AS THE SUN SETS, WE REMAIN:

BIOARCHAEOLOGICAL ANALYSIS OF THE GAUSE CEMETERY AT SEASIDE.

by

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July 2019

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Major Department: Anthropology

In 2014, *USA Today* reported that the search for family roots was the second most popular hobby in the U.S.. The concomitant recognition by the general public of the forensic and bioarchaeological value of human skeletal remains has, in a few cases, proffered osteological analysis as another form of genealogical research. This study focuses on the excavation of a small cemetery of a politically and economically prominent family in Sunset Beach, NC at the request of a descendant. The osteobiographical approach utilized here provides a detailed, contextualized study of the physical remains to complement other historical data on the family. Three brick burial vaults were excavated in 2017, recovering the skeletal remains of three potential adult ancestors of the descendant. The adult female (25-34 years old) and two adult males (25-25 years old and 30-39 years old) have paleopathology profiles expected of free landowners in the antebellum Southeastern U.S. based on comparative samples, with almost no lesions indicative of infectious diseases and malnutrition but with poor dental health. In addition, material remains and burial contexts suggest internment the late 18th to early 19th centuries. Survey also indicated the original cemetery bounds stretch beyond its modern limits, intruded

upon by modernization. The detailed osteobiographies presented in this study reflect the benefits and limitations of these data for genealogical research and addresses the ethical issues tied to descendant-initiated excavation of cemeteries.

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CHAPTER 1: INTRODUCTION

Research into one's roots is a common and growing public interest. Websites like *ancestry.com*, *genealogy.com* and *familytree.com*, DNA tests offered by *ancestry.com* and *23andMe*, genealogical repositories in state archives, and tidbits passed down through family lore are often employed by those wishing to learn more about their ancestors. While fascinating information may be learned, the available record is limited, biased, and does not offer an in-depth look at the individuals studied. Fortunately, archaeology offers a scientific approach for descendants to turn to. Such was the case for Jerry "J.R." Robinson, a descendant of the Gause family.

Robinson traces his lineage to the founding members of the Gause family as a descendant of William Gause, Jr., a founding member of the Gause legacy and a Revolutionary War hero. The Gauses were part of the antebellum plantation elites. The antebellum period—from the adoption of the Constitution in 1789 to the beginning of the Civil War in 1861 (Volo & Volo 2004)—was characterized by a growing dichotomy between the increasingly urban, abolitionist North and the wealthy agricultural planters of the South. Establishing their territory in modern day Sunset Beach, NC (Figure 1), the family amassed their territory throughout the region, building a thriving naval store trading business on the back of hundreds of slaves, and cemented their legacy in early North Carolina's history through economic exploits, government involvement, and military achievements. However, despite their prominence, the Gause name is sparse in the historical record and mainly remembered by local landmarks and legends associated with the family. Additionally, little is known about their deaths or burial locations.

Figure 1: Map of Sunset Beach, North Carolina

Robinson has endeavored to pay homage to his family's legacy by purchasing and rebuilding the cemeteries believed to hold his ancestor's remains. He first purchased a large mausoleum off Hale Swamp Road that once sat in the Gause territory. This large vault referred to as the "Gause Tomb" was commissioned by John Julius Gause, Jr. and is believed to house the remains of Gause descendants and was surrounded by possibly over 100 burials (Gause 2016). However, the vault was forgotten over time, overtaken by the elements and vandalized by grave robbers (Fallon 1962; Rockwell 1979; Carson 1999; Gause 2016). Robinson has since reconstructed and maintained the tomb/landscape—along with his wife, Diane, local historian, Anthony Clemmons, and caretaker, Jim Culpepper—in efforts to re-entomb the desecrated remains and open the site to the public as a Gause heritage site (Figures 2 and 3). Then, on

August 2016 Robinson acquired a small plot of land thought to be another Gause burial grounds (Pezzoni 2009) based on research by Clemmons (Wilson 2011).

Figure 2: J.R. and Diane at the Gause Tomb.

Figure 3: Gause burial grounds caretaker, Jim Culpepper (left), and local historian, Anthony Clemmons (right), watching over the Gause Cemetery at Seaside investigations.

J.R. contacted Dr. Charles Ewen, Professor of Archaeology at East Carolina University, in Spring 2017to request an archaeological examination of the Gause Cemetery at Seaside. The cemetery forms a pocket park at the entrance of a neighborhood between two roads that converge at its western end. The ruinous remains of six brick structures (Figure 4), believed to be graves, were visible at the surface though, without inscriptions or burial records, obscuring the identity of those interred. Robinson believed William Gause, Jr. was interred in the cemetery grounds and sought to confirm the mortuary nature of these structures and identify who was buried in the cemetery and when. He also wanted to locate other potential unmarked burials. Additionally, following his efforts at the Gause Tomb, he wanted to learn about the burial structures in order to

reconstruct them upon reburial of any remains found. His ancestral questions subsequently formed the basis for this thesis.

Figure 4: The Gause Cemetery prior to excavations.

Goals & Objectives

First and foremost, this project is a synthesis of historical information on the Gause family and contemporary mortuary data to provide a baseline for future research conducted on the Gause Cemetery and associated burial grounds while providing a scientific investigation to aid in answering the descendant's questions. Following Robinson's requests, the project

identified the presence and number of burials, extent of original cemetery bounds, and the period of cemetery use. The study of any recovered remains and mortuary context/artifacts provided insight into individual and population life histories. Finally, excavations and recordings of the burial structures allowed for an educated estimate on the original appearance and construction of the tombs. Results of the investigation correlate to individuals of higher socioeconomic status for the time period in North Carolina corresponding with founding members of the Gause family. In essence, the study can be described as a research design exploring the necrogeography, preservation status, osteobiographies, and mortuary architecture for the Gause Cemetery at Seaside.

In addition to the goals of answering Robinson's questions in hopes of providing even a modicum of information on the burials for their eventual reburial, the project undertakes a broader scope in arguing for expanding our knowledge in response to a biased record as well as the social implications/consequences that shape the archaeological community's relationship with the public. Utilizing historical and bioarchaeological analyses, the individuals examined will give insight into life histories from the privileges afforded to them by status to personal struggles not reflected in the record. The study will demonstrate the benefits and limitations of archaeological investigations for genealogical purposes. It also tests the historical record as the objective truth for the past, explains the lacuna of research on correlating populations, and expresses the social and scientific implications for the archaeological stewardship.

CHAPTER 2: BACKGROUND

The Gause family of early Brunswick County were large figures of their time, yet their name is often forgotten when speaking of the county's history despite their achievements. Historical archives and elements of the landscape (roads, Gause landing, etc.) are riddled with the family name yet there is no direct trace of any one member's life history, who often show up randomly in the archives or are completely missing (especially the female members of the family or males without notoriety). Attributed to incomplete record keeping, lost documentation, and the biased nature of early-American historical research, what we know about the Gauses is pieced together from census records, court proceedings, personal diaries, and amateur genealogists and historians.

Moreover, much of the work to reconstruct the Gause history has fallen to their descendants and local historians interested in the founding of their community. As such, this background constructs a view of the early Gause family through a comprehensive literature review wherever they appeared in historical documents as well as the oral histories of the parties interested in preserving the family's name. The research undertaken by this study may aid in supplementing our knowledge of the first generations of the Brunswick Gauses until a family bible can be located and serve as the first step for future professional investigations into one of North Carolina's leading families.

Early Brunswick County

Brunswick County, named in honor of King George I who was of the House of Brunswick, was established in March 9, 1764 by Author Dobbs, the royal governor of North

Carolina, who sought approval to separate this sector of land from incorporated parts of the surrounding New Hanover and Bladen Counties (Lee 1978, South 2010). As a riverine and coastal county, Brunswick created favorable deep water port communities, which prospered from their economic endeavors. Most notably, the region was also ideally suited to the production and distributions of pitch, tar, and turpentine—due to the vast forests of pine trees and a network of navigable streams—at a time when England, a maritime nation, was dependent on a constant supply of naval stores (Lee 1952; South 2010). Wooden sailing vessels of the time required naval stores: pitch was used in caulking, tar used as rope preservative, and turpentine as a paint ingredient and cleaning agent for the removal of tar and pitch. These pine derivatives were manufactured from the beginning of the county's origin, seemingly turning pine resin into gold, and attracted those with the deep pockets ready to buy land with seemingly endless expanses of trees and waterways as well as the enslaved labor force utilized for the arduous task of creating the naval stores (Lee 1978).

Many of the earliest prominent members of the region that would move to Brunswick sought new opportunities to increase their economic and political well-being. As such, Brunswick did not begin with poor and downtrodden men seeking relief from oppression like many contemporary frontier settlers, but with wealthy and influential individuals who came with slaves and other property. Small landowners were not excluded but discouraged, leaving the lower Cape Fear and surrounding coastal areas to begin as a region of large plantations with an economy based on trade rather than subsistence agriculture (i.e. rice, wheat, etc.) (Lee 1952). Some of those families that settled and prospered in the county, particularly around present-day Sunset Beach, included famous and historically well documented lineages such as the Moores, the Brooks, the Frinks, and the other family surnames present in the region to this day. The

Gause family was another lineage—and the focus of this study—that would dominate the area, serving as pillars in their communities and titans comparable to the other families though not as well known today.

The Gause Family

The origin of the Gause family of Brunswick County is difficult to track due to the spotty records of the time, intermarriages within and between famous families, and the commonality of first names through different generations. Also, as was common for the period, names could be spelled phonetically and the Gause surname can often be found in variations such as Gaus, Goss or Gosse. Descendants trace the name to either Germanic, Scottish or French roots. Genealogists also believe the first family ancestor to reach the New World was Edmond Goss, a French Huguenot immigrant from Langham, Suffolk and grandfather to the patriarch of the Gauses of Brunswick County (Gause 2016).

The Gauses owned vast tracts of lands ranging in the thousands of acres throughout Southeastern North Carolina as shown by the various land grant entries in the General Index Brunswick County, N.C. Register of Deeds. The 1910 Map of Brunswick County by Charles Henry Smith (State Archives call number MC.012.1910s) was the earliest located map of the county, naming roads as well as Gause territories (Figure 5), yet their influence in the region began almost two centuries earlier. William Gause, Sr. is credited as the patriarch of the influential family and has been the focus for many descendants in search of his life prior to his presence in Brunswick. According to their amassed research, prior to creating the Gause legacy at Brunswick William Gause, Sr. was a successful entrepreneur and appears in multiple land transactions in Edgecombe County and Bertie Precinct, N.C. and Craven County, S.C. William

then became an innkeeper and one of the earliest settlers of Prince George's Parish, South Carolina (now Windy Hill Beach of Horry County), receiving 400 acres of land from the crown after the state became a royal province in 1729. In 1751, he purchased a plantation from Nathan Frink, including equipment, livestock, furnishings and 400 acres of land (Berry 1988; David & Vern 2009; Judah 2011; Gause 2000; Jones 2001; Koontz 2015; Gause 2016). Though there is no evidence he ever settled there, his descendants would make home in the area where an old Gause settlement and cemetery are said to be located (Gause 2016). Soon thereafter, William apparently arrives in Brunswick County where he established the Gause Plantation and Gause Landing (discussed later in the next section).

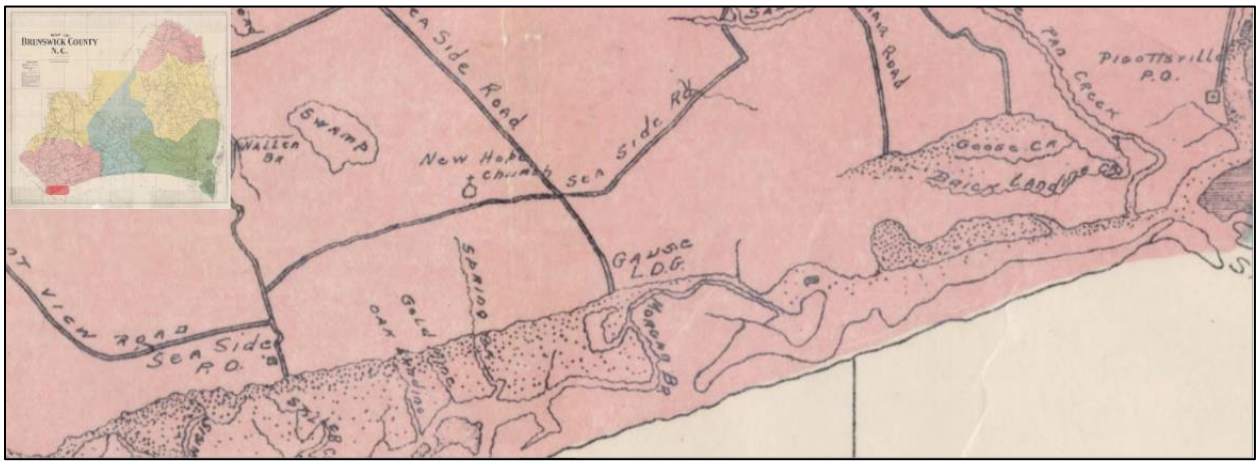

Figure 5: 1910 Map of Brunswick County.

While the Gause family was able to prosper thanks to William's endeavors, there is uncertainty regarding relationships between certain members of the early Gauses for the reasons stated in the opening section of this chapter. The name of William's wife does not appear in any

official documents recovered thus far. However, genealogists suspect that William married a woman named Ann Bryan, referencing a deed from 1740 in Craven County between William and Ann Bryan. While the deed calls Ann a "spinster", it also mentions the names of her three children at the time which shared the names of known Gause heirs despite showing up with the Bryan surname in the document. Another tentative connection is that another of William's suspected children was named "Bryan", linking to Ann's maiden name. Furthermore, fourteen months after the transaction with Ann Bryan, William disposes of items Ann's personal property through a bill of sale, hinting to researchers that William would have gained the right to do so after marriage. When the property was returned to Ann, her name appears as Ann Gause (Gause 2000; Jones 2001; Gause 2016). It is unknown if Ann was indeed William's wife and if the children were originally his or possibly adopted by William after marriage.

Most of the Gause heirs appear throughout archival data from the period and are easier to track than their parents to some degree. While sources vary, it is believed that William, Sr. had seven children: Benjamin, Needham, John, William, Jr., Charles, Bryan and Susannah (Gause 2000; Jones 2001; Gause 2016). Unfortunately, Susannah Gause's historical presence suffers from the similar circumstances of other women in this period, excluded from the historical record. If she existed, it is believed that she married a John Bell who appears in a bill of sale with William, Sr. on March 10, 1762 (Gause, 2016). A Susannah Gause appears on the 1790 and 1810 census for Brunswick County as the head of family (Census Data n.d.). Moreover, little is also known about Bryan Gause though he would have been the youngest of William's children if not? a true heir. Bryan is the son provided earlier as evidence of William's marriage to Ann as his first name shares his hypothetical mother's maiden name. Like his sister, a Bryan Gause appears as the head of family for as early as the 1790 Brunswick County census report (Census Data

n.d.). In his will, Bryan left his children (Benjamin, Bryan, Jr., and Elizabeth Gause) to the care of a nephew named "John Julius", the same name as John Gause's son, strengthening the link to William, Sr. (Gause 2000; Gause 2016). Thus, attempts to create a clear reconstruction of the Gause family lineage remain uncertain. Figure 6 shows this project's attempts at a family tree reconstruction for the early Gauses utilizing an in-depth genealogical report commissioned by Dawson Gause (2016) and provided to researchers by Robinson.

The rest of the Gause lineage has a greater presence in historical documents. All of the sons appear to have followed in their father's footsteps by becoming plantation and slave owners as can been seen through the various census reports around the late 18th to early 19th century (Pruitt 1989; Haskett & Reaves 1989; Mountain Press 1900a; Mountain Press 1900b; Pruitt 2001; Haskett et al. 1995; Census Data n.d.). They all married, often within the same network of powerful families, and had many children (Gause 2016). Benjamin may have served as a drummer boy around the ages of 13-14 during the French and Indian War, appearing on the 1754 roster of the Virginia Regiment commanded by Col. George Washington at Ft. Necessity, KY (Gause 2000). The five brothers fought in the Revolutionary War as soldiers in the Continental Army, with John and Charles rising to the ranks of captain in the North Carolina Militia (Gause 2000; Gause 2016). The brothers survived the war and are cherished patriotic heroes in the region today. It is noted that William, Jr. purchased 20 pounds of gun powder for the protection of Shallotte and Lockswood's Folly should they be attacked (McEachern et al. 1974; Holden 1989; Gause 2016). At some point in the war, William, Jr. was wounded and lost a leg (Daughters of the American Revolution 1976; Gause 2000; Jones 2001; Gause 2016).

