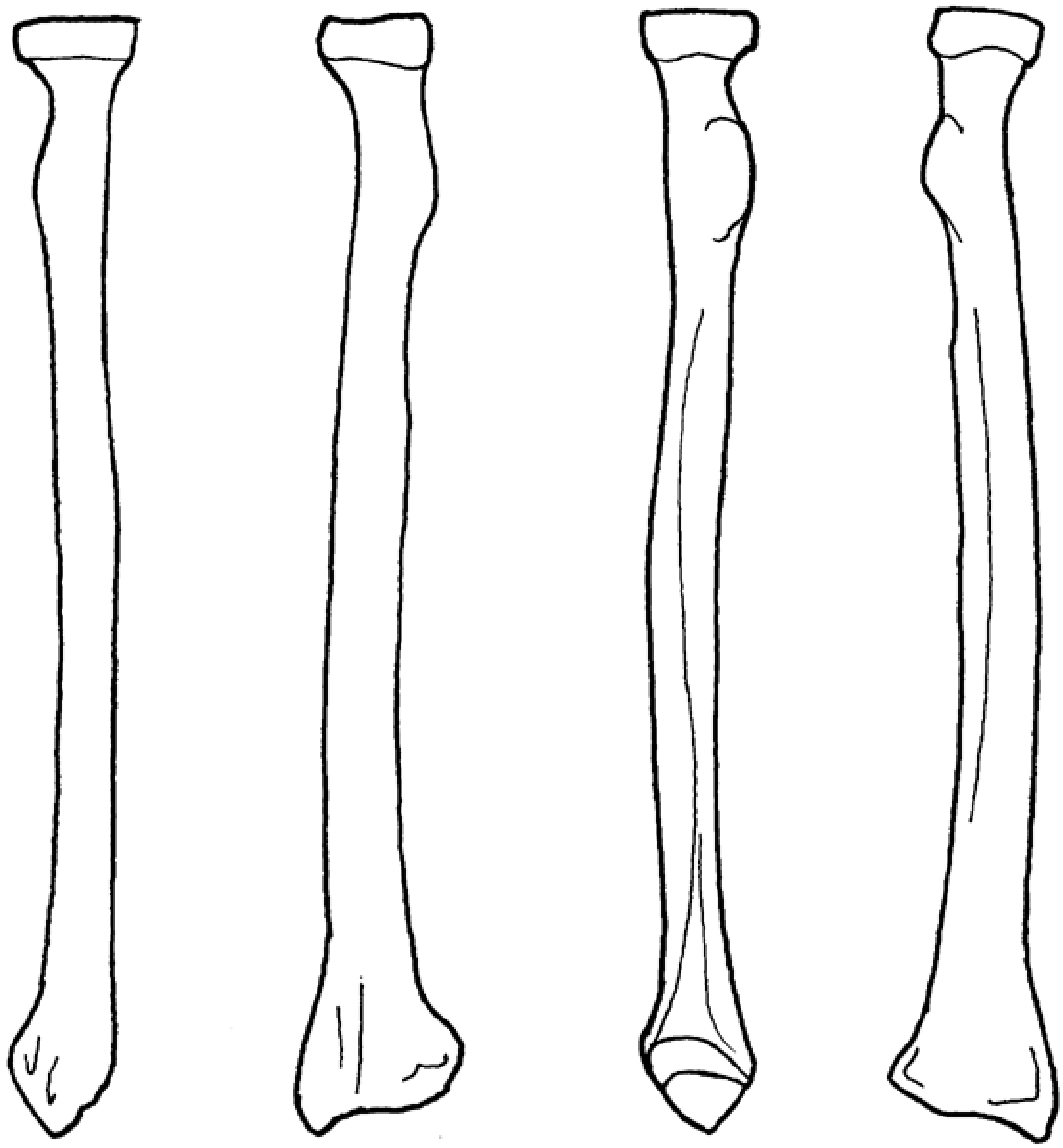
TRWD Richland Chambers Cemetery Mitigation

Date __________ Site 41NV716 Navarro County Recorder _____

Cell: _______ Burial Number: ______ Individual: _____

Form 16B

LEFT RADIUS



lateral **posterior** **medial** **anterior**

Notes: ____

____

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____

EComm 220-001 SKELETAL RECORDING FORM Page ___ of ___

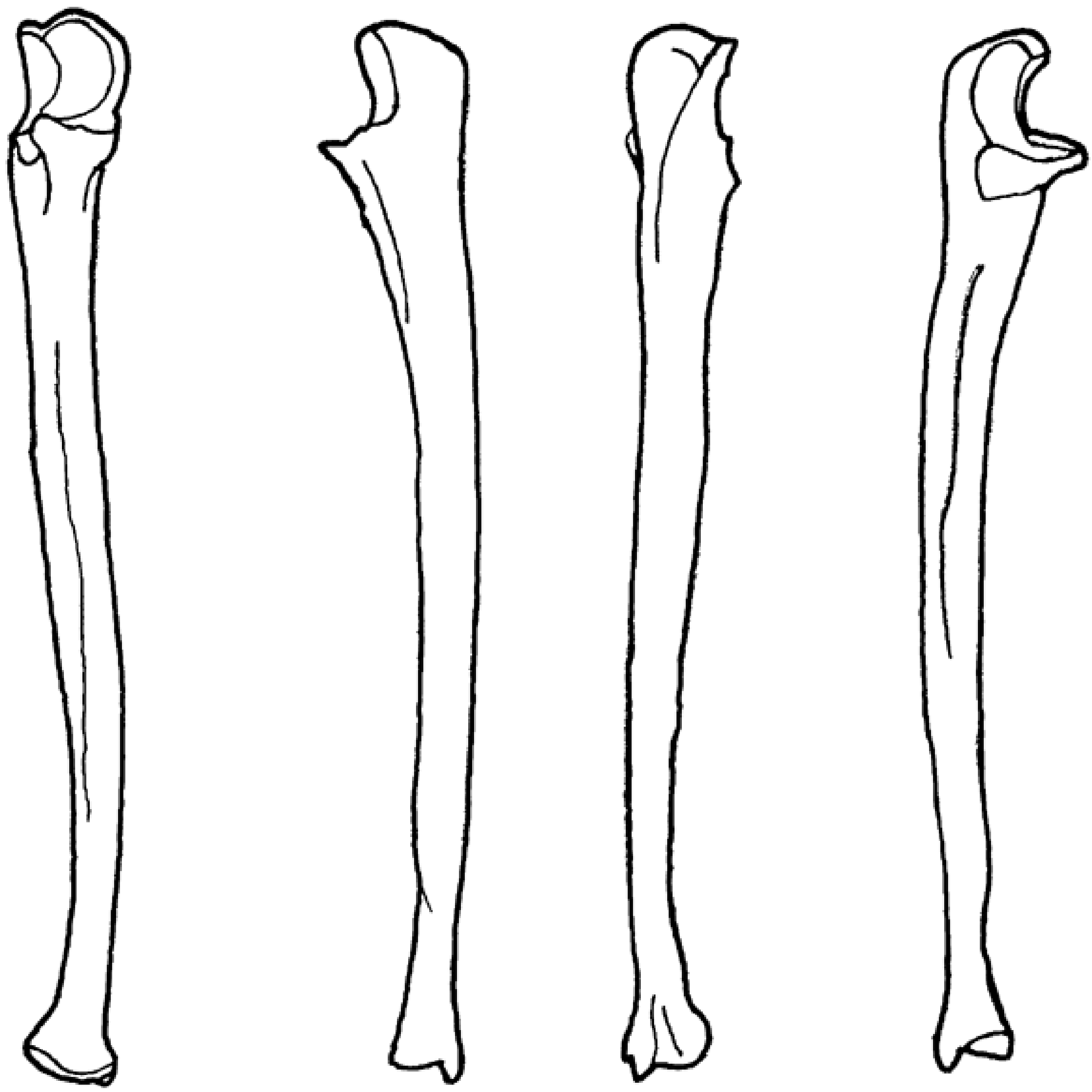
TRWD Richland Chambers Cemetery Mitigation

Date __________ Site 41NV716 Navarro County Recorder _____

Cell: _______ Burial Number: ______ Individual: _____

Form 17A

RIGHT ULNA



anterior **medial** **posterior** **lateral**

Notes: ____

____

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____

EComm 220-001 SKELETAL RECORDING FORM Page ___ of ___

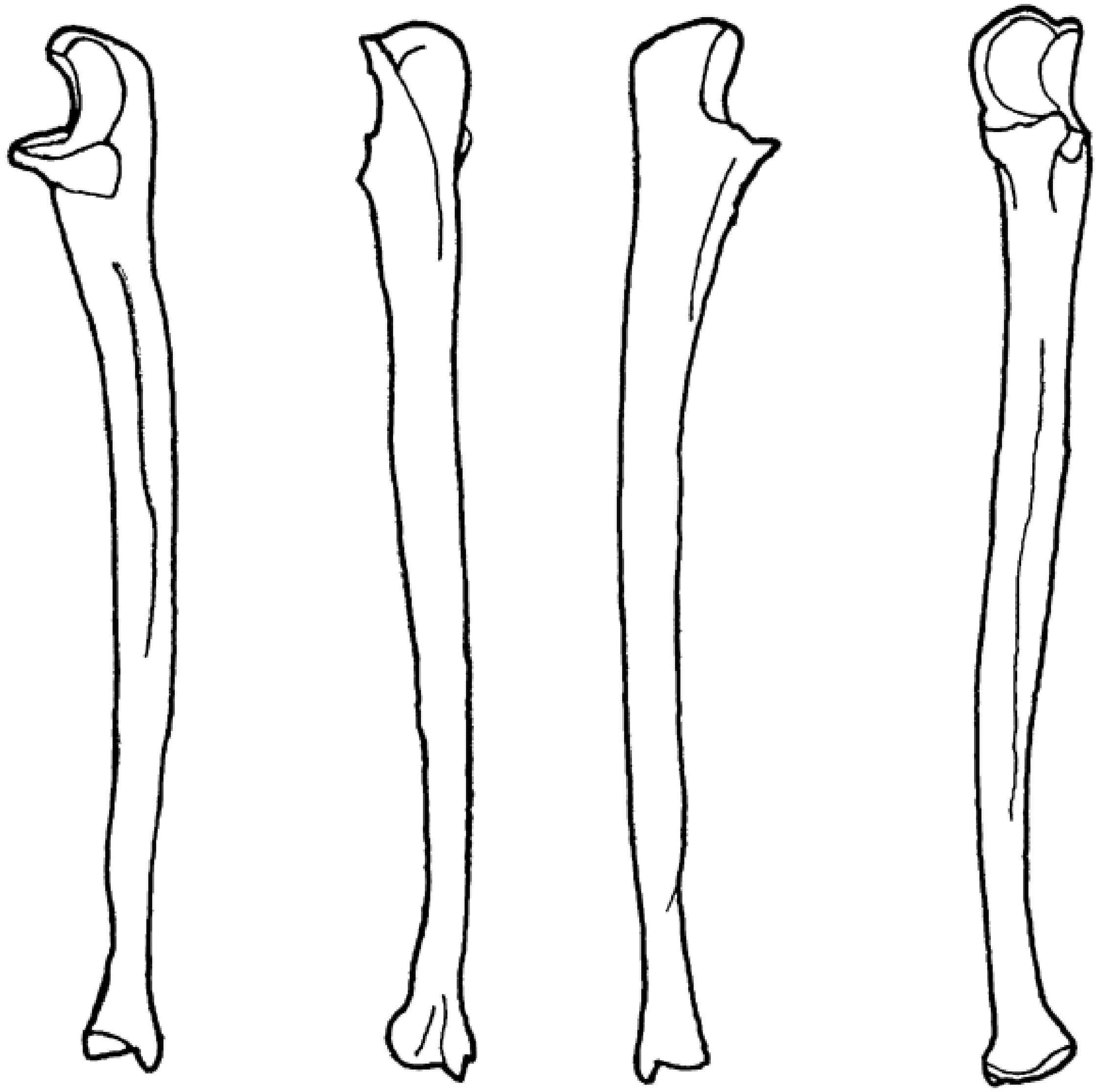
TRWD Richland Chambers Cemetery Mitigation