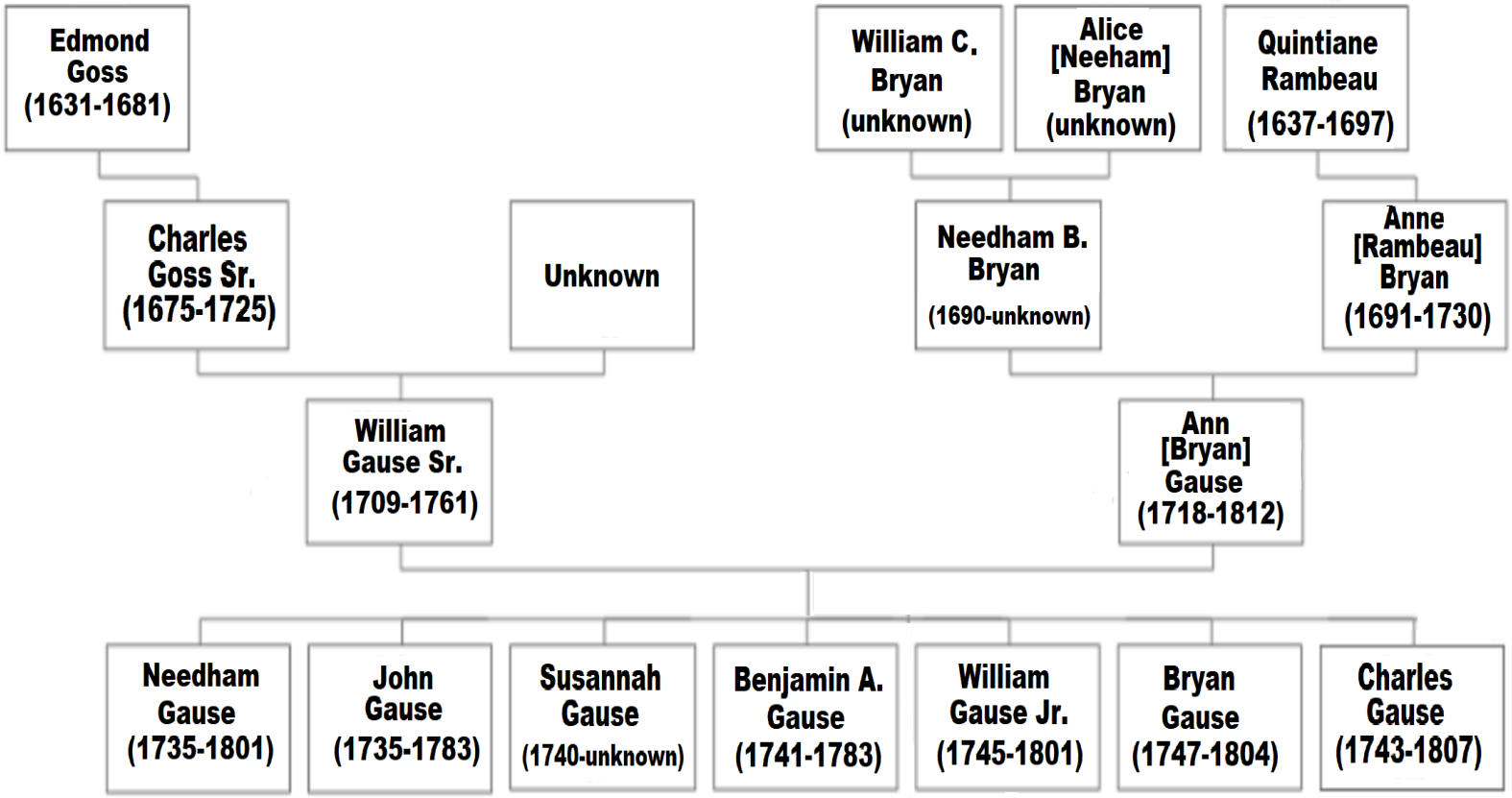

Figure 6: Gause family tree according to genealogy report (Gause 2016)

As leading members of Brunswick society, all of William, Sr.'s sons also sought prominence in the County's legal realms. William, Jr. and Needham are listed among the first justices for Brunswick County, named by a 1776 Convention act (Lee 1978; Thompson & Springle 1992). William, Jr. is also noted as a member of the North Carolina House of Commons, one of five representatives of Brunswick County, and voted for the adoption of the United States Constitution (Gause 2000). Charles was also instrumental in the establishment of the town of Smithville, now Southport, North Carolina, in 1790, when he aided Joshua Potts in circulating a petition to establish a new town in Brunswick County. After their first attempt failed, Charles is credited as resurging and planning a new petition while using his influence to push for support from other powerful figures. Charles then served as one of the first commissioners of Smithville (Lee 1978).

Living Memory

The Gause legacy extends beyond their living descendants or the influence they had in early Brunswick County. The Gause Cemetery at Seaside is the focus of this study and the most recent of the family's legacy to be brought to the public attention, but it is hardly the only one. They are remembered today in the region by their impressive architectural remains and the social connections that are presented as key moments in the area's history.

The Gause plantation established by William Gause, Sr. set the foothold for the Gause legacy in Brunswick County. The Gause plantation centered at "Gause Landing" stretched for thousands of acres from Gause Landing Road to the ocean and inland, including the location of the Gause Cemetery at Seaside. The plantation monopolized the local the naval store trade through the production of tar, pitch, and turpentine in an otherwise desolate area, though some

believe the plantation also was involved in rice production (David & Bender 2009; Gause 2000; Gause 2016). Taking advantage of the coastal geography, Gause Landing Road and the nearby Seaside Landing Road served as convenient and thriving ports for sailing vessels to enter through the many waterways of the area, such as Tubbs Inlet, and unload their cargo then replacing it naval stores (Fallon 1962; Gause 2000; Gause 2016). Bricks from England were imported through the ports for the construction of buildings and structures owned by the family, earning the name "Brick Landing" (David & Bender 2009; Gause 2016). The area today retains the name Gause Landing because of the successful port controlled by the family. Figure 7 shows the general vicinity of some of the family named sites on the earliest map (Price & Strother 1808) depicting the contemporary landscape.

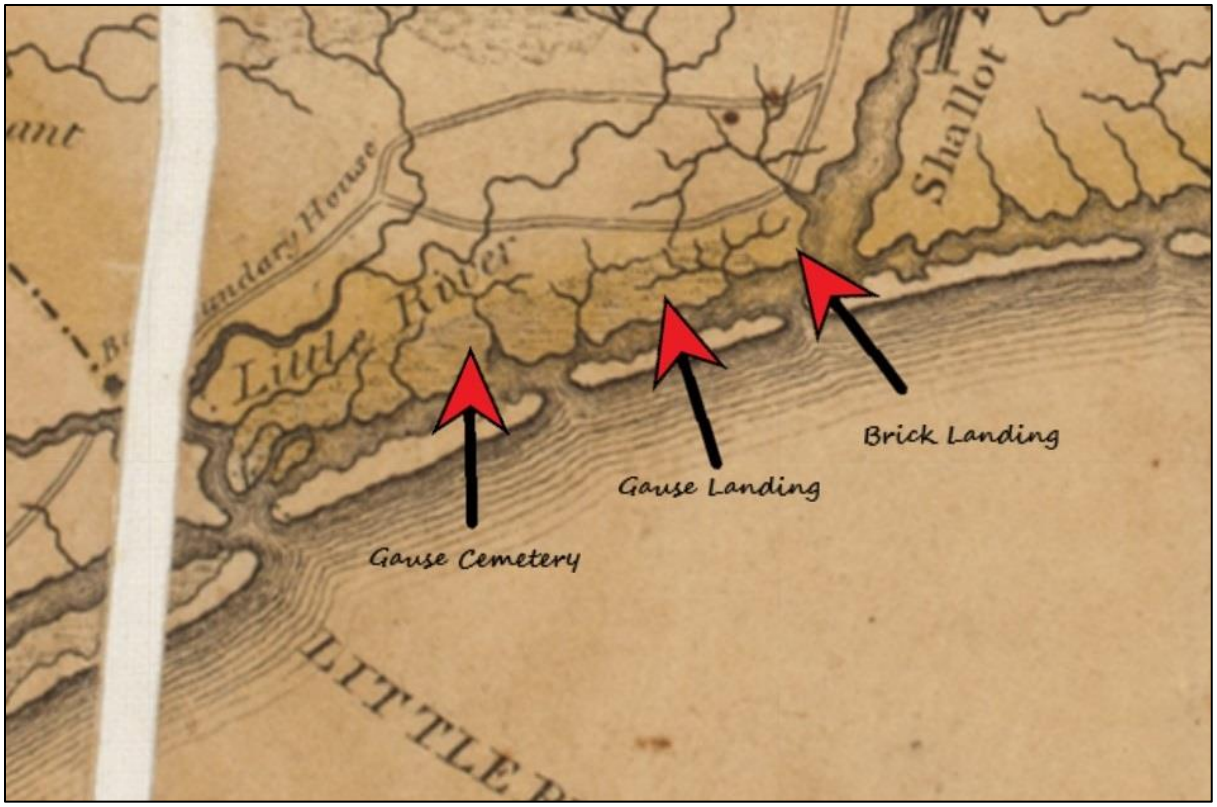

Figure 7: First survey map of North Carolina from 1808 (North Carolina Collection call number VC912 1808p) with Gause sites added to show their expansive territory and control over much of the local coastal terrain which aided their powerful commercial pursuits.

Once situated on top of a hill, appropriately named Gause Hill, within the plantation grounds of Gause Landing reportedly was a beautiful two-story manor house (Figure 8). The Gause Manor was said to have been located on a high bluff of the hill, overlooking the salt water creek and marshlands referred to as Gause Beach now part of the Intercoastal Waterway and Ocean Ilse Beach. The house is believed to have been made of heart lumber and the road leading to the manor ran under the enveloping canopy of some of the largest and most beautiful oak trees in the country, draped with Spanish moss (Carson 1999; David & Bender 2009; Gause 2016). Locals have stated that, until recently, flowers, crepe myrtle trees and the remnants of grape arbors originally planted by the Gauses grew atop of the hill (Fallon 1962; David & Bender

2009). Many theories surround the fate of the manor including destruction by fire or Union gunboats during the American Civil War. There are also local legends about ghostly concerts and baby cries that have been heard on the now ruinous abandoned hilltop (Fallon 1962). The site is now fenced in, under private ownership, with no trace of above ground structures from public view.

Figure 8: Hypothetical reconstruction of Gause Manor from David & Bender (2009).

The Gause Tomb (BW0405) is a large antebellum funerary monument that was constructed posthumously as requested in the will of John Julius Gause, Jr., son of John Gause and nephew of William Gause, Jr. The tomb is rectangular shaped and partially subterranean,

standing about four feet above ground. Built of handmade red brick, the tomb measures about 15 by 15 feet with 18” thick brick walls and stepped sides with a cambered, brick paved roof (Landmark Preservation Associates 2010; Judah 2011; Koontz 2015; Gause 2016; Marshall n.d). The interior was lined with racks to hold coffins (David & Bender 2009). The bricks were said to have been delivered by schooner from England, earning Gause Landing another name: Brick Landing (Landmark Preservation Associates 2010; Gause 2015; Gause 2016). It is reported that the jack-arched entrance had an obelisk and memorial plaque positioned above it (Gause 2016). Over 100 graves have been reported to have been visible at the site in the second quarter of the twentieth century but there are no markers to distinguish location. Over time, caretaking of the tomb was abandoned and it was lost to the elements (Figure 9). At some point in the early twentieth century the tomb had been vandalized in search of valuables claimed to be jewels, gold, and ornamental coffin hardware. The looters broke into tomb and desecrated the remains by scattering bones throughout the site and hanging a skull from tree branches (Fallon 1962; Rockwell 1979; Carson 1999; Gause 2016; Marshall n.d.). A descendant, Baldwin W. Gause, resealed the tomb and decided to cremate the remains (Rockwell 1979; Carson 1999; David & Bender 2009; Marshall n.d.). Robinson (who also commissioned the study on the Gause Cemetery at Seaside) has since acquired the site, which was left unkempt and overgrown, and restored the site to its former condition out of respect for his ancestors (Figure 10).

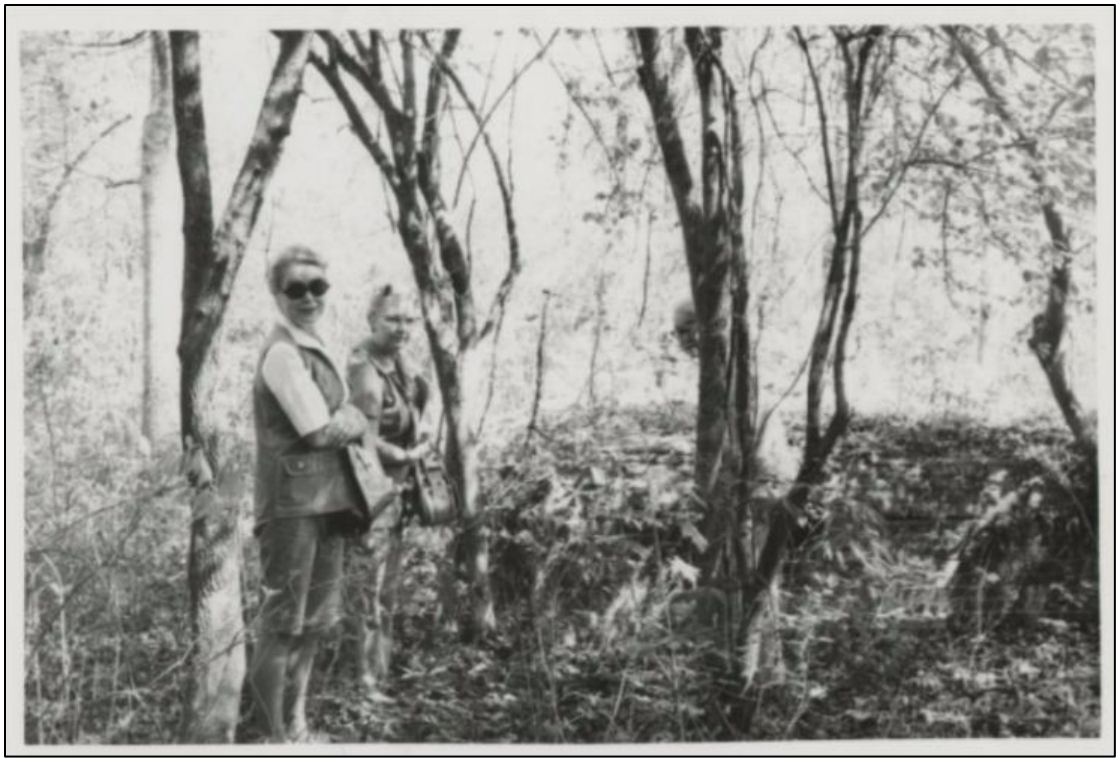

Figure 9: The ruinous state of the Gause Tomb in the 20th century from the "Horry County Historical Society Photograph Collection" at Coastal Carolina University.

Figure 10: The Gause Tomb in 2017.

Some of the richest memories inscribed in the community's history are the highly esteemed friends of the Gauses who noted their visits with the family in their diaries. President George Washington was apparently friends with William, Jr. On Wednesday, April 27, during his 1791 Southern tour, he stopped by the Gause Manor for breakfast (Washington et al. 1979; David & Bender 2009; Gause 2016). A piece of cloth is tied to a large oak tree adjacent to where the manor stood. Legend has it that the spot marks where President Washington rested his damped handkerchief on the tree after making an address to the locals, though others have it that president may have also taken a dip on Gause Beach and hung his underwear on the tree (Judah 2011; Long 2017). The oak tree still stands tall today and the historical marker, D-70, marks the famous visit. Another notable friend was the famous circuit-riding Methodist "Prophet of the Long Road", Bishop Francis Asbury (Lee 1978; Berry 1988). Asbury's diaries describe multiple visits to the Gause Manor over the course of his expeditions: preaching, visiting Gause Beach, and to mourn the loss of his friend, William, Sr. (Asbury & Clerk 1958).

Burial Confusion

While there may be a scant paper trail regarding the lives of the early Gause family of Brunswick County, there remains a greater mystery regarding their final resting places. Regardless of their notoriety and influence in the area, elite burials may be lost to time and forgotten, requiring professional intervention to prove positive location of burials such as the case of another contemporary planter elite of the Lower Cape Fear, Richard Caswell (Balko 2009). Despite the dedication of interested historians and descendants trying to locate the early Gause family, there is great confusion about where they may be buried.

Of the family members discussed above, Charles Gause is the only one with an existing burial place, marked with a grave stone inscription located at Shrub Hill Plantation in Winnabow, NC (Carson 1999; Judah 2011; Gause 2016). The exact location of the other early Gause members is not known (Gause 2016). It is reported that William, Jr. is buried at the Gause Cemetery at Seaside, but there is no evidence for this (Berry 1988; Pezzoni 2009). Earlier burials may have been moved to the Gause Tomb after its construction as it was built posthumously at the request of John Julius Gause, Jr., which also asked for the remains of other family members to be placed in the tomb. With the now cremated remains from the tomb, we will remain unable to rule out the Gause Tomb as the final location for the Gause family less remains uncovered elsewhere prove otherwise.

Antebellum Mortuary Customs

Treatment of the deceased is reflective of a culture's attitude toward death. Burial traditions are often anything but static; as a culture evolves, so do the ideologies regarding death and the dying. American colonists brought with them European beliefs, but the country's formative years saw changing mortuary behaviors with the rise of urbanism, westward expansion, industrial capitalism, consumerism, and regional identities.

Aries (1974) describes how early Americans viewed and approached death as a private affair between the dying and their maker with control over their final moments as the individual was "invested with sovereign authority by the approach of death" (p. 540). With the Christian theology of death as the transition between the living and the afterlife, the dying were expected to prepare themselves carefully for immediate judgement. As such, death was solely within the dying's purview, deeply personal, and out of the hands of those around them whose mourning

mimicked the traditional concept of seclusion. Moving death from the private sphere to the public around the 18th and furthered in the 19th century with rising romantic attitudes toward death (Aries 1974). This shift invited the public eye as a simple, private state became an aggrandized demonstration: death was no longer confined to the home and family but to hospitals and funeral homes, increased intricacies of funerary mythologies and adornments, and mourning became an impassioned and outwardly expressing of grief. By the end of the 19th century, the fruition of these developments in mortuary behavior came to be known as the Beautification of Death or the Cult of the Dead (Bell 1990; LeeDecker et al. 1995; LeeDecker 2009; Springate 2015)

Historical and archaeological documentation of antebellum mortuary customs in North Carolina are lacking, particularly preceding the 19th century. Most information is derived from well documented New England Puritan practices (Geddes 1981). Regardless, Christian theology greatly dictated mortuary behavior in early America, some of which persist today, despite denomination. The Book of Genesis made it clear that humans were made by God from the dust of the earth and that they will return to dust after death (Davies 2008). For this reason, traditional Christian burials were rather simple as described later in this section, keeping to the idea of "ashes to ashes, dust to dust". The interred were oriented with their head westward and the feet to the east, preparing the deceased to meet Jesus Christ who would return from the east on Judgement Day according to the Book of Revelations (Jordan 1982; Stilgoe 1982; Sloan, 1991). Also, wives are buried to the left of their husbands, similar to how they stand at the altar on their wedding, to reflect the account of Eve created from the left rib of Adam (Jordan 1982). The intra-spatial patterning of burials within rural cemeteries also reflect kin groupings and proximity

reflected the living's social network (LeeDecker et. al 1995). In the event of the death of mother and child at childbirth, they would usually be interred together (Geddes 1981).