Date __________ Site 41NV716 Navarro County Recorder _____

Cell: _______ Burial Number: ______ Individual: _____

Form 17B

LEFT ULNA



lateral **posterior** **medial** **anterior**

Notes: ____

____

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____

EComm 220-001 SKELETAL RECORDING FORM Page ___ of ___

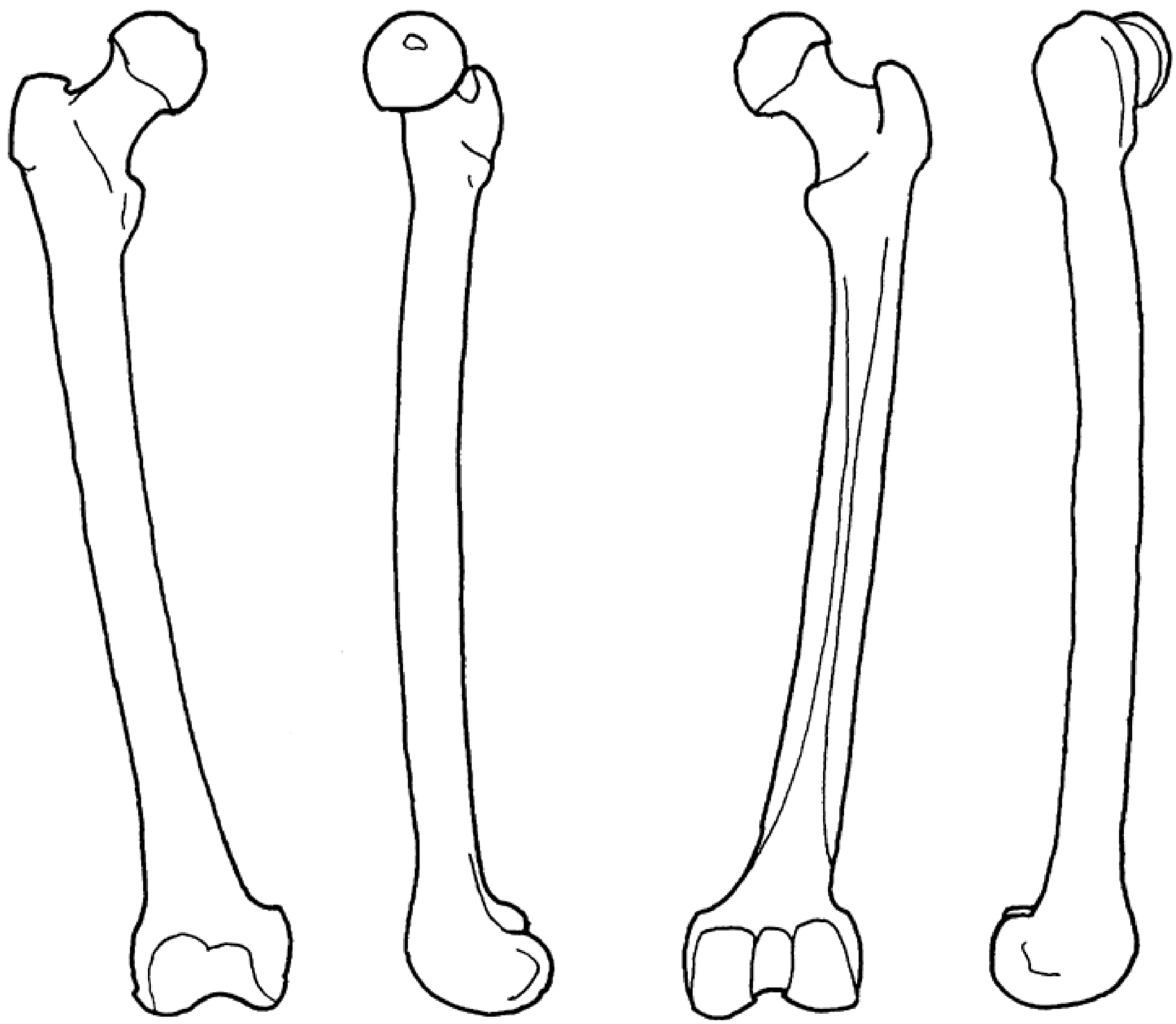
TRWD Richland Chambers Cemetery Mitigation

Date __________ Site 41NV716 Navarro County Recorder _____

Cell: _______ Burial Number: ______ Individual: _____

Form 18A

RIGHT FEMUR



anterior medial posterior lateral

Notes: ____

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____

EComm 220-001 SKELETAL RECORDING FORM Page ___ of ___

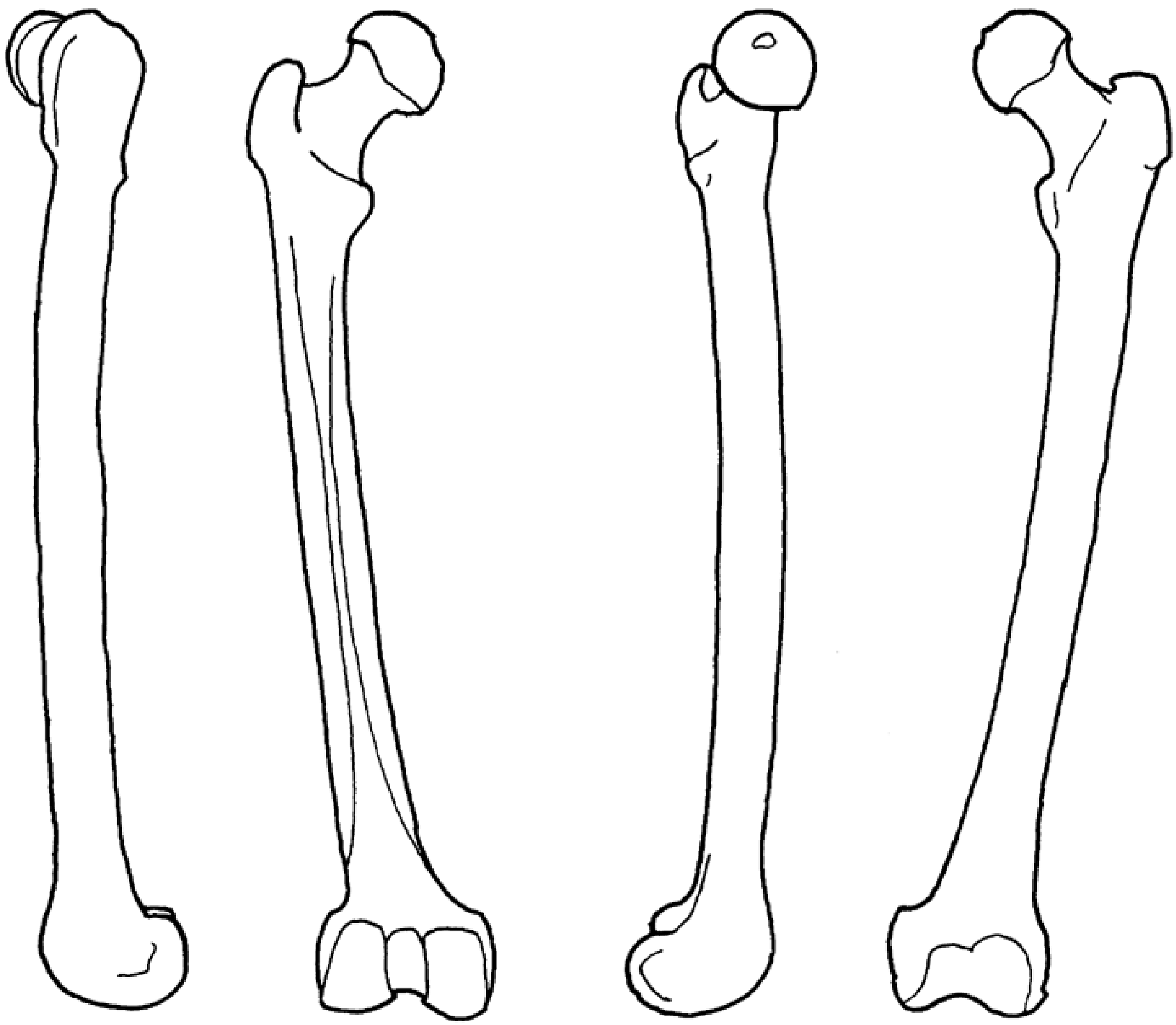
TRWD Richland Chambers Cemetery Mitigation

Date __________ Site 41NV716 Navarro County Recorder _____

Cell: _______ Burial Number: ______ Individual: _____

Form 18B

LEFT FEMUR



lateral posterior medial anterior

Notes: ____

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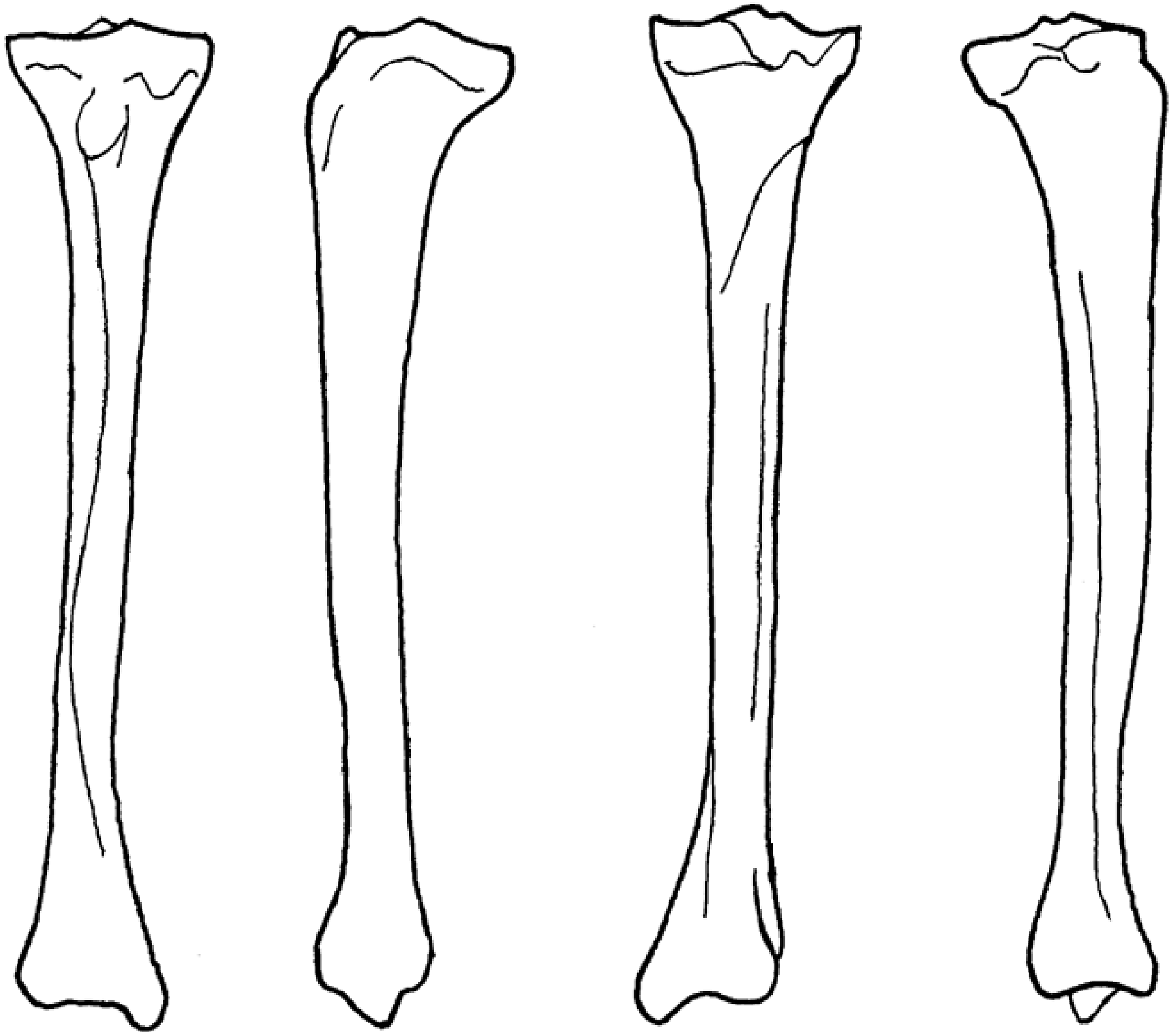
____

TRWD Richland Chambers Cemetery Mitigation
Date __________ Site 41NV716 Navarro County Recorder _____
Cell: _______ Burial Number: ______ Individual: _____

Form 19A

RIGHT TIBIA



anterior medial posterior lateral

Notes: ____
____
____
____

EComm 220-001 SKELETAL RECORDING FORM Page ___ of ___

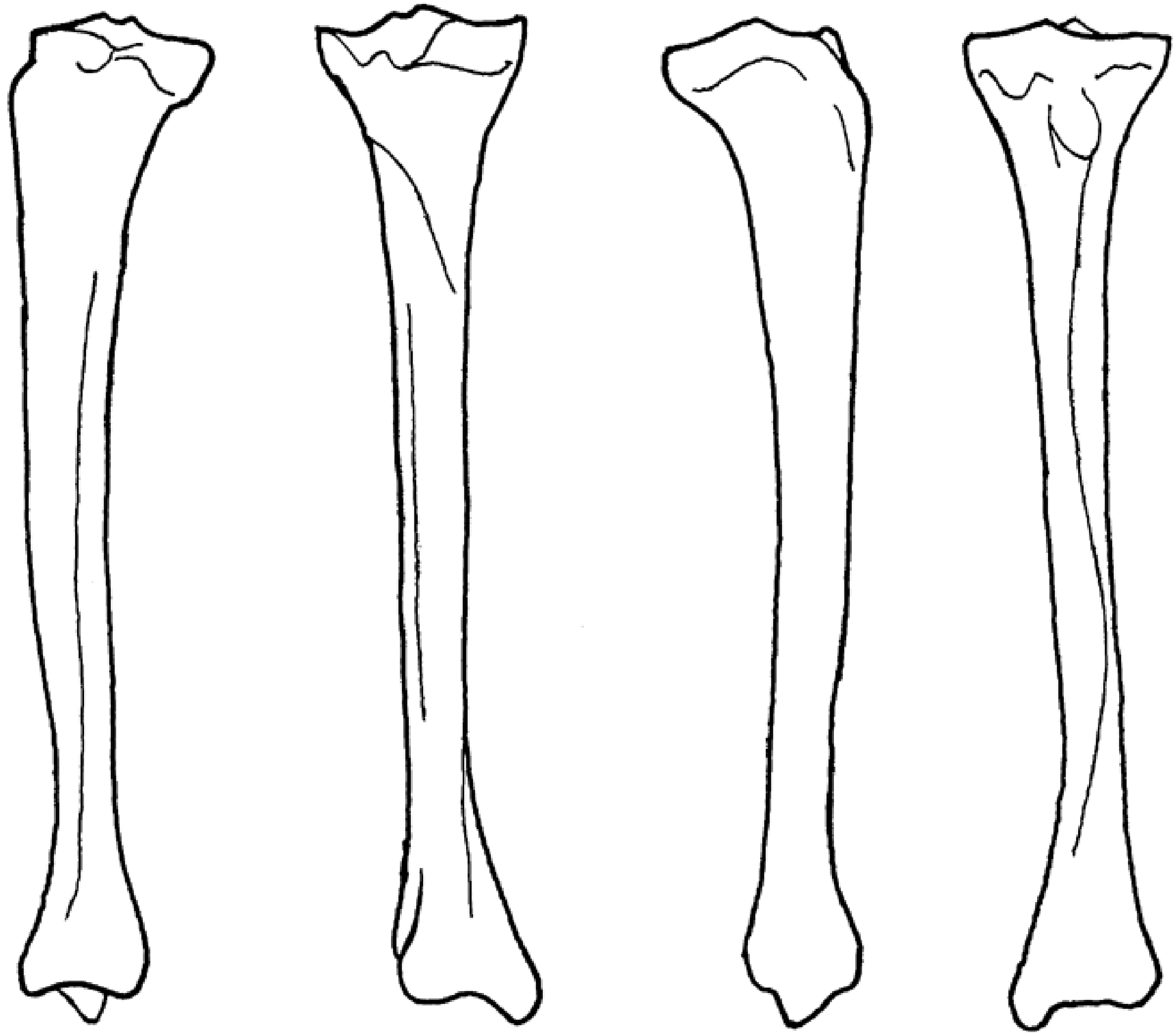
TRWD Richland Chambers Cemetery Mitigation