Additionally, spatial arrangements within burial grounds can reflect hierarchical associations along religious ideologies. Ecclesiology—study of churches—has found that Christian churches are typically oriented in an east-west fashion, much like burials, with location of the more important activities for the church reflecting the same orientation (apse and alter on the eastern end). Churches were meant to be on high and open places facing the light, where Jesus would return during his second coming (Catholic University of America 1967). One's status in life could have significant bearing on the location of burial within consecrated grounds of churchyards. The north side or areas outside of consecrated ground, outside the perimeter of the church graveyard, was often reserved for criminals, suicides and the unbaptized and locations near the altar had more prestigious associations. The rear/eastern side of the church was often set aside of lower status individuals, though perimeter to the wall of the church denoted status. Dissenters of the faith were usually unable to bury their dead in consecrated ground (Gittings 1984; Litten 1992; Sloane 1991).

Along with churchyards, early American burial grounds included pioneer graves, domestic/homestead burials, and Potter's/paupers fields (Sloane 1991). The modern, elaborate urban cemeteries located within cities and town boundaries began around the nineteenth century. Pioneer graves were common in the frontier, and interred wherever death occurred in unmarked graves or in repurposed Native American burial grounds. Domestic, or homestead, graveyards were common in areas without a centralized church, though they remained a popular burial ground in the farm and plantation culture of the South where land was plenty. The burial plots were situated behind or at the edge of the farm, outside of view from the principle road of the

farm and not on the foreground of the cultural landscape. Family burial plots seldom received elaborate treatment and may be quartered off by a fence, wall, drainage ditch, or distinctive plantings. Domestic graveyards were often forgotten and neglected over time after a change of property ownership, unlike the churchyards, which were maintained and supplied by continuous generations of parishioners and the clergy. Domestic graveyards were also typically smaller than churchyards and could go unmarked or received iconographic markers of wood or stone (Stilgoe 1982; Sloane 1991; Gibb 1996; Mytum 2004; LeeDecker 2009). Finally, Potter's fields, also known as pauper cemeteries, were reserved for the burial of persons unknown or the downtrodden unable to afford or excluded from better burials grounds. Due to their low economic status, burials were rather simple, compatible to pioneer graves (Sloane 1991).

Antebellum preparation of a body was a ritualized affair. Deaths frequently occurred at home where it was prepared for burial and funerary display. Before the development of modern undertaking embalming practices in the early nineteenth century in urban areas, and until it was a recognized profession, preparation of the corpse was conducted by nurses more commonly in urban areas or women of the household/town in rural communities. Steps included washing, laying out the corpse to fit a made to order coffin, and wrapping the corpse in a burial shroud (Geddes 1981; Stilgoe 1982; Sloane 1991; Fritz 1994; LeeDecker et. al 1995; Larkin 1988; Mytum 2004). The deceased was often interred with the absence of clothing but covered in a burial shroud. Shrouds were made of linen or a wax-dipped linen called cerecloth. The shrouds looked like a long caped dress and bound at the feet with a knot or pins (Geddes 1981; Litten 1992; LeeDecker et. al 1995). Those who could not afford a burial shroud would substitute with a lengthy piece of sheeting fabric called winding sheets or muslin (Geddes 1981; Larkin 1988). While it was customary to be buried in the absence of clothes and bound in a shroud, individuals

may have also worn a shirt, cap, and chin-cloth underneath the shroud, fastened to the shroud with a copper pin, so-called shroud pins. While shrouds remained in use, their popularity began to wane in the eighteenth century when burial clothing started to trend (Litten 1992; LeeDecker et. al 1995; Riordan 2000, 2009; Lawrence, Schopp, and Lore 2009).

Furthermore, men of the family, or contracted specialists and local workmen such as carpenters and grave diggers, constructed the coffin and dug the grave (Geddes 1981; Mytum 2004). Prior to the universal use of burial coffins, the dead were commonly buried in tight shrouds and commonly used coffins owned by the church only to transport the body (Geddes 1981; Riordan 2009). By the early seventeenth century, coffins became the standard depositional method for all but the poorest (Riordan 2009). Symbolically, coffins came to be viewed as vessels carrying the dead to the afterlife, becoming important artifacts in the death ritual. Before the Beautification of Death, coffins were rather simple and utilitarian in design made up of nothing more than a few boards and nails, lacking decorative coffin hardware (LeeDecker 2009), though rare examples of more elaborate designs that would follow are found in earlier periods (Springate 2015). In the mid to late nineteenth century, with the advent of the funerary business, Beautification of Death and the increased presence of death from the American Civil War, coffins became standardized, mass-produced and elaboratively decorative, birthing the modern casket patterns (Bell 1990; Sloane 1991; LeeDecker 2001). Prior to the standardized caskets, Coffins were generally constructed to fit the individual, so each coffin was uniquely correlated to body size (Lawrence et. al 2009), while the choice of coffin shape strongly correlating to age at death (Riordan 2009). A basic coffin consisted of six to eight boards making up the head, foot, sides, bottom and lid and makers used the greatest number of nails, regardless of coffin shape, at both ends (Lawrence et. al 2009). Early American coffins (Figure 11) came in three primary

shapes: rectangular, trapezoidal, and hexagonal. Additionally, all three shapes could be found with flat or gabled lids. Flat lids would be secured with nails or screws along the perimeter and A-line gabled lids would have additional nails along the center line where the two boards met. The simple rectangular designs had four parallel side bending at 90° corners. The trapezoidal designs, or tapered coffins, were some of the common earliest coffin form in North America which were wide at the head and tapered towards the feet, earning the name “toe pinches”. Beginning around the mid-seventeenth century, the most commonly used coffin shape in early America was the hexagonal coffin form. The simplest form was built with a flat lid and the use of the hexagonal coffin persisted until the mid-nineteenth century. Hexagonal coffins widened at the shoulder but tapered at the head and feet, nicknamed “shoulder coffins”. Another form existed as an anthropomorphic shaped coffin which narrowed at foot and expanded up to the shoulder where it angled in and boxed around the head (Hume 1982; Riordan 2000, 2009; LeeDecker 2001; McKeown and Owsley 2002).

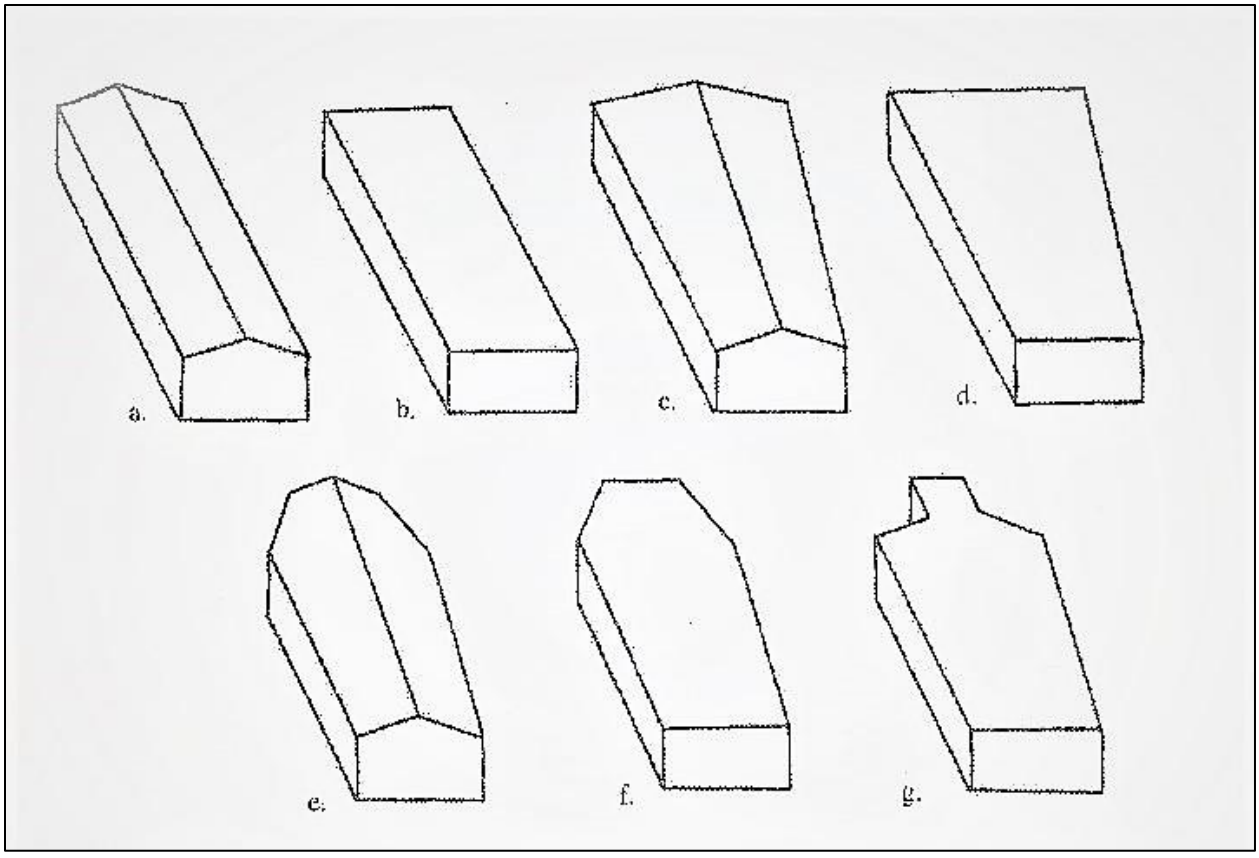

Figure 11: "Historic period coffin shapes: a) gable-lidded rectangular; b) flat-lidded rectangular; c) gable-lidded trapezoidal; d) flat-lidded trapezoidal; e) gable-lidded hexagonal; f) flat-lidded hexagonal; g) flat-lidded anthropomorphic" (from Balko 2009, p.27, based on McKeown and Owsley 2002).

Colonial coffins were made from mahogany or walnut, which ran on the expensive side, or elm, oak, pine, southern pine, chestnut, cedar, Southern pine, or bald cypresss depending on local availability, preference, and financial standing (Lee Decker 2001; McKeown and Owsley 2002; Espenshade, Matternes, and Gillett 2007). Pine sources were plentiful in the South, easy to work and cheap, often attributing to their increased presence in southern graves (Larkin 1988). They were frequently painted, stained red or black, darkened with wax, or decorated with a cloth cover and perhaps ornamented with hinges and an inscribed plate (Giddes 1981; Espenshade et.

al 2007). To prevent leakage of fluids and gases, coffins joints would be sealed with pitch and a thick layer of sawdust or bran was placed underneath the corpse to act as a cushion and sponge (Litten 1991; Mytum 2004).

According to Geddes (1981), burial occurred two or three days following death. Quicker timelines were employed if the body was offensive to the living through noxious gases. Early forms of embalming—removal of body fluids and perhaps organs—were utilized on occasion in hot weather by the desire to keep the body from smelling until a decent funeral could be arranged. Funerals could also be postponed if close relatives of the deceased required long distance travel to attend. The coffin with its shrouded cargo was often laid out in the best room of the home with open casements for coolness until transportation to the burial ground. Mirrors and pictures may have been draped in black shrouds and crepes. The family of the deceased would choose the day and time of the funeral, adjusting accordingly for attendees and necessary preparations. Printed invitations were not used until the late eighteenth century and notice of death by church bells or messengers was common. The traditional means of tolling funerary invitations was one ring for a child, two for a woman, and three for a man, followed by tolling the age of the deceased. Those asked to bear the body to the grave, ministers, and civil officials were more formally invited. Attendance does not seem to have been restricted and a whole town could be brought out in honor of a prominent figure's death. Funeral parties dressed in mourning attire, such as emblems of black and badges of mourning, gathered shortly before burial and were segregated by rank. Burials were usually late in the day shortly before dark. Prayers, elegies, poems or remarks were read before departure to the burial site. Processions would follow the carriage-carried coffin transport through the streets, being sure to pass through the town's main area under church bell rings. Mourners would follow behind the coffin on foot in rows of

two-by-two, with immediate family first followed by friends ranked in order of social standing. Military servicemen and public leader would have additional armed troops in the procession, firing volley shots as a solute in honor of the deceased.

Antebellum Mortality Data

Longevity and mortality are important measures of the life context for any group (Rathbun 1987). While adequate death registration procedures did not exist for all states until 1933, investigators have attempted to create life tables for earlier time periods (Pope 1992; Hacker 2010). Available information on the trend in life expectation for the antebellum period are not especially diverse because most life tables result from death registration coverage concentrated in the more industrialized and urbanized states of the Northeast until 1910. The earliest life tables rely heavily on data from Massachusetts due to their better documentation of mortality data. However, that state was characterized by much higher levels of urbanization, industrialization, and immigration and much lower levels of nuptiality and fertility than the rest of the nation. Compared to North Carolina, it was much more urban and had a proportionately larger and more rapidly growing foreign-born population. Massachusetts had a much lower proportion of its labor force engaged in agriculture with the state being one of the first to industrialize in the early nineteenth century as well as one to the best public health systems in the nation.

Life tables for females present more troubling documentation bias as women appear less often in public records and are difficult to track due to surname changes at marriage, disappearing from mortality observation more frequently than men. Data for women based on Massachusetts records are also not suggestive of the national estimates as the state led in

employment of women in the labor force and in fertility transition, with fertility rates approximately one-third lower than the nation, thus failing to represent the increased mortality rates for women in their childbearing years seen in agricultural states (Hacker 2010). Researchers note the importance in distinguishing the difference between rural and urban societies when creating life tables for women. Johansson (1977) observed that past agricultural societies unfavored females by reserving most of the food, particularly meat, for males of the family unit whereas industrialized societies with a female work force faced less nutritional discrimination decreasing susceptibility to diseases. Evidence suggests that nineteenth century rural females suffered higher rates of infectious diseases relative to males, with higher susceptibility to respiratory diseases such as tuberculosis which was more pronounced in rural areas, than their urban counterparts (Alter et al. 2004).

Rural areas also had higher nuptial and fertility rates, which increased the cumulative risk of maternal mortality. Pregnancy and lactation have been noted to increase nutritional demands and reduce cell-mediated immunities on women increasing infection risks (Kippen 2005). The antebellum South, with the highest maternal mortality rate in the country (Tunc 2010), commonly saw expectations for new life was followed by preparation for death. To ensure mother and baby were correctly attended to in death, mothers-to-be often drafted informal wills regarding the distribution of their personal belongings, messages and instructions for the child should it survive the birth, their own funeral and burial arrangements, and preparations of deathbed wishes (Tunc 2010; Haynes 2015). In doing so, they articulated their death with commanding and deferential language which assumed recognition and respect from the male members of the family (Haynes 2015). The unfortunate reality allowed control over one's death and bittersweet independence rarely afforded to women. Estimates suggest U.S. nineteenth

century mortality rates averaged between 5 and 10 maternal deaths per 1,000 live births in rural areas (Loudon 1992; Kippen 2005; Hacker 2010). According to the World Health Organization (2018), infections after childbirth, complications such as sever bleeding, pre-eclampsia and eclampsia, complications from delivery and unsafe abortions account for nearly 75% of modern maternal deaths.

Hacker (2010) provides the latest life table reconstruction found for antebellum whites, building on prior models with estimates fitted to new standards derived from the 1900–1902 rural and 1900–1902 overall death registration area life tables using a two-parameter logit model with fixed slope, resulting in decennial life tables which more accurately represent sex and age-specific mortality rates for decades contemporary to the assumed cemetery use dates. While no consensus has emerged on the trend in mortality from the late eighteenth century to the Civil War, mortality research shows declining life expectancies from the late eighteenth century for both sexes up to the sharp drop in male life expectancy concurrent with the war. According to Hacker, white male life expectancy at age 20 was 41.4 years from 1790-1799 and continued to decline to 38.4 years from 1850-1859 before experiencing a sharp drop to 33.8 years from 1860-1869 attributed to the war. Moreover, women's life expectancy followed declining pattern in the antebellum period, with lower life expectation than their male counterparts. According to Hacker's (2010) model, the female life expectancy at age 20 was 40.5 years from 1790-1799 and steadily declined to 37.5 years for the 1850-1859 decade. The Civil War was the first time that the female life expectancy of 38.9 years surpassed their male cohort's and maintained a higher life expectancy than males moving forward. Interestingly, antebellum period women had a higher life expectancy around age fifty, not coincidentally a time also associated with menopause

which removed the individual from the higher mortality rate women faced during their child bearing years (Pope 1992).