Date __________ Site 41NV716 Navarro County Recorder _____

Cell: _______ Burial Number: ______ Individual: _____

Form 19B

LEFT TIBIA



Notes: ____

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EComm 220-001 SKELETAL RECORDING FORM Page ___ of ___

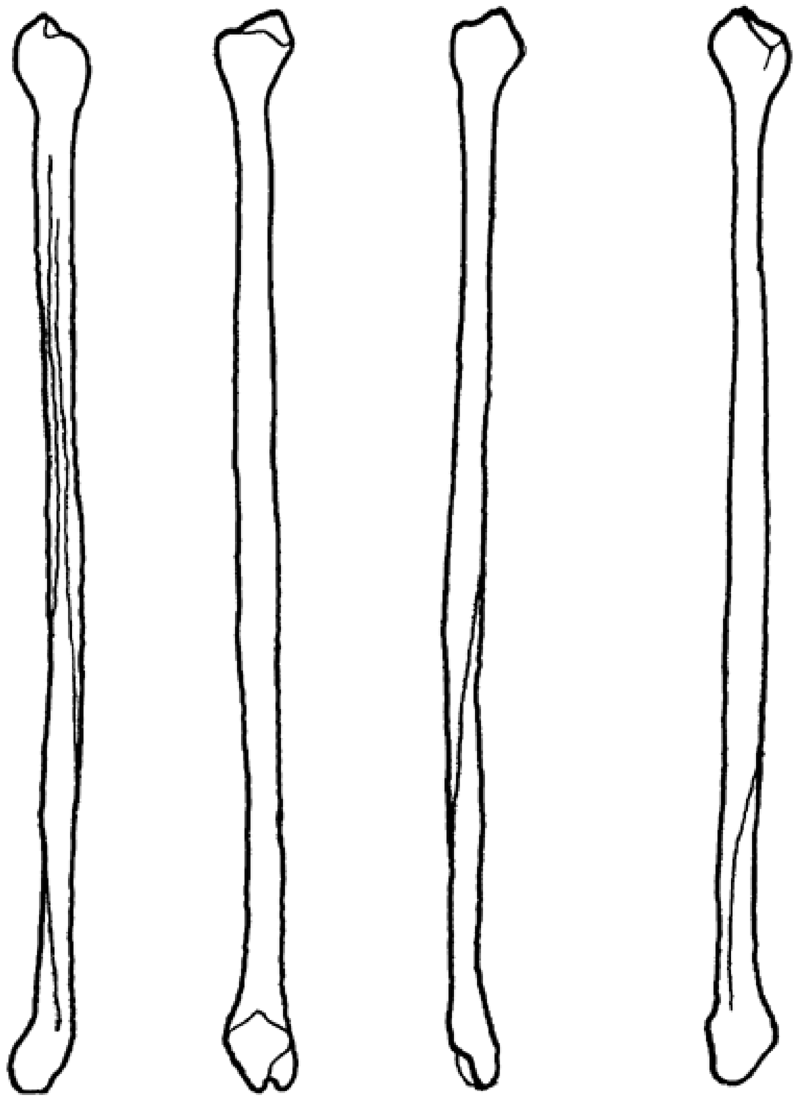
TRWD Richland Chambers Cemetery Mitigation

Date __________ Site 41NV716 Navarro County Recorder _____

Cell: _______ Burial Number: ______ Individual: _____

Form 20A

RIGHT FIBULA



anterior medial posterior lateral

Notes: ____

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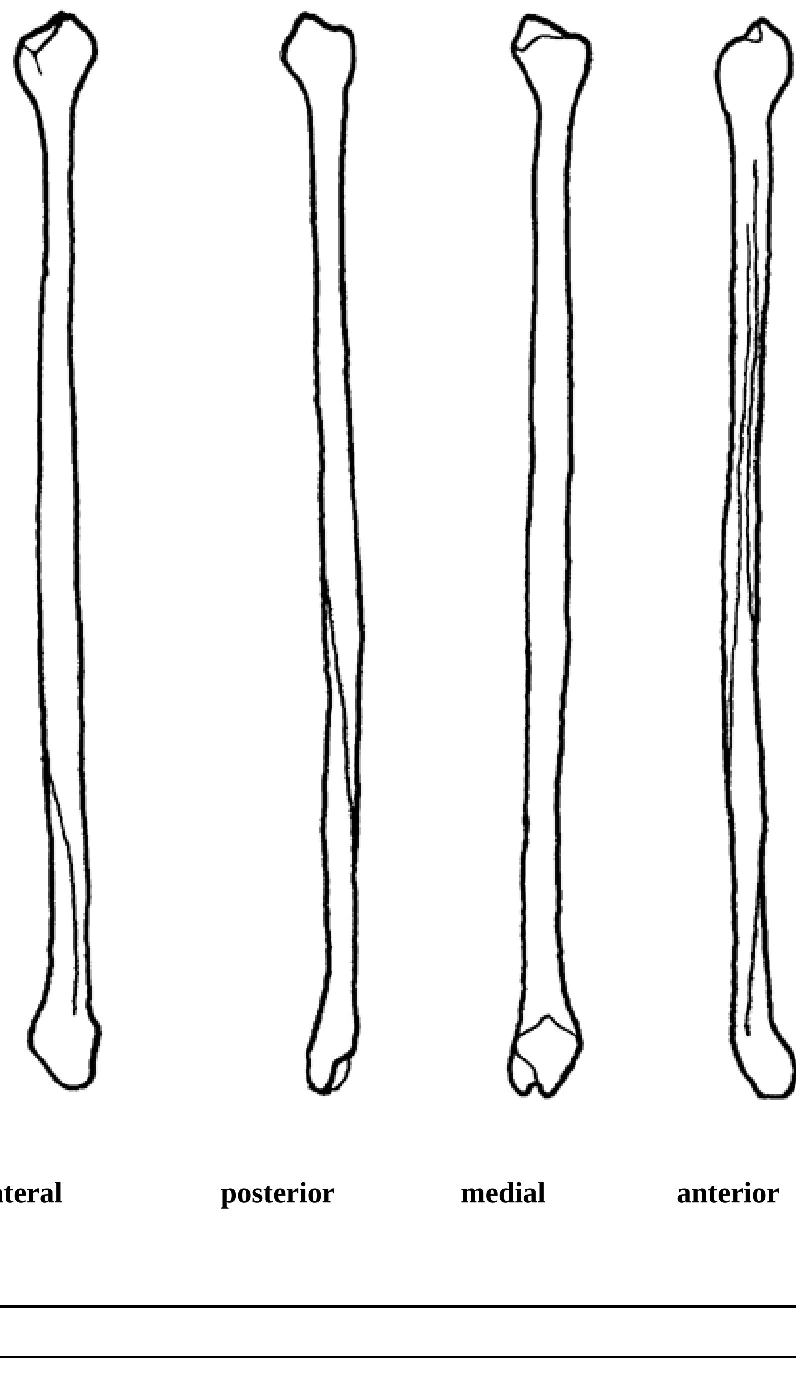
____

EComm 220-001 SKELETAL RECORDING FORM Page ___ of ___
TRWD Richland Chambers Cemetery Mitigation
Date __________ Site 41NV716 Navarro County Recorder _____
Cell: _______ Burial Number: ______ Individual: _____

Form 20B

LEFT FIBULA



Notes: ____

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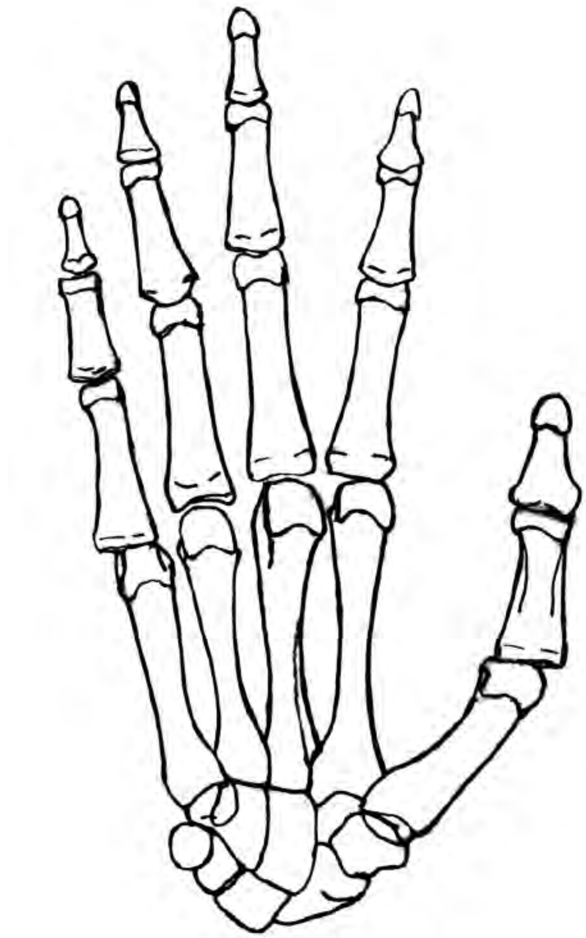
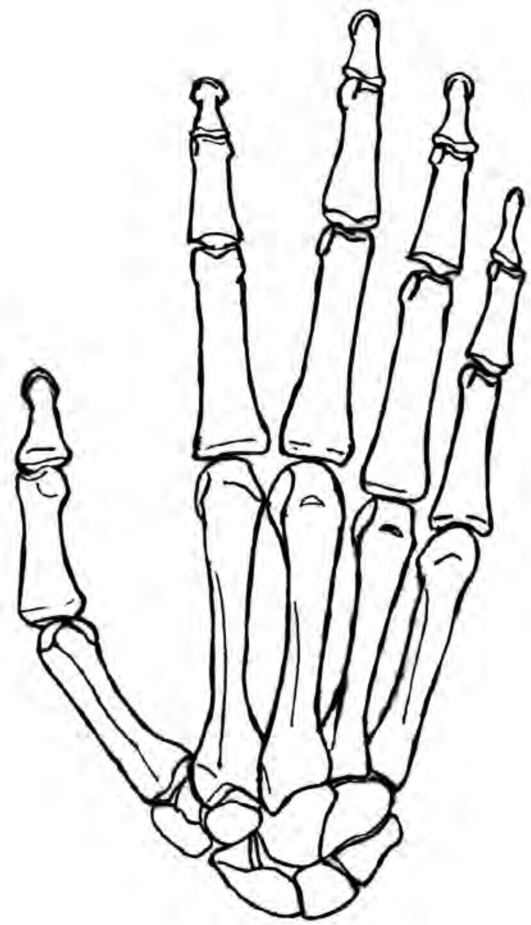
EComm 220-001 SKELETAL RECORDING FORM Page ___ of ___
TRWD Richland Chambers Cemetery Mitigation
Date __________ Site 41NV716 Navarro County Recorder _____
Cell: _______ Burial Number: ______ Individual: _____

Form 21A

RIGHT HAND



palmar



volar

EComm 220-001 SKELETAL RECORDING FORM Page ___ of ___

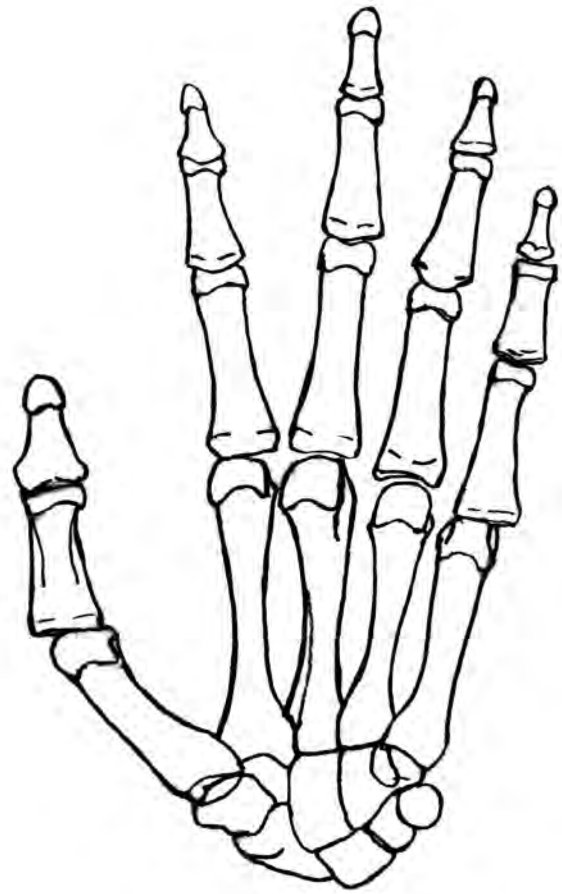
TRWD Richland Chambers Cemetery Mitigation

Date __________ Site 41NV716 Navarro County Recorder _____

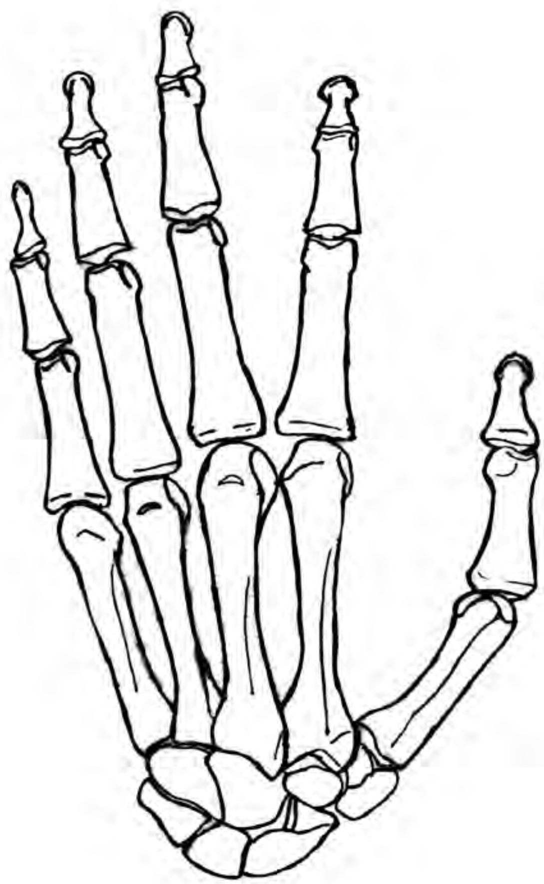
Cell: _______ Burial Number: ______ Individual: _____