Bioarchaeological studies of colonial and antebellum mid-Atlantic/Southeastern cemeteries provide background on expected biological data derived from communities preceding and contemporary to the Gauses, allowing for interpretation of health and quality of life that affect mortality rates. Applicable bioarchaeological studies of skeletons from these time periods have focused on populations of both African American (enslaved and free blacks) and white tenant farmers or those of lower socioeconomic status than the Gauses (Angel 1976; Thomas et al 1977; Savitt 1978; Rathbun 1987; Aufderheide et al. 1981, 1985; Clark 1985; Angel et al. 1987; Lanphear 1990; Owsley 1990; Rathbun & Scurry 1991). Generally, tenant farmers and slaves from the early part of the nineteenth-century display high amounts of non-specific indicators of stress, associated with rigorous, load bearing and repetitive activity notable of farming life and malnutrition and parasitic infections leading to anemia (Savitt 1978; Clark 1985; Angel et al. 1987; Rathbun 1987; Rathbun & Scurry 1991; Trinkley et al. 2011). In some cases, whites experienced less levels of acute stress than their black contemporaries (Angel et al. 1987; Trinkley et al. 2011; Davidson & Mainfort 2011). Poor dental health was common amongst the populations, though whites sometimes displayed evidence of dental health access in the form of dental fillings and hygienic practices (Angel et al. 1987; Rathbun 1987; Trinkley et al. 2011; Seeman et al. 2011). High rates of dental pathology and growth interruptions suggest a diet fairly high in carbohydrates and plant foods, malnutrition, increased sugar intake, and less real meat and fish protein carrying fluoride (Angel 1976; Angel et al. 1987; Rathbun 1987). Epidemic diseases (e.g. smallpox, yellow fever, scarlet fever, cholera, typhoid, diphtheria, tuberculosis, malaria, etc.) had no racial biases and lead to maternal as well as neonatal mortality (Angel 1976;

Rathbun & Scurry 1991; Trinkley et al. 2011), while treatment through purging and bloodletting probably exacerbated the effects of diseases (Rathbun & Scurry 1991). According to Rathbun & Scurry (1991), health similarities were more pronounced between groups of clearly unequal social status than differences expected for diametrical social positions, subject to shared burdens posed by their environments.

However, advantages afforded to whites of higher socioeconomic status have been documented in both the mortuary practices and skeletal remains (Little et al. 1992; Seeman et al. 2011). The Foscue family of rural nineteenth-century North Carolina were an elite plantation family comparable to the Gauses. Analyses of the Foscue vault skeletal elements indicated that the childhood and adult health of these individuals is notably better when compared to slave and free landowning individuals in other areas of the Eastern seaboard. Their skeletons displayed a fairly sedentary lifestyle with no indicators of skeletal trauma, low indicators of activity stressors, and few non-specific indicators of stress other than mild degenerative joint disease or vertebral pathologies attributed to aging. Similarly, they exhibited attempts at good dental hygienic behaviors and access to dental care. However, rates for dental caries were similar to contemporary populations, resulting from diets high in carbohydrates and sugars (Seeman et al. 2011). Likewise, differences found in lead intake levels has been attributed to social status, wherein higher lead content was noted in whites than contemporary blacks from extensive household use of lead and its products in the storage, preparation, and serving of food that was practiced by, and reserved for, the wealthy plantation whites (Aufderheide et al. 1981, 1985).

Archaeology in Historic Cemeteries

The archaeological investigation of historical cemeteries is a relatively recent phenomenon when compared to the history of the discipline, with some attributing the rise of interest to urban growth and renewal projects (Ubelaker 1995). However, many question the need for osteological studies pertaining to historical cemeteries if the historical record already provides the answers sought. At the same time, historical archaeologists may view the skeletal record as more trouble than it is worth, irrelevant or only viable as a handmaiden to the historical record (Larsen 1997; Perry 2007). Of those that recognize the importance of skeletal analysis for historical archaeology, many are descriptive and focused on singular cases lending to small percentages of human remains of whole groups overrepresented (Larsen 1997). Historical bioarchaeology provides a unique perspective that aids the understanding of cultural processes not reflected or argued in the written record.

By looking at historical cemeteries for answers, we look at a sample of the population studied. Large skeleton assemblages provide "pattern and tendency in a population perspective" (Larsen 1997, p. 3). Historic cemetery populations frequently belong to specific localities and are more homogenous genetically and with similar experiences to environmental pressures, providing a clearer picture of the past locations than inference using existing skeletal collections or individual cases. The population approach is useful for establishing patterns of physical behaviors and lifestyles, health and disease, and demography among other aspects of the human condition (Larsen 1997). Historical cemeteries may also be paired with recorded information pertaining to individuals interred within the burial grounds which can be compared to the historical record for identifiable variables that may have been left in the skeleton, possibly allowing for "individuation" (White 2005) of remains recovered. A practical resource for the

archaeology of historical cemeteries is Bell's (1994) reference work which amassed a body of research on the subject.

Historical cemetery studies are affected by the fact that the osteological record is biased, in terms of preservation, as remains recovered do not reflect the true extent of the population that persisted at the time of burial. White (2005) cites four extrinsic factors, independent of the biological features of population under study, acting on the dead which reduce the size of the sample available for study. "First, only a portion of those that died are buried at the site being studied. Second, only a portion of the buried evade destruction. Third, only a portion of the undestroyed are discovered. Fourth, only a portion of the discovered are recovered for the osteologist to analyze" (p. 360). Burials exist in an environment where complex interactions occur between the body and a wide range of variables. Therefore, it is imperative to understand the preservation factors (i.e. taphonomy) that may affect the site to control for potential absence of remains and needless future study.

Taphonomy, the law of burial, is the interdisciplinary study of what has happened to an organism between death and recovery of its remains (Schotsmans et al. 2017). After death the body may be affected by biological, physical, chemical, and cultural factors. Taphonomic forces related to preservation for historic-period cemetery burials include soil chemistry and composition; precipitation, groundwater and drainage; temperature; age-at-death of interred individual; bone structure; method of burial; and local flora and fauna (Gordon and Buikstra 1981; White and Hannus 1983; Von Endt and Ortner 1984; Henderson 1987; White & Folkens 2005; Mays 2010; Warren et al. 2011; Surabian 2012; Schotsmans et al. 2017). Soil chemistry and soil composition, in a multitude of combinations, affect the decomposition and preservation of human remains in different ways. Soils with high acidity do not preserve organic remains

well, as they result in protein demineralization of organic substances (Gordon and Buikstra 1981; Mays 2010; Warren et al. 2011; Surabian 2012; Schotsmans et al. 2017). Alkaline, aerobic fine sands lend in favor of preservation though some abrading and cracking of the bone surface may occur. Well drained and aerated soils speeds decomposition through contact between water, oxygen and the noxious gases expelled by the body. When drying, this environment warps, cracks, laminates, and splinters the bone. Rainfall, groundwater and sunlight, as well as fluctuation in water activity and seasonal freeze/thaw cycles cause weathering on bones that damage its durability and may transport destructive chemicals into osseous tissue (Henderson 1987; Nawrocki 1995; Surabian 2012; Schotsmans et al. 2017). Constant change between wet and dry soil create expansion and contraction forces being exerted on remains. Extremely wet environments promote waterlogging and result in bone flaking, peeling, or total destruction of the skeletal elements within a short period of time (Price et al. 1985; Nawrocki 1995; McKeown and Owsley 2002; Warren et al. 2011; Surabian 2012; Schotsmans et al. 2017). Temperature can regulate decomposition and microbial activity with increases in temperature, as well as fluctuations, speeding disintegration of the corpse though extreme temperatures may preserve remains well (Von Endt and Ortner 1984; Mays 2010; Surabian 2012; Schotsmans et al. 2017). Such taphonomic factors may result in the complete decomposition of a skeleton by the time of recovery (Balko 2009).

Furthermore, the age of the interred and bone composition factor into preservation of remains. Juvenile remains may be underrepresented in burial excavations because they do not preserve well in comparison to adult remains (Manifold 2015). They are subject to the same taphonomic processes at a quicker rate due to their small size and limited mineralization. Similarly, remains of the elderly have reduced bone mineral density despite their larger size, and

are susceptible to faster disintegration (Buikstra & Ubelaker 1994; Larsen 1997; Schotsmans et al. 2017). Long, circular bones are more likely to survive soil pressure while flat bones are prone to crushing, warping, and breakage. Smaller bones and trabecular (spongy) bones are quicker to decay while thicker and more compact bones are better suited to survive destructive taphonomic factors (White & Folkens 2005; Schotsmans et al. 2017).

The burial method utilized will also have a mitigating effect on preservation. Antebellum preparation for the dead, such as washing and shaving of corpses, do not affect preservation status but coffins and shrouds may greatly attribute to the status of remains. Closed confines provide a barrier against decomposition by microorganisms, insects, and other environmental elements (Schotsmans et al. 2017). Conversely, a collapsed lid allows/retains water and sediments into the coffin space, fracturing and damaging osseous tissue. Like soil chemistry, acidity of the wood content of the coffins can contribute to skeletal destruction. Burial depth influences quantity of soil bacteria, insect and other invertebrate activity, and attraction of carnivorous animals, with deeper burials better preserved against these elements. Finally, scavenging by fauna may damage and scatter the skeletal remains while plant roots etch the bone surface as they penetrate the bone, seeking moisture and nutrients (Warren et al. 2011; Surabian 2012; Schotsmans et al. 2017). Additionally, skeletons may be affected by coffin wear, the localized destruction of skeletal elements caused by contact with the coffin. As decomposition of soft tissue occurs, portions of the skeleton come in contact with the coffin floor or compressed by the coffin lid. Bones may become warped, have a sheared appearance, or stained from contact with coffin remains (Schultz 2012).

Taphonomic factors not only relate to preservation effects but also affect the location of burials during remote sensing mapping to locate unmarked burials (Ewen 2016). Ground

penetrating radar (GPR) has been found to be particularly useful in the identification of historic structures and graves. The technology is essentially the same as traditional radar but aimed to uncover hidden targets below the surface rather than the air. The main difference between traditional radar and GPR lies in the parameters of frequency and wavelength as different radars measure depths and targets in fractions of their wavelengths, thus a single system cannot fit all applications (Utsi 2017).

Simply put, GPR is a geophysical survey technique that transmits electromagnetic waves into the ground, in the form of high-frequency radar pulses. The waves are transmitted from a control system equipped with a surface transducer pair antenna—transmitter and receiver—and some means of data collection through a computing device. This device contains a data logger and a distance measurement device, such as an odometer or encoder wheel. The controller generates electromagnetic pulses which are passed into a transmitter which then conducts through the survey medium where parts of the signal are bounced back to the receiver. The changing nature of the survey medium and subsurface anomalies trigger these reflections which carry information back through the receiver, into the control unit and from there to the computing device for visualization and data collection. GPR generates a data set of reflections from specific materials along the interfaces between units in the ground. Radar travel time is measured precisely. The measurements are converted by depth and amplitude, yielding a three-dimensional data set of reflection amplitudes over a surveyed area and transformed into profile, plan, and slice maps. To generate such maps, the GPR data should be collected within an established rectangular grid along consistently spaced transects, though arbitrary runs may also yield the important information about the presence of anomalies to a trained eye but fail to build a coherent map (Conyers 2004; Utzi 2017).

GPR is subject to a number of variables affecting the interpretation of GPR images, including: (1) soil changes and types; (2) soil chemistry; (3) stratigraphy of different depositional environment; (4) energy propagation, reflection, refraction, and attenuation in the ground; (5) types of cultural features that might be present and their geometry, distribution, and origin; (6) water distribution and retention; (7) the nature and distribution of other materials in the ground, such as roots and animal burrows; and (8) understanding of GPR methods and theory (Conyers 2004). As such, GPR is not the panacea for geophysical investigations but rather faces several limitations. For example, soil conditions need to be favorable as fine-grained sediments (low resistivity) and areas with saline groundwater cause rapid attenuation of the radar signal, leading to poor signal penetration (Bristol & Jol 2017). Archaeological subsurface features need to be markedly unambiguous to be distinguished from non-archaeological man-made features (such as utility lines) or geological elements. Features must also be at a depth that can be recognized by the appropriate antenna, the machine and the data interpreter. Additionally, unlike the common misrepresentation of radar investigations presented in popular media, GPR does not present an accurate picture of the subsurface feature but rather anomalies from soil disturbances. Also, location of anomalies may range within a one-meter radius of the area originally recorded (Bevan 1991; Conyers 2004; Ewen 2016).

The layout of historic Christian cemeteries offers the opportunity for systematic archaeological investigations as graves are typically interred in rows at varying intervals, allowing for an educated guess of burial locations which can be supported by GPR. However, the successful use of GPR to identify historic burials is contingent upon a number of factors, such as the distinctiveness of the burial as a reflector of electromagnetic energy, the characteristics of the burial, the amount of clutter and background noise present in the soil, the

underlying geology, and the amount of uncertainty or omission that is acceptable. More recent, and better preserved, burials should be more apparent as there is more distinct features to detect, particularly coffin hardware or the air pocket if the burial container remains sealed. However, in cases of coffin decomposition where only the skeleton remains, if at all, rather the disturbed soil of the grave shaft may be identified in relation to the more uniform soil. Even under ideal conditions, burials may be overlooked with GPR while other features within the soil may be misidentified as unmarked graves, necessitating the need for proof-testing (Nobes 1999; Conyers 2004; Davenport 2000; Doolittle & Bellantoni 2010; Dupras et al. 2016; Utsi 2017). Still, GPR is becoming more commonplace is the search for unmarked graves and increasingly successful (Balko 2009; Bevan 1991; Buck 2003; Conyers 2004; Davis et al. 2000; Ewen 2016; Hoving 1986; King et al. 1993; Mellett 1992; Miller 1996; Nobes 1999; Nodes 2000).

Electrolysis and Galvanic Wrap

Like organic material found deposited in cemeteries, inorganics break down over time. Metals, though long lasting in equilibrium, begin to degrade as they are impacted by the fluctuating and volatile natural processes undergoing decomposition and their deposited environments. Corrosion of iron follows the general corrosion theory in the formula: $4Fe0 + 2H2O + 3O2 \rightarrow 4FeO(OH)$; iron plus water plus oxygen will turn to ferrous oxy-hydroxide (rust). A more complex understanding of the simple general corrosion formula states that all corroding metals create a battery with a positive pole and a negative pole wherein corrosion or oxidation is the movement of electrons both within and between metals and the freeing of metallic ions while reduction is the collection of electrons. At the positive side of the battery, or the anode, the iron will give off electrons, turning iron atoms in charged ions which migrate. The

migrating iron ion will encounter oxygen, energy, and water and turn to rust while also producing hydrogen ions, or acid. In short, corroding iron produces rust, acid, and electricity. At the cathode, or negative pole of the battery, the electrons given off at the anode are used, reducing oxygen and water produce hydroxyl ions, or a base. Therefore, corrosion is an electron transfer that will continue so long as electrons are produced at the anode and used at the cathode (Rodgers 2004).

Concretions begin to form almost immediately when iron is exposed to oxygen and water in the soil as the metal corrodes. As the metal breaks down, the iron is moved out of the artifact, forming a hard, bulbous hollowed-out mold. Attempts at conserving iron artifacts involve understanding the corrosion process and undertaking methods to halt, stabilize, and even reverse it through electrochemical and electrolytic reduction cleaning processes. An electrochemical cleaning reaction (galvanic wrap) is based upon the association of two metals occupying different positions on the galvanic or electromotive series of the metals, where the less noble metal will begin to donate electrons to the more noble metal without an externally applied electromotive force. Electrolytic reduction (electrolysis) is an electrochemical reaction maintained by an externally applied electric current (Hamilton 1999; Rodgers 2004).

CHAPTER 3: METHODOLOGY

The methods employed in this project served to confirm the data of the cemetery, including the necrogeography, mortuary architecture, and osteobiographies of individuals interred. The excavation and analysis of both the cultural and skeletal remains recovered from the Gause Cemetery at Seaside relied on a combination of physical anthropological, archaeological, and historical methods and data. Through a holistic approach, the material aided in developing a thorough understanding of the burial grounds.

Records Review

Historic period maps were observed to note earlier mention of the Gause cemetery prior to the Pezzoni's (2009) historic property survey—the first governmental document to identify the grounds as a burial site and associate it with the Gause family—in order to narrow down the date of the cemetery. Early maps were also useful in depicting accessibility and distance to the Gause cemetery from the Gause living spaces, such as the manor and plantation. As stated earlier, Southern antebellum family burial grounds, as reminders of death, would be located outside of the foreground associated with the living and not in view from the principle road leading to the farm, often behind or at the edge of the farm. With time, old roads may have disappeared or moved, or information was lost regarding their historical use and ownership. However, the earliest located map of the region with named Gause sites and roads was the "Brunswick County Map, 1910" by Charles Henry Smith (State Archives call number MC.012.1910s). Though the map is a reminder of the Gause legacy in the county almost two centuries after their founding, it would have been affected by continuous modernization and miss on the necessary context between the cemetery's location and the rest of the Gause cultural landscape.

Furthermore, the original ownership and identity of those interred for the Gause Cemetery at Seaside remains a mystery. Prior to Pezzoni's (2009) survey, there is no indication of the cemetery belonging to the Gause family. Documenting family ownership of the area during the burial ground's period of use will strengthen ties to the Gause family. A review of land entries, warrants and grants was initiated at the Brunswick County Register of Deeds through the online database (http://brunswick-live.inttek.net/) and followed by a review of physical records at the Brunswick County Courthouse. The Legacy Indexes E-K (1764-1931) of vendor-vendee land transactions identified the appropriate book and page references of Gause-related land records.

Similarly, this research was supplemented by a review of accessible land records, wills, government documents, and newspaper mentions at the North Carolina State Archives. The study also accessed genealogical research conducted by other parties interested in the early Gauses (i.e. descendants and local historians) which may contain valuable information outside of public purview from sources such as family bibles and generational knowledge. The historical review allowed for a more holistic background on the family whereas most sources provide a modicum of redundant information. Additionally, such information provided for an educated assessment on which members of the family were around the area during the cemetery's use, relationship reconstruction, and death information pertinent to the project's results.

Survey of the Gause Cemetery at Seaside

The graves at the Gause Cemetery at Seaside seemed to form a series of clearly-defined rows expanding across the landscape from north to south (Figures 12 and 13). Five of the visible graves formed two of the rows (row one: Graves 1, 2, and 3; row two: Graves 7 and 8) and three

more delineated a third row (Graves 4, 5, and 6). All of the visible graves were oriented east-to-west. Initial cemetery documentation involved mapping in two types of surface features in the cemetery area: three brick-fall assemblages were inferred to be graves (Graves 1, 4, and 5) which had only the midpoints plotted, and four graves marked by visible rectilinear superstructures (2, 6, 7, and 8), were plotted at their outer-most visible corners. Top-profiles of excavated graves are found in Appendix A.