Form 21B

LEFT HAND



palmar



volar

EComm 220-001 SKELETAL RECORDING FORM Page ___ of ___

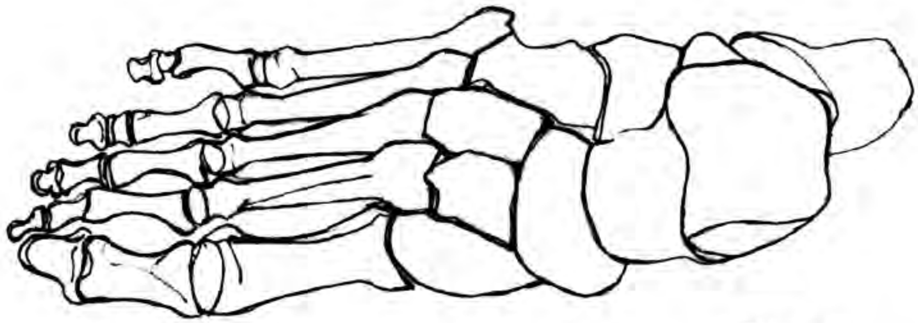
TRWD Richland Chambers Cemetery Mitigation

Date __________ Site 41NV716 Navarro County Recorder _____

Cell: _______ Burial Number: ______ Individual: _____

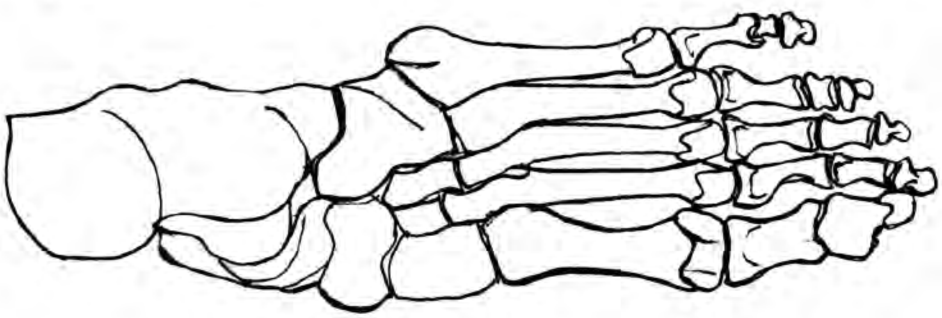
Form 22A

RIGHT FOOT

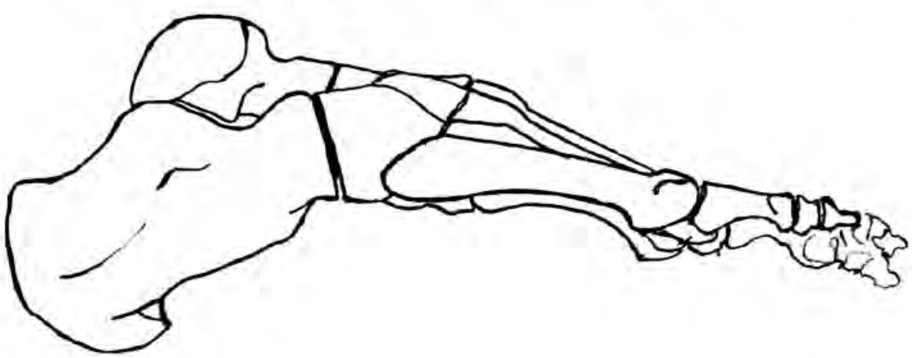


superior

medial



inferior



lateral

EComm 220-001 **SKELETAL RECORDING FORM** **Page ___ of ___**

TRWD Richland Chambers Cemetery Mitigation

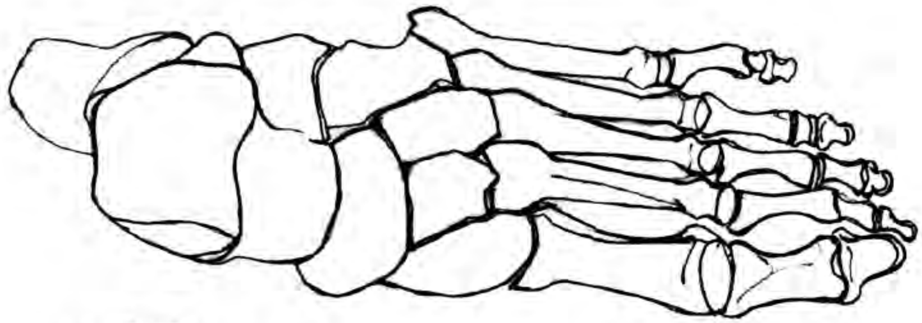
Date __________ **Site 41NV716 Navarro County** **Recorder _____**

Cell: _______ Burial Number: ______ Individual: _____

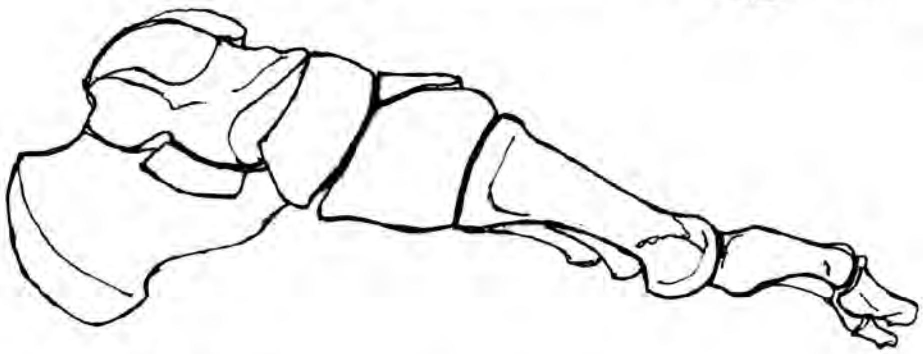
Form 22B

LEFT FOOT

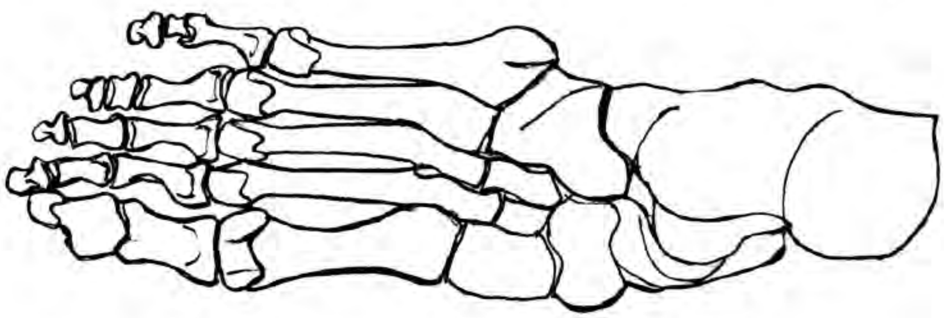
superior



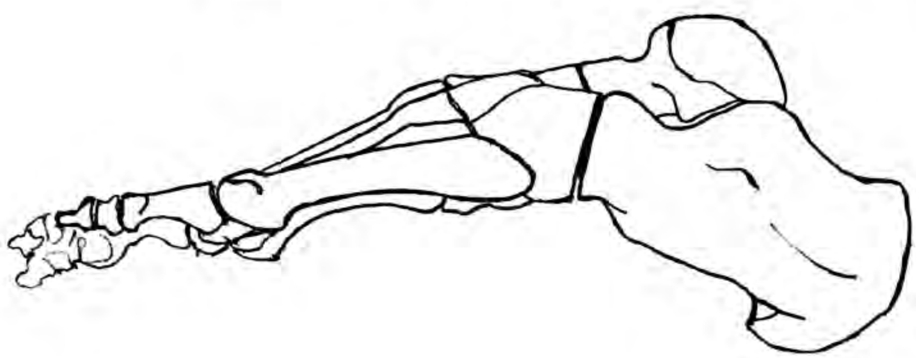
medial



inferior



lateral



EComm 220-001 SKELETAL RECORDING FORM Page ___ of ___

TRWD Richland Chambers Cemetery Mitigation

Date __________ Site 41NV716 Navarro County Recorder _____

Cell: _______ Burial Number: ______ Individual: _____

Form 23

ISOLATED BONE

MNI _______

List each element. Indicate R or L side. Code completeness as C (75% or more), P (25-75%), or F (< 25%). For long bones, code regions as PE (proximal epiphysis), DE (distal epiphysis), P 1/3 (proximal third of shaft), M 1/3 (middle third), D 1/3 (distal third).

Elements Represented:

Cranial ____________________

____

____

Dental ____________________

____

____

Axial ____________________

____

____

Appendicular ____________________

____

____

Extremities ____________________

____

____

Unknown ____________________

Age & Sex assessment ____________________

____

____

____

Comments: (note pathologies, taphonomy, etc.) ____________________

____

____

____

____

EComm 220-001 SKELETAL RECORDING FORM Page ___ of ___

TRWD Richland Chambers Cemetery Mitigation

Date __________ Site 41NV716 Navarro County Recorder _____

Cell: _______ Burial Number: ______ Individual: _____

Form 24A

CREMATED BONE (<100 g)

MNI __________

Bone weight (grams) __________ Maximum length (cm) __________ Average length ____________

Color ______________________________

Warping/Surface texture ______________________________

____

Elements Represented:

Cranial ______________________________

% _____ ______________________________

____

Dental ______________________________

% _____ ______________________________

____

Axial ______________________________

% _____ ______________________________

____

Appendicular ______________________________

% _____ ______________________________

____

Extremities ______________________________

% _____ ______________________________

____

Unknown ______________________________

% _____

Age & Sex assessment ______________________________

____

____

____

Comments (note pathologies etc.): ______________________________

____

____

EComm 220-001 SKELETAL RECORDING FORM **Page ___ of ___**
TRWD Richland Chambers Cemetery Mitigation
Date __________ Site 41NV716 Navarro County Recorder _____
Cell: _______ Burial Number: ______ Individual: _____

Form 24B

CREMATED BONE (>100 g)

MNI __________ **MNI Form ______________**

left	right	**CRANIAL REMAINS**			**DENTAL REMAINS**	#	condition	**AREA**	**cond**	**path**
___	___	Parietal	___	Mandible	Incisors	___	___	Cranial	____	____
___	___	Temporal	___	Frontal	Canines	___	___	Dental	____	____
___	___	Zygomatic	___	Sphenoid	Premolars	___	___	Axial	____	____
___	___	Lacrimal	___	Ethmoid	Molars	___	___	Appendicular	____	____
___	___	I. N. C.	___	Vomer	Milk Incisors	___	___	Extremities	____	____
___	___	Nasal	___	Occipital	Milk canines	___	___			
___	___	Maxilla	___	Hyoid	Milk molars	___	___			
___	___	Palatine	___	Thyroid	Peg teeth	___	___	**AGE CLASS**	___________	
____		Ossicles	___	Crycoid	Unident teeth	___	___	**SEX**	___________	

POSTCRANIAL REMAINS

	#	condition		left	right		left	right
Cervical	___	___	Scapula	___	___	Ilium	___	___
Thoracic	___	___	Clavicle	___	___	Ischium	___	___
Lumbar	___	___	Sternum	___		Pubis	___	___
Sacrum	___	___	Humerus	___	___	Femur	___	___
Coccyx	___	___	Radius	___	___	Tibia	___	___
			Ulna	___	___	Fibula	___	___
						Patella	___	___

	#	condition		#	condition		#	condition
Left Ribs	___	___	Carpals	___	___	Tarsals	___	___
Right Ribs	___	___	Metacarpals	___	___	Metatarsals	___	___
			C. Phalanges	___	___	T. Phalanges	___	___

PATHOLOGY:

____

____

____

Sex Criteria ____

____

Age Criteria ____

____

Bone weight (grams) _________ Maximum dimension (cm) _______ Average Dimension (cm) _________

Color ____

Warping/Surface texture ____

Notes: ____

____

EComm 220-001 ARTIFACT RECORDING FORM Page ___ of ___
TRWD Richland Chambers Cemetery Mitigation
Date __________ Site 41NV716 Navarro County Recorder _____

Burial Number ______ Individual _____ Artifact Number _______ Page: ____ of ____ Photo #: ______

Cell: ________ Locus (UTM or cm from S-SW cell) X: ____________ Y: ___________ Depth: _______ (cmbd)

Scale ___ : ___
Length: ______ Width: ______ Depth/Height: ______ Circumference: ______ Diameter: _______ (cms)

Other (describe): 1) ___________________ 2) __________________ 3) _______________________ (cms)

Material: _______________________________ Date: ____________ Number of Similar: _________________

Description: ____

____

____

Inscription(s) & Locations: ____

____

____

____

Position in Relation to Burial: ____

____

Gender: M/ F/ Gender Neutral/ Unknown **Socioeconomic:** Wealthy/ Middle Class/ Poor/ Neutral/ Unknown

Cleaning Method: ____

TRWD Richland Chambers Cemetery Mitigation

Date __________ Site 41NV716 Navarro County

Chain of Custody
For Human Remains and Personal Effects
from 41NV716, a 19th-20th Century Cemetery in Navarro County

I, ___________________, hereby accept all responsibility for the transportation, security, and further care of the enumerated remains and personal effects, excavated by the Ecological Communications Corporation, under the auspices of the Tarrant Regional Water District, from the site known as 41NV716 in Richland Chambers Reservoir, on ____________ 20__:

Grave Number: ________________________ Individual: _________________________

Personal Effects: ____

____

____

____

____

____

____

____

____

EComm Employee:

____

Print Name

____

Sign

____

Date

Ecological Communications
4009 Banister Ln
Austin, TX 78704

Coroner:

____

Print Name

____

Sign

____

Date

____

____

____

Address