Figure 12: Members of research team documenting the cemetery upon first visit. 4 brick tombs observable in the picture.

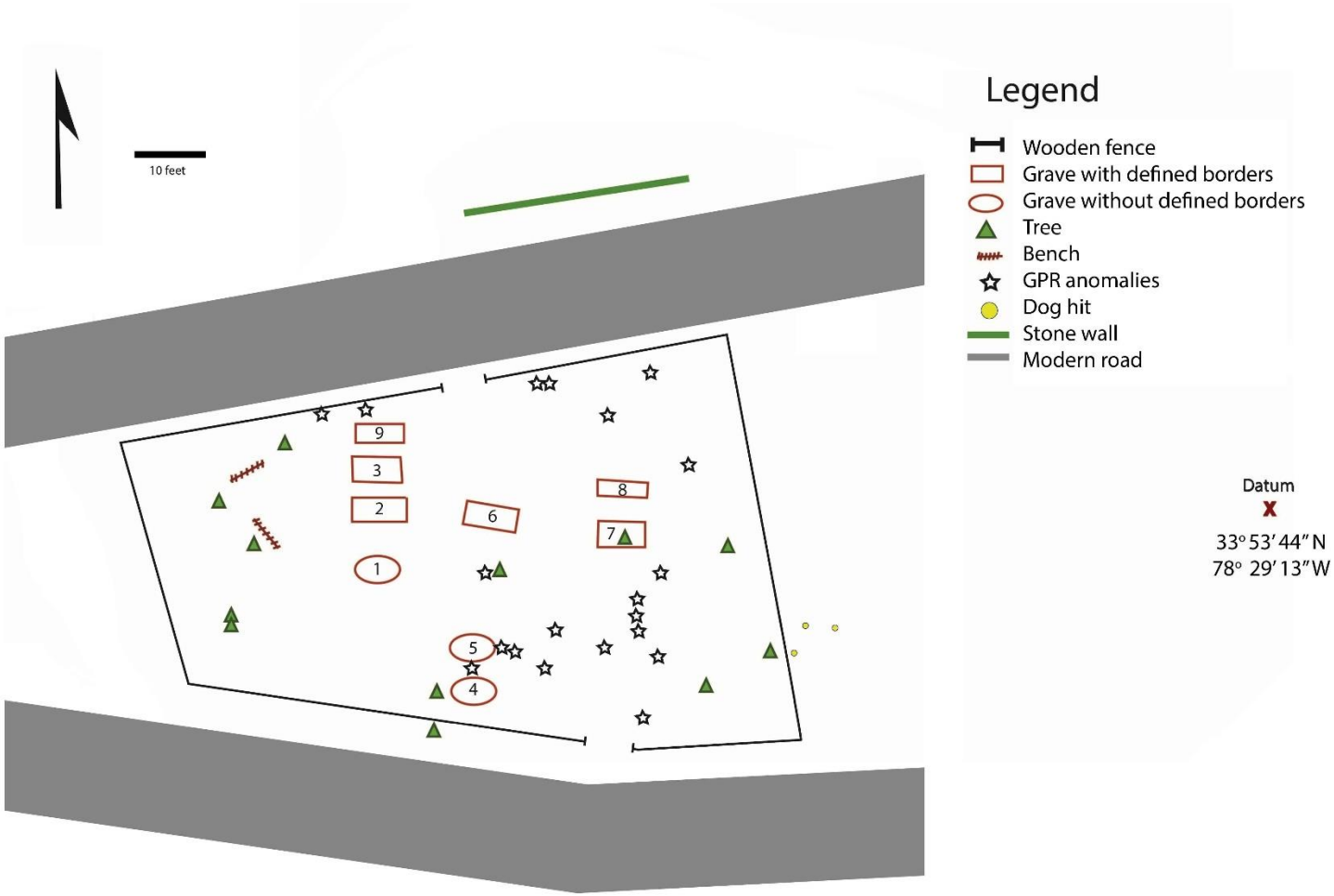

Figure 13: Line Map of Gause Cemetery. Datum was centered on an already existing survey benchmark monument marker (PID: DD2596) on the western end of the cemetery for reference against the National Geodetic Survey database.

Geophysical survey served to identify other graves within the rows along with additional rows, and define the extent of the cemetery, including a possible boundary wall. The survey was conducted using the East Carolina University Phelps Archaeology Lab's TerraSIRch SIR-3000 GPR machine. Metal pin flags were utilized to demarcate any detected subsurface anomalies indicated by hyperboles or obvious irregularities within a consistent profile. GPR coverage of the western end of the cemetery was hindered by brush, dense tree cover and modern architecture. In many instances, other obstacles prohibited a strict linear survey by the GPR. Two blacktopped roads delineate the northern and southern sectors of the central cemetery area, and because of private property limitations, only the northern side of the northern road could be surveyed. Unfortunately, a 2000 MHz GPR antenna was unavailable to conduct a survey of the roads. It is unknown if human remains under the road prism existed, were removed upon road construction, or remain undisturbed.

Excavation Methods

Cemetery excavations spanned ten days between May 24th, 2017 to June 5th, 2017. The final phase of fieldwork—clearing the project footprints—occurred over two days, June 6th and 7th, 2018. Project crew consisted of ECU professors, Dr. Charles Ewen and Dr. Megan Perry, two graduate students, Jorge Quintana (author) and Kara Weidner, and a rotation of undergraduate field school students. The graves sampled and selected for excavation were purposely chosen based on logistics wherein those with existing, and well defined above surface structures were most likely to be graves and possibly yield material for analyses. Three assumed graves (Graves 1, 2 and 6) were initially planned for excavation due to project time constraints. Investigations began with Grave 1 but were subsequently terminated as evidence of

misidentification arose. Grave 8 was then chosen to replace Grave 1 through the same logic previously stated. In addition, the selecting of the new grave would allow the investigations to reach a wider scope of the cemetery with one excavation in each row series (Grave 2 in row series 1; Grave 6 in row series 2; and Grave 8 in row series 3).

The feature-based excavations focused on documenting and removing any visible surface tomb architecture to reveal the rectilinear grave shaft, which was presumed to follow the interior dimensions of the tomb architecture. Excavation of the shaft fill commenced at arbitrary 10 cm levels. Initially, 100% of grave shaft fill was sifted, but it seen became clear that the grave shaft contained almost no material culture, and thus sifting was only conducted on soil within the coffin interior and immediately surrounding the body. Grave shaft profiles became unstable as moisture within the sand evaporated, and plywood and other materials had to be used to shore up the sides of the grave as excavation progressed deeper. In addition, it became clear that the rectilinear surface structure did not always match width of the actual burial shaft. This was the case with Grave 8, where the eastern and northern portions of the brick grave architecture had to be removed and the excavation area expanded 2' to the north and 1' to the east to recover the entire burial. The exposed graves were backfilled after excavation, which in some cases (such as Grave 1) contained broken bricks followed by soil. Figures of the full skeletons articulated *in situ* can be found in Appendix B.

The next day, Grave 2 was exhumed following procedure. However, the vault walls ended at a depth less than anticipated, with no vault floor. Assuming we had reached the bottom of the grave shaft, it was believed there may have been a previous removal event of the remains unbeknownst to the landowner. Despite concluding the end of the excavation, solid-core probing was utilized, detecting a deeper sub-surface anomaly than the vault depth. Digging was then

restarted until the anomaly revealed a wooden mass, later realized to be part of the coffin lid, which broke open to reveal a skull (Figure 14). Reaching the end of the work day, the exposed remains were covered with a plastic tarp and partially backfilled. The grave was subsequently topped with plywood and a tarp to protect the grave from intrusion by the elements (Figure 15).

Figure 14: Skull in Grave 2 revealed and documented.

Figure 15: Safety measure employed during excavations before ending each day.

Excavation resumed on May 27th, 2017. Grave 2's contents were uncovered, and coffin remains collapsed on the skeleton were removed and bagged. All soil at the coffin level was sifted for artifacts, coffin remains, and disarticulated skeletal pieces. The articulated skeleton was recorded and collected in meshed bags which allowed air flow to avoid condensation buildup leading to further and further damage of the remains. These bags also aided sifting while transporting without losing skeletal pieces. Following complete removal of grave contents, reaching sterile soil, the interior vault walls were recorded.

The same procedures were applied to Grave 6 and 8 though adjusted accordingly based on encountered circumstances. Grave 6 excavation hit a thick root about 1.5' in diameter running the E-W just below the vault which had to be worked around yet served as a convenient step for entering and exiting the grave shaft. With previous knowledge of the grave contents past the vault depth from Grave 2, excavation continued straight until the skeletal level. The landowner/descendant also helped with the excavation of Grave 6, thus offering the opportunity to present proper archaeological methodology to the public and strengthening the relationship between the project at hand and the directly affected community.

Grave 8 proved too narrow to dig straight down the grave fill to the skeleton like the previous graves. Therefore, fill was removed until the vault depth and the north wall was then demolished after recording, allowing expansion of the unit size to accommodate the excavators (Figure 16). The remains were partially exposed upon reaching the skeletal level—from skull to upper tibiae with the lower limbs and right side of the body, as well as associated coffin remains, still entrenched in the soil beyond the unit walls—due to offset vault placement and size in comparison to the person interred. The researchers carefully expanded beneath the southern and

western unit walls to avoid demolishing yet another facade or risk the collapse of the already compromised vault before recording and recovering the remains.

Figure 16: Grave 8 before and after unit expansion.

Artifact Processing and Inventory

All material and skeletal artifacts found within the tombs were bagged by stratum and grave and processed in ECU's archaeology laboratory. Wooden coffin fragments were dry-brushed to remove excess soil and weighed per individual grave. Buttons were dry-brushed and refit if possible. Iron artifacts—coffin nails and fasteners—were dry-brushed, individually

counted, and weighed. When possible, nail pieces were refit and counted as a single unit, or if fragmented were differentiated between head, shaft or end piece. Finally, ceramic sherds recovered from Grave 2's shaft fill were cleaned with a wet brush and dried before inventoried.

All iron artifacts recovered from the site showed heavy corrosion defined by iron concretions, a red/brown mass consisting of sand and other hard rock cemented together in a ferrous oxide and ferrous carbonate. Of all iron artifacts recovered, only four nails and one fastener were deemed in favorable condition to undergo conservation. Selection was based on artifacts being fully intact with no breaks and the amount of metal within the iron concretions necessary for treatment, determined to be a suitable amount of metal remaining when the artifact was attracted and stuck to a passing magnet. Pre-treatment photographs were taken and the treatment was commenced in the maritime conservation laboratory. Sand paper and a sand-blaster were used to expose a small contact point on the bare iron at the shaft of the nails and side body of the clasp. Two nails were chosen to undergo galvanic cleaning while two nails and the fastener were chosen for electrolysis.

The nails used in the galvanic wrap were enveloped loosely in aluminum foil and placed in a glass beaker of 20 percent solution of sodium carbonate, or soda ash. The artifacts were left in the caustic solution until the aluminum foil completely oxidized, thereafter rewrapped with new foil and replaced into the solution. The artifacts chosen for electrolysis were suspended in an 0.5 percent sodium carbonate electrolytic solution with steel alligator clips. The clips were connected to a mild steel anode also placed in the tank, making sure the artifacts did not touch the sacrificial metal. The anodes were charged using a DC power source at 12 volts amperage to engage the electrochemical reaction, noted with the production of a fine mist of hydrogen bubbles.

After the artifacts stopped giving off hydrogen bubbles in the electrolysis tank and the aluminum foil stopped oxidizing in the galvanic cleaning, the artifacts underwent a final scrub with a nylon bristle brush and a paste made from sodium bicarbonate and distilled water followed by a final soak in distilled water. The objects were then subjected to three successive baths in denatured alcohol for dehydration. A 5 percent mixture of tannic acid, a corrosion inhibitor, in alcohol was brushed on the surface of the artifacts. A final humidity barrier was applied immediately after the tannic acid application, coating the artifact in microcrystalline wax by submerging them in a vat heated to about 220 degrees F until bubbling caused by water driven from the objects subsided. A final photograph was then taken for each of the artifacts.

Osteological Examinations

The skeletal remains recovered were heavily warped and fragile, though remarkably well preserved for a region unfavorable to osteological preservation. The general color of the bones was a yellow-brown with no noticeable staining aside from soil stains. All remains were transferred from the field to the laboratory in meshed bags which allowed for further sifting and air flow to combat further degradation caused by condensation. Skeletal remains were cleaned by dry-brushing and inventoried at ECU's Bioarchaeology laboratory. Since each burial consisted of single individuals, all bones were assigned a single field specimen number at the ECU laboratory according to their corresponding grave. After processing was completed, all skeletal elements were inventoried using protocol outlined in *Standards for Data Collection from Human Skeletal Remains* (Buikstra and Ubelaker 1994).

Analysis of the remains included estimating sex, age, stature, and ancestry, and documenting pathologies. Data collection of followed protocol outlined in Buikstra and Ubelaker

(1994). FORDISC 3.1 computer software (Ousley and Jantz 2005) was used for the estimation of stature against 19th century samples of white males or white females depending on the determined sex of the skeleton. Age and sex were determined using morphological observations following standards set in Buikstra and Ubelaker (1994). Due to taphonomic exfoliation of bone surfaces and absence of pubis symphyses, age was determined through combined analysis of the auricular surface of the pelvis, following Lovejoy et al. (1985), and epiphyseal fusion (e.g. medial clavicular epiphysis and vertebrae annular epiphyses. Identification of ancestry utilized cranial morphological by Gill (1998) as metric measurements to identify race were unlikely due to heavy warping and fragmentation.

Health and quality of life was assessed from presence of dental and bone pathologies and documented using Buikstra and Ubelaker (1994) standards. These skeletal lesions from indicators of activity, environment, and diets leave behind evidence to reconstruct an individual's life history. Anomalies of infectious, mechanical, and congenital origins can be used to assess an individual's quality of life and stressors faced. Patterns observed for in this study include degenerative conditions, non-specific indicators of stress, infectious conditions, and congenital anomalies. Antemortem tooth loss, caries, calculus, abscesses, alveolar resorption, and enamel wear as assessed macroscopically. Goodman & Rose (1990) was used to calculate age of stress for any dental enamel hypoplasias (DEHs) found wherein a hand-held 10X microscopic lens was used to identifying the type of defect present in teeth while measuring its distance from the cemento-enamel junction with sliding calipers. Pathologies of a congenital nature were identified using Barnes (2012). All defects were documented by region and severity.

CHAPTER 4: RESULTS

Data from the investigation of the Gause Cemetery at Seaside are presented into four sections: necrogeography, tomb architecture, material culture, and biological data. The necrogeography data details the layout of the cemetery and identified graves. The architectural data examines the burial vault structures and grave construction methods. Material culture concerns the coffins and artifacts found within the interments. The biological data regards the preservation of remains uncovered and skeletal investigations to create individual osteobiographies based on age, sex, ancestry, and skeletal pathological lesions.

The research design of the project was limited to the examination of three burials due to the time constraints. The graves excavated in 2017 (Graves 1, 2, 6, and 8) had a clear brick superstructure indicative of a burial and appeared to have minimal disturbance from surrounding trees and shrubs. However, removal of the above-surface bricks associated with Grave 1 failed to reveal a clear rectangular cist seen in the other burials, nor clear evidence of a grave cut. The other three graves were identified as true mortuary structures and in fact contained human skeletal remains within the grave shaft.

Necrogeography

The cemetery is situated at the entrance of a neighborhood between two asphalt roads that run along the north and south sides, connecting at the western end of the site (Figure 17). The site dimensions (Parcel ID: 242MH01204) encompass 0.16 acres. The area containing mortuary-related brick superstructures is surrounded by a modern wooden fence. The site perimeter contains eleven large trees, one growing from the middle of Grave 7, and couple of large shrubs

within the western side of the fence. The trees were identified by the cemetery caretaker, Jim Culpepper, as one dogwood tree, one red oak, two hickory, two water oaks, and five live oaks.

Figure 17: (Top) Site area from aerial view looking west-northwest. Cemetery sits behind the open dirt lot. (Bottom) Cemetery from northern bisecting road featuring in situ brick piles/structures prior to excavations. Pictures from Google Earth/Maps.

A quick reconnaissance survey identified the apparent ruins of eight brick tombs, represented by a piles of disturbed and partially dislodged bricks. These graves were given numbers 1 through 8. In addition, a 9th potential tomb, represented by a layer of *in situ* bricks partially visible at ground level, was discovered at the end of the season but not fully documented (Figure 13). All of the visible graves appeared to be oriented east-to-west and were organized in north-to-south rows. Some sets of visible mortuary features (e.g., Graves 2, 3, and 9 or Graves 4 and 5) likely indicate the interval spacing between each grave in each row, and between rows, which could help in identifying graves with no remaining surface features (Owsley et al. 1997; Mytum 2004).

The presence of unmarked graves in the cemetery was explored using a probe to find brick grave features and/or loose burial fill soil, ground-penetrating radar (GPR) to find subsurface anomalies indicative of soil transitions, e.g., between grave fill and the surrounding soil, and cadaver dogs. The only graves identified through solid probe subsurface testing were Graves 4 and 5, which discovered larger concentration of bricks under the few visible at ground level. The rest of the site had scattered bricks and tree root obstructions at different levels within the subsoil so positive hits could not be distinguished from false-positive indications of burials. We also failed to discover any rectangular shaped brick layouts characteristic of the burial vault wall dimensions other than Grave 9 (accidentally revealed after the topsoil was removed during backfill). In addition, the natural strata at the site, which consists mostly of the Kureb fine sand series, has a looseness that makes it indistinguishable from the burial fill. Furthermore, if burial layout follows an observable pattern which we had not discerned, the interval measures employed for probing may have unintentionally missed the vault walls.

The GPR survey recorded several anomalies at the east and north ends of the cemetery. The southwest section of the cemetery had too many shrub and tree obstructions to allow for surveying. The twenty anomalies recorded in the rest of the cemetery area extended to depths similar to that of the graves excavated (Figure 13). Most points do not allow for much interpretation in terms of the shape of the subsurface features, with the exception of a series of linear hits just south of Grave 7 within margins of what may be an east row. Ground truthing in future seasons could identify soil with similar color and consistency of grave shaft soil seen in the excavated graves.

In addition, a linear series of anomalies at the same level were identified to the north of the north road over an area previously probed by the cemetery caretaker and believed to be one of the original walls of the site. A test pit at one of the markers revealed the remnants of what appears to be an old stone linear feature. The extent of this possible wall extended eastward as far as the northern fence on the other side of the rode, and then it corners to the south and extends just outside of the eastern fence (Figure 13). This linear feature may be the original northern and eastern boundaries of the cemetery, and that the cemetery may extend under the northern road. Archival research has not clarified whether or not the presence of the cemetery was noted during construction of the road, which is common when forgotten burial grounds impede modernization (Owsley et al. 1997).

The cemetery also was used for the training of cadaver dogs by the "Brunswick Search and Rescue" team chief, Christy Judah, on June 2nd in human skeletal remains detection, and these results also could indicate further graves (Figure 18). First, the dogs were alerted to the skeletal remains uncovered in the excavated graves, and then were commanded to indicate smells similar to the skeletal remains. First, dogs successfully marked the backfill from the burial

excavations, lending a measure of reliability to the use of their ability to identify skeletonized human remains. The dogs were also run through the rest of the cemetery area, and hits from the dogs were marked with flags by the cadaver dog trainers. Unfortunately, attempts to map in the cadaver dog hits were hindered by removal of most of the flags by the trainers before we could geolocate most markings. There were no clear concentration of hits within the cemetery fence, but three points within close proximity to one another outside the fence line were recorded. This may represent one burial outside of the modern border (Figure 13).

Figure 18: Cadaver dog team searching the empty lot west-adjacent to the cemetery.

Vault Data

The above ground burial vaults were covered in rubble mixtures composed of brick, mortar and marlstone. There was no evidence of brick whitewash suggesting the vault walls did not undergo treatment. However, thick pieces of straight marlstone with brick patterning were recovered from the rubble mixtures though it remains uncertain which walls were originally plastered. Some marlstone/mortar pieces were curved, which likely was used to create the barrel vaults of rounded cresting noted in the 2009 Historic Site Survey report's description of the burial vaults. However, none of these pieces contained the barely legible inscription date described by the survey. This piece may have been removed from the site or may have been weathered beyond recognition, obscuring the original transcription. The size of the marlstone block, and lack of plaster on the rectangular vault walls, suggests that it was not a simple layer of finish but rather a thick rounded covering placed on top of the vault walls. Removal of the rubble from the upper parts of Graves 2, 6, and 8 revealed a rectangular-shaped stanchion two courses wide filled with light yellowish-brown sand. The two course-wide cist continues below ground, but instead of creating a stable feature all of the way down to the body, it only extends a few courses deep. A limestone mortar served to adhere the bricks together. The burial fill was almost devoid of artifacts and lacked bits of brick and mortar that would indicate looting or any intrusion into the grave.

Grave 1 initially had a mound of rubble with a visible rectangular-shaped sublayer similar to the other graves. While removal of the brick fall revealed a roughly rectangular feature, these bricks appear to have been placed loosely without mortar as a platform-like feature, rather than a rectangular-shaped alignment with fill (Figure 19). About 1.5' of soil was removed after removal of this base, but no distinct grave cut could be identified in the subsoil.

The soil followed the expected stratigraphy of the site with no evidence of disturbance other than tree roots and decayed tree root matter. No remains were uncovered within the soil removed and probing did not yield subsurface anomalies. Excavation of Grave 1 therefore was suspended because it appeared to not have been a grave. However, excavation of the other graves possibly indicates that the expected stratigraphy may not apply to the site and the yellowish sand (Figure 20) that appeared to be the natural stratum of the level was indeed the grave cut and erroneously interpreted.

Figure 19: (Left) Grave 1 with rubble (left) and its subsurface brick platform (right).

Figure 20: Grave 1 when suspended. Yellow sand starting to show.

Grave 2 consisted of a damaged brick burial vault with only the brick and mortar fill remaining over a rectangular base. The base was two courses of bricks wide, all held together by mortar, and had external dimensions of 7.8’ E-W by 3.4’ N-S (Figure 21). These surrounded a rectangular area of fill that measured 6’ E-W by 2’ N-S. A 2 courses wide substructure continued five courses (24”) below the surface of the extant feature (Figure 22). The upper part of the grave fill consisted of loose, yellowish sand that did not resemble the local soil (10YR 8/6). Three moderately-sized prehistoric sherds were found within this fill (Figure 23) at 13.5” (for a single piece) and 23.5” (for the others) below feature surface of the feature that appear to be accidental inclusions. The grave shaft soil continued as slightly muddled light grey fine sand, as expected from a single depositional event. At 4.5’ below the surface, the vestiges of the original wooden coffin sides began to appear, indicating the original level of the top of the coffin. The coffin had

collapsed into the grave where the remains of the coffin lid rested on top of the skeleton. The grave continues to a 5.91’ at its lowest depth from the surface to the bottom where the bottom of the coffin and soil meet. The coffin interior measures about 6.02’ E-W by 1.6’ N-S. Wood used in its construction is about 1” thick though cyclical waterlogging and drying periods may have caused shrinkage. The extant height of the coffins walls suggests the coffin was at least 1.4’ tall. No constructed cist surrounded the coffin. Coffin hardware in the form of heavily corroded nails were recovered from the coffin and sifted fill though no pattern was noted. The skeleton laid E-W with head westward, hands crossed at the pelvis, and skull facing north (Figure 24). No coffin bottom was found beneath the skeleton and the heavily fragmented wooden pieces around the body were too indistinguishable to differentiate between coffin lid or bottom. Excavation of the soil beneath the lowest coffin and skeletal remains was sterile (Figure 25). Bioturbation was noted by small roots intruding throughout the vault walls and into the coffin. There is no evidence of faunal or human disturbance on the graves. The missing coffin bottom, waterlogged wood, rusted metals, and eroded posterior skeletal elements suggest the graves were subject to taphonomic effects of humidity, rain and/or a rising water table.

Figure 21: Grave 2 with brick rubble (left) and exposed vault structure (right).

Figure 22: Grave 2 structure showing vault walls.

Figure 23: Sherd piece found on NW corner at end of vault wall during Grave 2 excavations.

Figure 24: Grave 2 skeleton exposed.

Figure 25: Sterile soil and coffin vestiges after upper body skeletal elements were removed.

Grave 6 contained the same brick and mortar rubble tumble above the stanchion as Grave 2. The rectangular feature was constructed with two courses of brick on each side (Figure 26). Exterior dimensions measured roughly 7.4’ E-W by 3.6’ S-W and interior dimensions at about 6’ E-W by 2.5’ N-S. The subsurface portion of the rectangular feature continued six courses (24”) below the surface level (Figure 27). A large tree root intruded on the burial N-S just below vault wall. The vestiges of the coffin appear around 5’ deep where the original coffin lid probably reached. Like Grave 2, coffin collapse was also noted in this grave and no coffin bottom was found under the skeleton. The wooden remains were similarly fragmented as that of Grave 2 and coffin features were indistinguishable. The grave continues to 5.7’ at its lowest depth from the extant surface to the bottom where the skeleton and sterile soil meet. The coffin interior measures about 6.4’ E-W by 1.6’ N-S. No constructed cist surrounded the coffin. Coffin hardware in the form of nails were recovered from the coffin and the sifted fill. Bilateral metal staining was found about 5” from the long axes on the head end and lower portions of the coffin. This parallel may suggest a feature on the coffin such as design (mid-line opening lid) or construction technique. The skeleton laid E-W with head westward, hands crossed at the pelvis, and skull facing south (Figure 28). The difference in head position between the graves is attributed to natural shifting rather than mortuary behavior. Bioturbation was noted by small roots intruding throughout the vault walls and into the coffin and the large root underneath the vault walls previously stated. There is no evidence of faunal or human disturbance on the graves. The missing coffin bottom, waterlogged wood, rusted metals, and eroded posterior skeletal elements suggest the graves were subject to taphonomic effects of humidity, rain and/or a rising water table.

Figure 26: Top view of Grave 6 structure.

Figure 27: Grave 6 south wall. Large, bisecting root visible.

Figure 28: Grave 6 skeleton exposed.

Grave 8's structure was the most unique and troublesome of the three burial vaults with skeletal remains. The stumps of two small dead trees were found touching the eastern wall. The grave had the same rubble mixture above the substructure as the previous two graves, but the rectangular stanchion was much smaller compared to the other graves (Figure 29). In fact, the initial hypothesis was that this was the grave of a child. The superstructure was constructed of two courses of brick and its exterior measured about 6.4' N-S by 2.5' E-W while the inside was a tight 4.5' N-S by 1' E-W, making it impossible to excavate only the shaft fill within the feature. Thus, the complete north wall of the rectangular feature was removed, and the excavation area extended to the north by 2' to accommodate the burial excavation. The subsurface portion of the feature, like the other graves, only extended along the upper portion of the grave shaft, at four courses or 1.63' below the surface (Figure 30). The extension of the excavation unit revealed the actual grave shaft in profile, which extended about 1' beyond the northern side of the constructed crypt (Figure 31). At 5.5' below the surface a trace outline of the coffin was located at the southern edge of the unit, and it became clear that it extended into the southern profile, requiring removal of the east vault wall and expanding the unit another foot to completely excavate the burial. As discussed below, the remains were not those of a child, and the surface feature was not big enough to outline the entire grave shaft and burial. In fact, the extension to the east was not enough to reveal the portion of the skeleton below the middle 1/3rd of the tibiae. A small probe was created into the eastern end to reveal the distal tibiae, feet, and eastern end of the coffin. Coffin hardware consisted of corroded nails but no associated pattern was noted. The body was laid E-W with head westward, hands on the hips, and skull facing south (Figure 32). The shoulders and femorae were supported by bricks that possibly served as pedestals for the coffin. As with the other burials, no cist was created surrounding the burial. Excavation below the

surface continued until 7.5’ to confirm sterile soil had been reached, making it the deepest grave encountered. No coffin feature stood out except for an 8 x 19 cm, 0.75” thick, single piece of coffin lid wood (Figure 33) running N-S, resting above the chest. Grave 8 also showed greatest bioturbation from root activity, possibly from the connected stumps mentioned or the tree growing out of the middle of the adjacent burial, Grave 7. There is no evidence of faunal or human disturbance on the graves. The skeleton was also the most heavily fragmented of the sampled graves. Like the others, the missing bottom portion of the coffin, waterlogged wood, rusted metals, and heavily damaged skeletal elements, including missing thoracic elements in two graves, suggest the graves were subject to taphonomic effects of humidity, rain and/or rising water table. The vault differences may explain the difference in preservation, with the larger, body encompassing vaults offering better protection from the elements and environment.

Figure 29: Grave 8 with surface rubble (left) and exposed vault (right).

Figure 30: South wall of Grave 8 after removal of north wall to allow for excavation.

Figure 31: Exposed grave silhouette of Grave 8 extending beyond where the northern wall sat.

Figure 32: Grave 8 skeleton exposed.

Figure 33: Largest, most intact, piece of coffin recovered. Part of the coffin lid.

Material Culture

Only a few objects were found within the graves (Table 1), mostly associated with the body and the coffin. Cleaning of the artifacts in some cases was hindered because of their poor preservation. Conservation was attempted on a few of the metal artifacts using galvanic wrap and electrolysis (Rodgers 2004). As stated previously, prehistoric sherds were found within the upper fill of Grave 2. The ceramics (Figure 34) were identified by Dr. Randolph Daniel, Jr., professor of prehistoric archaeologist at East Carolina University, as clay-sand tempered, Cape Fear core-marked sherd of the Middle Woodland period. The artifact inclusions are believed to be accidental, introduced upon backfilling the grave but speak of the site's multitemporal use.

Table 1: Summary of grave artifacts with count/weight

Grave #	*Artifact Type/Count*			*Coffin fragments (total weight)*
Grave 2	Nail/Nail fragments (x100)	Button (x1)	Ceramics (x3)	2,2079g
Grave 6	Nail/Nail Fragments (x199)	Buttons (x8)	---	1,1047.4g
Grave 8	Nail/Nail Fragments (x142)	Buttons (x9)	Fasteners (x2)	1,580.9g

Figure 34: Photos of ceramic sherds found in Grave 2's fill.

Coffins were found in Graves 2, 6, and 8. The coffin wood was highly degraded and distorted, making it difficult to tell how many single pieces were used in their construction, but all coffin pieces were retained during excavation. The tops and upper portions of the coffins collapsed on top of the bodies, presumably after they deteriorated to the point that they could not withstand pressure of the overlying soil. In some cases, the lid was indistinguishable from the upper portions of the collapsed sides. The coffins appeared to be simple rectangles. Samples of

each coffin were sent to Dr. Ilona Peszlen at North Carolina State University to aid in wood identification. Dr. Peszlen (2018) found wood samples from all three graves belong to the group of southern yellow pines, identified by their pinoid cross field pitting and dentate ray tracheids. The wood characteristics did not allow for distinguishing of any particular southern yellow pine species, but native species found on North Carolina's Southeast coast include: Virginia pine (*Pinus virginiana*), Pond pine (*Pinus serotina*), Shortleaf pine (*Pinus enchinata*), Loblolly pine (*Pinus taeda*), and Longleaf pine (*Pinus palustris).*

All of the coffins were constructed using with iron cut nails. The coffin nails had a high degree of corrosion and thus were poorly preserved. Metal concretions coated the nails, creating a mold of the original nail forms and retaining small metallic traces. When concretions were removed, only a thin layer of the nails' surface remained with interiors hollowed out. The better-preserved nails still were embedded in pieces of coffin wood, perhaps helping their preservation. All nails identified were machine-cut (Figures 35-37), which were in use from the late 18th century until the mid to late 19th century (Figure 38), when they were replaced by wire nails (Hume 1974). No other coffin hardware was found in any of the graves, as expected of antebellum elite burials prior to the more ornate hardware found in mid to late 19th century burials following the Beautification of Death. In addition, two metal fasteners (Figure 39) were found to the left and right of the lumbar region in Grave 8, potentially part of the burial clothing, such as fasteners for suspenders.

Figure 35: Examples of the better-preserved nails found in Grave 2.

Figure 36: Examples of the better-preserved nails found in Grave 6, showing concretions.

Figure 37: Examples of the better-preserved nails found in Grave 8.

	Hand-wrought nail, before circa 1800
	Type A cut nail, circa 1790s-1820s
	Type B cut nail, circa 1810s-1900s
	Wire nail, circa 1890s to present

Figure 38: Nail Typology Chronology (Visser 1997).

Figure 39: Metal fasteners found at either side of the lumbar region in Grave 8.

Twelve buttons also were found during the excavations, eleven of which were made of bone and one made of shell. Two bone buttons were too fragmented for complete documentation. Eleven buttons were identified using South's (1964) button typology for contemporary Brunswick Town and Fort Fisher, North Carolina (Figure 40). Based on this typology, the shell button from Grave 2 was identified as type 22, the five bone buttons from Grave 6 as one type 19, three unidentifiable, and two smaller four-hole bone buttons not matching South's typology, and the four of the six bone buttons from Grave 8 were identified as type 19 and two as type 15 (Figures 41-43). These buttons could be homemade and do not offer precise chronology of manufacturing but are commonly found in colonial and antebellum archaeological sites. However, this minimalistic burial style, including the lack of elaborate coffin hardware indicates that these interments date prior to the beatification of death period that arose in the latter half of the 19th century (South 1964; Bell 1990; Marcel 1994; Springate 2015).

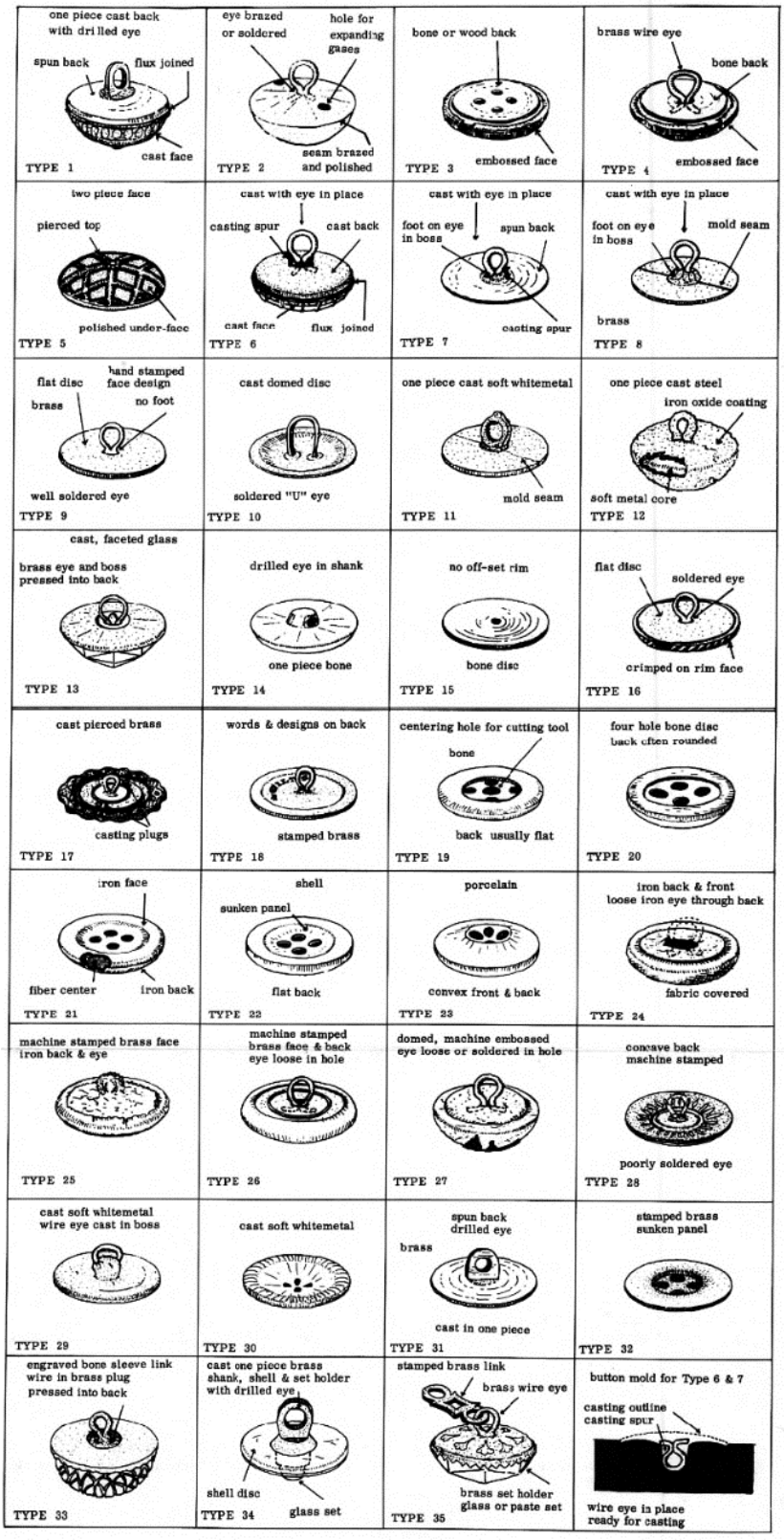

Figure 40: Button Typology from South (1964).

Figure 41: Shell button from Grave 2, type 22.

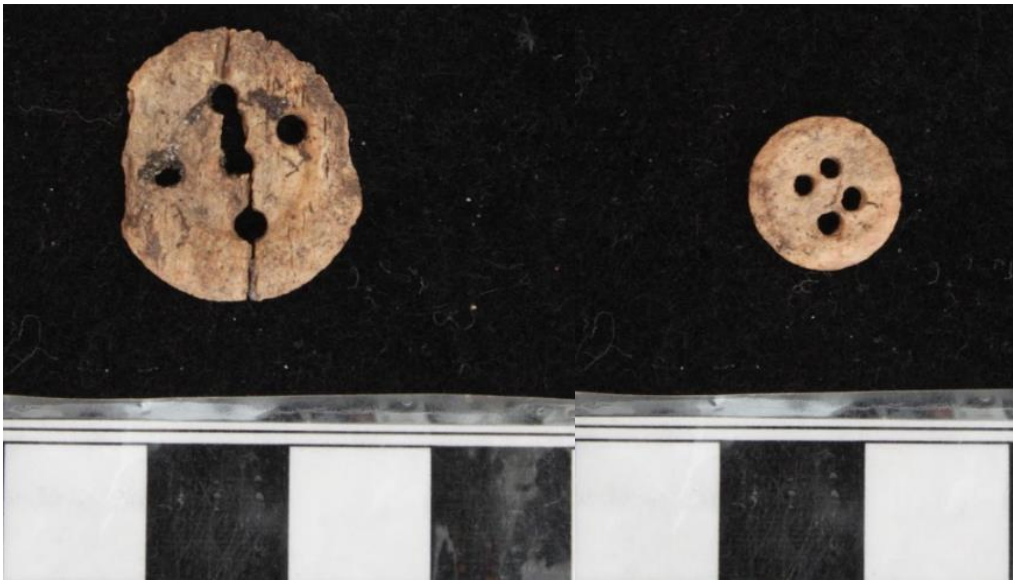

Figure 42: Two bone buttons found in Grave 6, type 19 (left) and UID (right).

Figure 43: Two bone buttons found in Grave 8, type 19 (left) and type 15 (right)

Biological Data

The skeletons from Graves 2, 6, and 8 displayed remarkably good preservation in a region known for typically acidic soils (2004 Brunswick County Soil Survey; Kamprath & Adams 2010). This likely stemmed from the soil within which they were buried. The Kureb series that characterizes the region is extremely well-drained and supports sparse native vegetation and provides a poor habitat for animals. In addition, the region where this soil is located contains a deep water table, meaning the skeletal remains would not be subjected to intermittent water submersion that results in very poor preservation. The soil can range from highly acidic to neutral unless the surface layer has been limed (2004 Soil Survey of Brunswick County, North Carolina). The vaults probably provided surface protection from the elements, sheltering from rainwater and stabilizing the ground above the burials. The lime mortar that covered the vaults may have also seeped into the soil, raising the pH of the soil from acidic to basic. Liming of the vaults could have also deterred worsening root interference on the remains

as it presented rich and easily accessible source of calcium. Soils from the skeletal levels were tested with a Truog soil reaction test using triplex indicator and were found to be around 6.5 pH, or "very slightly acidic". However, many other taphonomic factors resulted in differential preservation of portions of the skeleton. Many of the skeletons had been affected by root infiltration, resulting in fragmentation, and in Graves 6 and 8 portions of the skeleton were not preserved. In addition, warping in the crania likely resulted from a combination of some soil moisture as well as coffin collapse, preventing the collection of measurements for sex and ancestry estimation. Instead, these variables relied upon morphological indicators. Table 2 provides a comprehensive overview for the three individuals identified at the Gause Cemetery.

Table 2: Age, sex, stature, and pathologies of the Gause Cemetery samples.

Burial	*Age*	*Sex*	*Stature*	*Pathologies Summary*
Grave 2	30-39	Male	66.9 - 71.7"	Osteophytic lipping and Schmorl's Nodes on thoracic vertebrae; Infection (mastoiditis) on right mastoid; DEH scores between ages 2-6. Evidence of tooth polishing behavior.
Grave 6	25-34	Female	61.6 - 66.6"	Atlanto-Occipital fusion between the cranial base and atlas; No other significant pathologies found but extremely poor dental health; DEH scores between ages 1-6; Evidence of tooth polishing behavior.
Grave 8	20-25	Male	70.3 - 75.3"	Congenital absence of left P^2; Bilateral Os Calcaneus Secundarius on calcanei; Radix Entomolaris on left M_1; DEH scores between ages 1-5; Evidence of tooth polishing behavior.

Grave 2 Individual (31BWGause-ECU-1):

Sex: Male

Age: 30 - 39 years old

Ancestry: European

Stature: 69.3 ± 2.4” (Figure 44)

Grave 2 contained a male individual, 31BWGause-ECU-1, based on the cranial and skeletal (i.e. pelvic) morphology. Age of 30-39 years was based on an auricular surface phase of 3 to 4, which corresponds with 30-39 years of age. Unfortunately, the pubic symphysis was not preserved to allow for age estimation using this feature. Analysis of the long bones using FORDISC 3.0 (Owsley et al. 2005) indicates that this male was between 66.9 to 71.7” tall (5’7” – 6’).

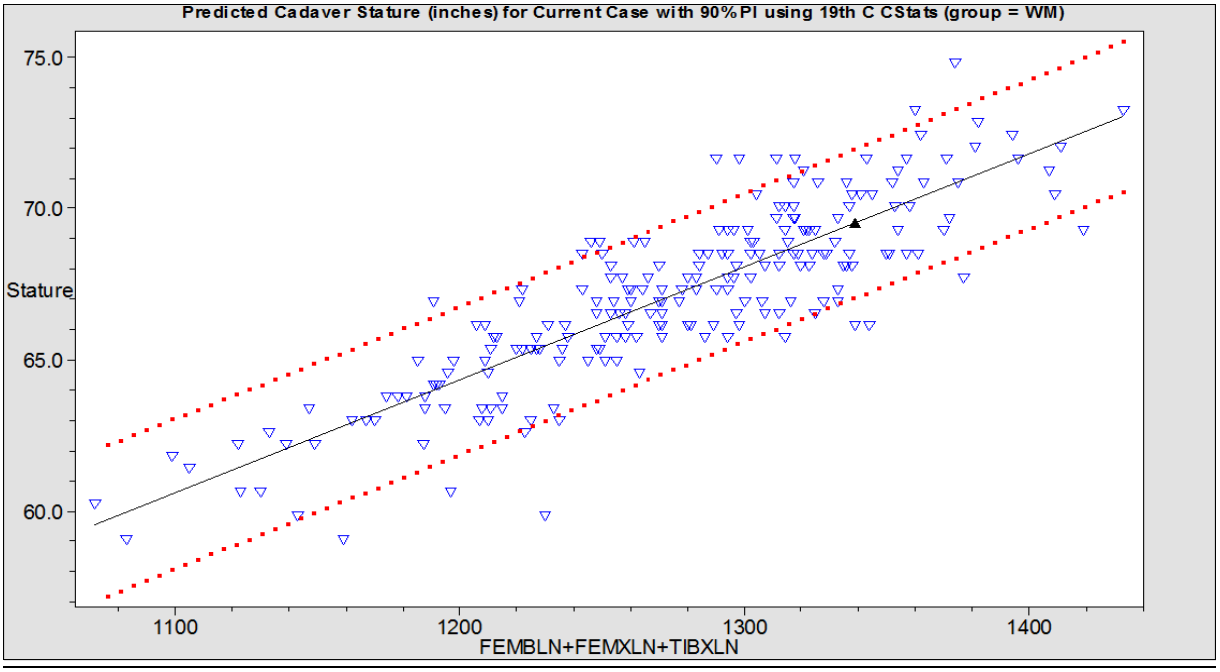

Figure 44: Stature for 31BWGause-ECU-1

Dental Pathology: This individual was missing only two teeth, the left and right M^1, both due to antemortem tooth loss (AMTL). Abscesses found in the alveolar bone associated with these teeth suggest that infection of the pulp cavity caused the tooth loss. The documented dental wear and the occlusal surface cavities could explain the process by which the pulp cavity was infected. Almost all teeth displayed notable dental wear and had the most caries of the samples, though most received low scores except for two large caries found on right P^2 and M_3. The maxillary incisors and mandibular incisors, canines and premolars showed enamel removal on the labial surface indicative of dental polishing (Figure 45), and these tooth surfaces had little calculus development. Some teeth showed small and moderate amounts of calculus, mainly on the lingual aspect. Multiple dental enamel hypoplasias on the anterior dentition suggest that this individual went through periods of nutritional or disease stress between the ages of 2 and 6. A summary of 31BWGause-ECU-1 dental recordings is provided in Table 3.

Table 3: Dental health summary for individual 31BWGause-ECU-1.

31BWGause-ECU-1 Dental Health		
Pathology	**Location**	**Scores/Notes**
Antemortem Tooth Loss (AMTL)	Left and Right M^1	Right M^1 perforation present on lingual and labial aspects.
Calculus	Left M^2 C, P_1 M_3; Right P_2 M_1 M_2 I^2 C' P^1 P^2 M^2	Mainly present on lingual surfaces with moderate amounts on back mandibular.
Abscesses	Left and Right M^1	Resulting in AMTL
Dental Enamel Hypoplasias (DEH)	Left: I^1 I^2 C' P^1 P^2 I_1 I_2 C, P_1, M_1; Right: I_1 I_2 C, M_1 M_2	Occurred between the ages of 2 and 6.
Occlusal Wear	On all teeth except for the missing maxillary M^1s and left incisors that could not be recorded due to missing enamel.	Maxillary teeth lower scores (1-5) on occlusal surfaces, except for right P^2 which displayed a higher score of 7. Mandibular teeth showed the greatest amount of wear with scores ranging from 4-7.

Dental Abrasions	Labial surfaces	Dental Polishing
Caries	Left: M_2 M_3; Right: C, P_1 M_1 M_2 M_3	Most caries of the three samples. Scores of 6 (large caries) on Left M_3 and Right P^2.

Figure 45: Example of dental polishing shown as labial surface abrasion of the right canine and first premolar from a contemporary socioeconomic elite study (Seeman et al. 2011).

Skeletal Pathology: A majority of the pathological lesions seen in this skeleton resulted from soft tissue degeneration in the vertebral column. The 10th thoracic through 1st lumbar vertebrae displayed osteophytic lipping on the vertebral bodies, and T10, T12 and L1 had Schmorl's nodes on the left sides—inferior aspects for T11 and L1, superior aspects for T12—of their vertebral bodies (Figure 46). The right mastoid process displays what appears to be mastoiditis (Figure 47), an inner ear infection that may cause osseous changes such the bone proliferation and enlarged cells observed in this specimen (Flohr and Shultz 2009).

Figure 46: Superior aspect of T12 showing lipping around vertebral body and Schmorl's nodes on the left side (red arrow).

Figure 47: Right mastoid process with mastoiditis.

Grave 6 Individual (31BWGause-ECU-2):

Sex: Female

Age: 25 - 34 years old

Ancestry: European

Stature: 64.1± 2.5” (Figure 48)

Grave 6 contained a female, 31BWGause-ECU-2, aged 25-34 years old based on morphology of the cranium and pelvis and degeneration of the auricular surface (phase 2 to 3). The auricular surface age range was supplemented by observations of partial to complete union of the sternal end of the clavicle, the recently completed fusion of annular epiphyses on the sacral vertebral bodies 1 and 2, and partial fusion of first and second sacral bodies. Taphonomic disturbance resulted in the destruction of a majority of this individual’s thoracic skeleton, resulting in the recovery of only a number of tiny rib fragments, two pieces of the first ribs, and

four right and four left thoracic neural arch fragments. FORDISC 3.0 regression analysis of long bone measurements found that she would have been around 61.6 to 66.6” tall (5’2” - 5’7”) at time of death.

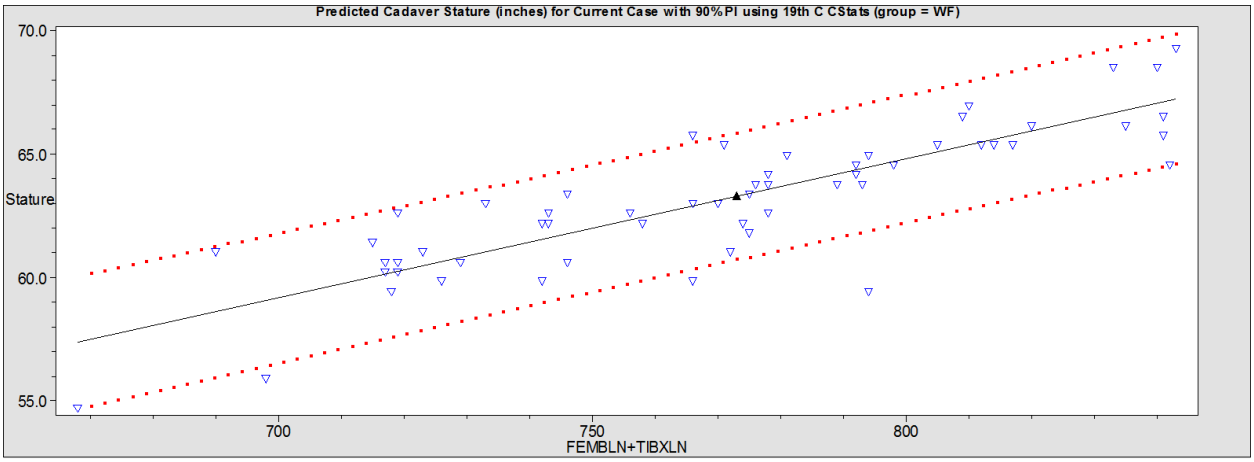

Figure 48: Stature for 31BWGause-ECU-2

Dental Pathology: This individual had lost the most teeth due to AMTL. Similar to the individual in Grave 2, abscesses in the alveolar bone were associated with the missing dentition. A high degree of dental wear also was noted for this individual with some molars almost completely worn down, receiving the highest wear scores of the three skeletons. A few dental caries were present on occlusal, interproximal, and smooth surfaces except for two large caries found in the left M_2 (which had extensive wear and an associated abscess), and right M^1, which essentially destroyed the crown. Like 31BWGause-ECU-1, small amounts of calculus were noted, mainly on lingual aspects. Extensive enamel abrasion on the labial surfaces of most premolars, canines and the sole incisor resulting from tooth polishing obscured observations of DEHs and removed any possible calculus from these surfaces. The observed dental enamel hypoplasias suggest that this individual went through successive periods of nutritional or disease

stress between the ages of 1 and 6. A summary of 31BWGause-ECU-2's dental recordings is provided in Table 4.

Table 4: Dental health summary for individual 31BWGause-ECU-2.

31BWGause-ECU-2 Dental Health		
Pathology	**Location**	**Score/Notes**
ATML	Left: M^1 M^3 I_1 M_1; Right: M^2 M^3 I_1 I_2 M_1 M_2	Greatest number of ATML from the three samples.
Calculus	Left P^1 P^2 M_2 P_2; Right M_3 P^1 C'	Small amount (1), mainly on lingual aspects. Left M_2 and Right M_3 showed circumferential presence.
Abscesses	Left: M^3 M_2; Right: M^2 M^3	Resulting in AMTL.
DEH	Left: I_2 C'; Right: P^1 C,	Between the ages of 1 and 6.
Occlusal Wear	On all teeth present.	Maxillary teeth scored between 2-5 except for right M^1 which displayed a score of 10 on all four cusps present. Mandibular teeth scores ranged from 2-4, except for right M_2 which also scored a 10 on all cusps present.
Dental Abrasions	Labial surfaces	Dental Polishing
Caries	Left M_2	Scores of 6 (large caries) on Left M_2 and Right M^1.

Skeletal Pathology: The only anomaly noted in this skeleton was occipitalization of the atlas (Figure 49), a congenital condition. Atlanto-occipital fusion is one of the most common osseous anomalies of the craniovertebral junction and individuals affected can exhibit phenotypical and neurological symptoms (Barnes 2012).

Figure 49: Atlas occipitalization in 31BWGause-ECU-2.

Grave 8 Individual (31BWGause-ECU-3):

Sex: Male

Age: 20 - 25 years old

Ancestry: European

Stature: 72.8 ± 2.5” (Figure 50)

The individual from Grave 8, 31BWGause-ECU-3, was tallest the three burials, measuring at about 70.3 to 75.3" tall (5'10" - 6'3") according to FORDISC analysis of the long bones. Sex of the individual was based on cranial and pelvis morphology. The individual has been identified as an adult male between 20 and 25 years old. Unfortunately, poor preservation of the pelvis hindered any age estimation based in the pubic symphysis and auricular surface. Instead, age estimation relied on incomplete or recent fusion of primary and secondary centers of ossification, such as the recent fusion of the epiphyseal rings (which appeared to be at a younger stage than Grave 6) and recent fusion of the first and second sacral bodies. Similar to the skeleton in Grave 6, a significant portion of the axial skeleton was missing, and only a few rib fragments, part of a first rib, a thoracic vertebral body, and a heavily decomposed sternum were recovered.

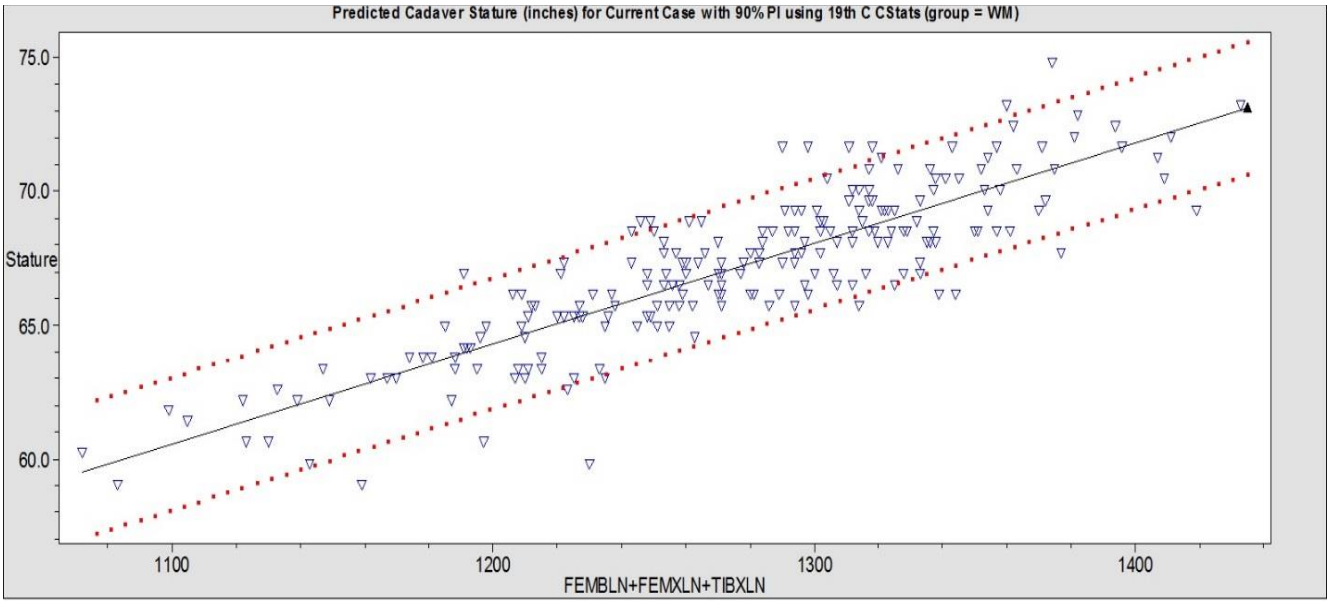

Figure 50: Stature for 31BWGause-ECU-3

Dental Pathology: The mandible of this individual was severely fragmented, affecting assessment of the lower dental arcade of this individual. Only one tooth, the right M^1, was missing due to AMTL and accompanied by abscesses in the associated alveolar bone. However, another, the left P^2, seemed to have been missing congenitally. Notable dental wear and occlusal surface caries in three teeth may explain the AMTL. 31BWGause-ECU-3 showed the lowest number and severity of caries and calculus with calculus mainly found on labial aspects. No caries and only calculus on the buccal aspect of left P_1 were found in the mandibular teeth. Furthermore, extensive labial abrasion on most observable teeth, particular those of the mandible, show evidence of tooth polishing, similar to Graves 2 and 6, possibly obscuring the presence of DEHs on these teeth. The DEHs that were observed suggest that this individual went through periods of nutritional or disease stress between the ages of 1 and 5. Additionally, the left M_1 displayed radix entomolaris (Figure 51), a congenital anomaly of an additional root lingual to the main distal root. A summary of 31BWGause-ECU-2's dental recordings is provided in Table 5.

Table 5: Dental health summary for individual 31BWGause-ECU-3.

31BWGause-ECU-3 Dental Health		
Pathology	**Location**	**Scores/Notes**
ATML	Right M^1	Many missing with no associated alveolar bone; Congenital absence of left P^2.
Calculus	Right P^1 C'; Left P^1 M^1 M^2 M^3 P_1	Scores of 1 (small amount). Mainly present on the lingual aspect of the Maxilla.
Abscesses	Left M^1	Resulting in ATML.
DEH	Left I^1 I_1 C,; Right I_1	Between the ages of 1 and 5.
Occlusal Wear	Left P^1 M^1 M^2 M^3 M_1 P_2 P_1 C, I_1; Right I_1 I_2 M_3 I^2 P^1 M^2 M^3	Maxillary wear ranged from 2-5. Mandibular wear scores ranged from 2-4.
Dental Abrasions	Labial surfaces	Dental Polishing
Caries	Left M^1; Right M^2 M^3	On occlusal and interproximal surfaces.

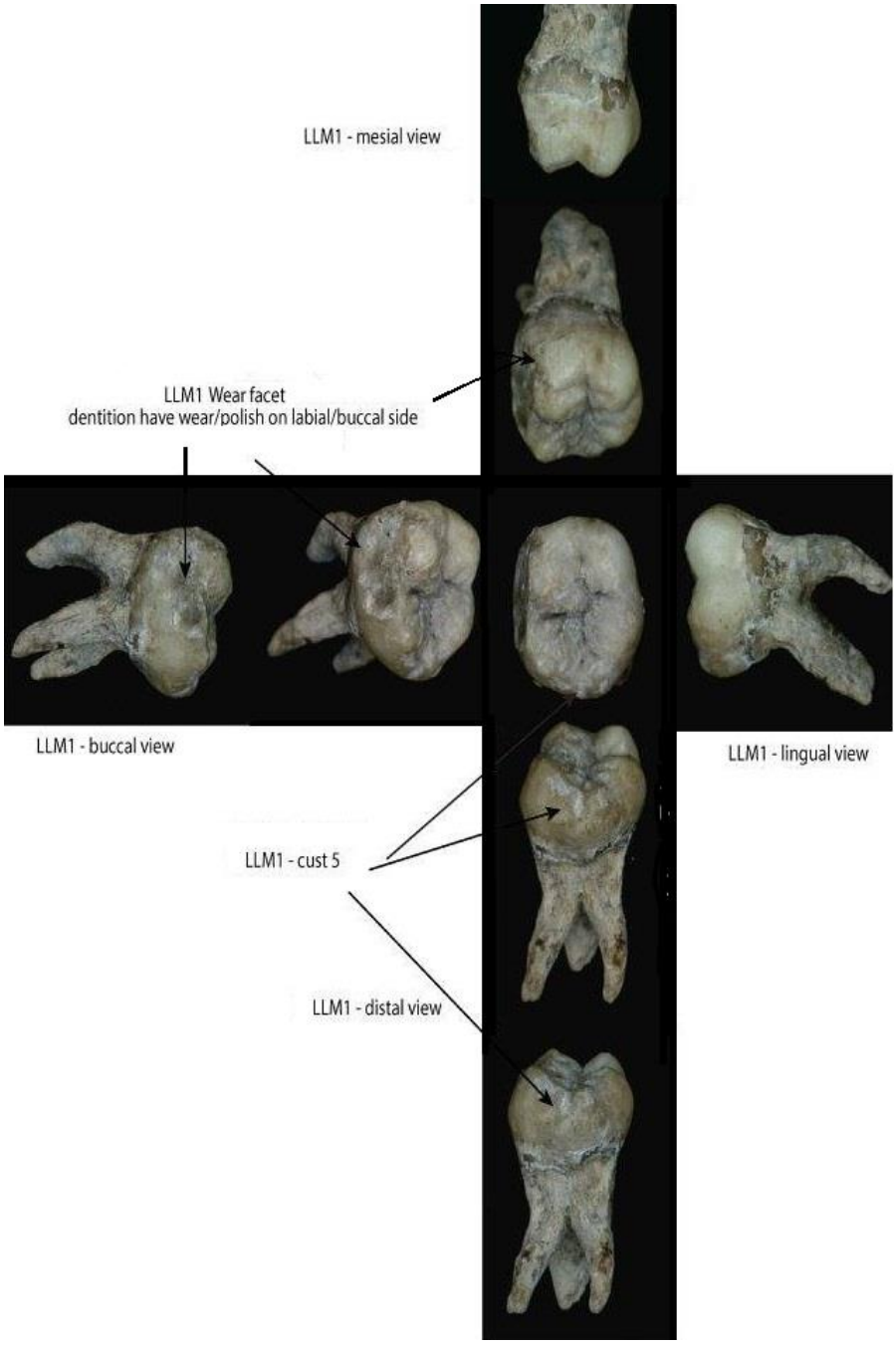

Figure 51: Mandibular left first molar displaying radix entomolaris.

Skeletal Pathology: The only pathological condition noted in the skeleton was congenital in nature. The left and right calcanei have os calcaneus secundarius, (Figure 52) a condition resulting from incomplete development of the calcaneus due to failed union of the posterior sustentaculum tali (Barnes 2012). In this case, no accessory ossicles identified as these unfused sustentaculum tali were recovered.

Figure 52: 31BWGause-ECU-3's calcanei exhibiting os calcaneus secundarius.

The results presented in this chapter for each of the three categories: architecture, artifact, and biological will be further expanded on in the following chapter. These results were largely expected given the time period and socioeconomic status assumed for those interred in the

cemetery. However, the burial vaults' architecture was unexpected and almost resulted in premature termination of excavations. Similarly, the abundance of congenital anomalies was not factored into expectations. Of the three, the individual in Grave 6 diverted from the pattern seen in the males which will be explored further on. These results only allow for additional interpretations of the data and the broader implications they have to the historical context of the cemetery.

CHAPTER 5: DISCUSSION

Archaeology aids in the corroboration, correction and expansion of the historical record through the study of cultural remains left behind by past peoples. Additionally, bioarchaeology provides the means to study individual and population life histories through skeletal remains. Hence, biocultural studies of cemeteries offer an opportunity to understand the individuals interred, the culture of the time, and the impact these necro-landscapes have on society today and in the past. The Gause Cemetery at Seaside provides a case study on Southern antebellum plantation elites wherein the artifacts, mortuary behaviors, and biological data recovered from the site present a more holistic reconstruction of a prominent family lost to history. Additionally, the scientific study of the Gause Cemetery, despite a small sample size, demonstrates the benefits of conducting research on compatible sites and reveals the limitations of bioarchaeological examinations dealing with an insufficient record and a neglect from the archaeological community.

The Death Display

The study of historic period burial practices has provided links between the elaboration of graves and an individual's status, often inferred from assortment of grave goods which mirror the dead's status when alive. However, the presence of material culture deposited with the body is not the sole indicator of an individual's standing in life and archaeologists must look at burial displays and the information gathered through osteological analyses to derive clues on those interred. Cemeteries thus are more than mere disposal grounds of the dead, rather they are reflections of social bonds which actively express many of a community's basic beliefs and

values (Mytum 2004; Davidson & Mainfort 2011). Though the Gause Cemetery was absent of burial goods, the biological and architectural remains revealed a family of high standing, displaying their values not in what they took with them in death but what they left behind.

It has long been the case for aristocratic and religious elite to be buried separate from the rest of the population, reinforcing their class status even in death. In Christian traditions, the elite furthered this display by burial proximity to the religious centers of their faith, such as the church altar or side chapels, with social prestige derived from visible commemoration within the church (Mytum 2004). Elaborate burial styles and locations were symbols of privilege by preventing lower-class emulation from becoming a threat to elite identity (Little 2016). However, antebellum southern rural cemeteries are rarely associated with churches, usually located in proximity with the homestead (Jordan 1982; Daniel 1996). This practice did not necessarily imply less piety from the community but arose from transportation difficulties associated with carrying the dead over long distances to churches by difficult terrain in the hot southern summers. (Geddes 1981; Stilgoe 1982; Sloane 1991; LeeDecker et. al 1995; Daniel 1996). Though no religious centers or iconography has been noted in or around the Gause Cemetery's time of use, it would be doubtful to suggest the Gauses lacked in faith as they held strong ties with the famous circuit-riding Methodist Bishop Francis Asbury and adhered to Christian burial orientation of facing east, expectant of judgement day. Aside from the more elaborate mortuary structures, the burials were rather simple without associated grave goods possibly observing the notion of "ashes to ashes, dust to dust".

Strong familial bonds were reinforced through death, with death usually taking place at home and funerary rituals conducted by the close relations (Geddes 1981; Stilgoe 1982; Sloane 1991; LeeDecker et. al 1995; Larkin 1988; Mytum 2004). It naturally followed that cemetery

inclusion reinforced familial ties and burial plot access was limited to members of one or two extended families (Jordan 1982; Daniel 1996). Close relationships within family units can often be inferred through spatial groupings, wherein proximity when in life was reflected upon burial. However, there is evidence that plantation family burial grounds may not have been exclusive to blood relations as some plantation cemeteries may have included slaves and workers within the cemetery bounds, albeit at a distance from the named family and within their own clusters (Aufderheide et al., 1981; Daniel 1996; Gibb 1996). The Gause Cemetery can be tentatively divided into two clusters, separated into the larger north section and smaller south section where the former displays a higher abundance of graves with mortuary displays. If this cemetery shares spatial distinction of tenant families and servants observed in the plantation grave pattern noted, relationships between those interred may be inferred. Due to the small size of the cemetery, definite statements should be reserved until a full assessment of unmarked graves, cluster distribution, and ground-truthing can be implemented. The burial vaults may have merely been reserved for important members within the family dynamics, while others were buried in more simple traditions—though discovery of Grave 9 revealed that vaults may cover the cemetery grounds, obscured from view by removal of the superstructures defining the marked grave locations.

The Gause burial vaults were a means of wealth display and commemoration for the family. Though reconstruction of the tombs resembles the above-ground structures in other cemeteries, to the author's knowledge there is no detailed description or analysis of these kinds of features. The investigations into the Gause tombs may be the first in the literature to describe this style and may possibly be unique to the cemetery, a burial style differentiating the Gauses from their contemporaries. Prior to the mid-19th century Gothic revival of the Victorian era,

defined in mortuary studies by the beautification of death movement, impressive mortuary memorials were rather rare in the west and most were buried in more modest means (Bell 1990; Sloane 1991; LeeDecker 2001; Mytum 2004). Early burial displays of the modern period were marked by piled up earth or stones, vegetation planting, or simple uninscribed markers meant to last for the period of grave visitation and swept away within decades. Monuments modeled on medieval-style external memorials began to appear and grew in popularity during the 18th century with the concept of more permanent grave markings, including the more common grave slabs, large and rectangular with a beveled edge onto which an inscription was placed, though many did not have identifying inscriptions, and the elaborate tombs. Tombs raised the ledger slab, preventing it from grassing over and raised its visibility and extending remembrance in the graveyard. These early tombs consisted of raising the slab up on pillars, creating table tombs, or on a solid or hollow box, also known as chest or altar tombs, which allowed for decoration and inscriptions on the vertical faces though North American tombs were rather rare and plain, with the more elaborate styles possibly imported from England (Figure 53). Approaching and through the 19th century, table tombs declined in popularity while chest tombs remained the dominant form (Mytum 2004). The American South saw a popular style of partially buried brick chest tombs which were developed in their larger forms as mausolea to house groups of related dead (see the Gause Tomb). The tomb tops ranged in shapes (Figure 54) and the inscribed slab, usually of marble, was often placed vertically at one end of the tomb, though it inhibited the inscription of detailed chronologies. Memorial materials were often local though higher status memorials may have utilized exotic materials to emphasize status differences. In some cases, paint may have been used though now weathered away (Mytum 2004). Over time, tombs may be reduced to resemble grave slabs as their foundations become unstable and collapse or are

intentionally removed, may be used as paving, or parts may be recycled as markers where previous graves went unmarked (Mytum 2004; Hugh 2018).

Figure 53: Contemporary box tomb located in Old Smithville Burying Ground, Brunswick County, NC. (Photo by author.)

Figure 54: Flat and rounded tomb tops in Church Street graveyard, Mobile, Alabama (from Mytum 2004)

Brick burial structures were a common occurrence within American elite cemeteries throughout the antebellum period as the expense of this practice would have made it too costly for those lesser means. Along with tombs described earlier, brick burial vaults commonly observed consist of a subterranean chamber lined with brick and closed with a barreled roof or ledger (Figure 55). The vaults differ in structure, sometimes having brick flooring, shouldered sides, or different chambers, and may contain one or more individuals stacked on top of each other (Figure 56). The most common brick-line graves in the United States are single internment, rectangular graves, closed with a brick arch beneath the surface, sometimes topped with a brick stanchion holding a ledger stone (i.e. the brick chest tombs). The stanchion/superstructure

typically begins near the upper, outside edge of the barreled vault and continues just below the ground surface (Riordan & Mitchell 2011). In one documented case, the stanchion was buried four to five brick courses deep (Figure 57) which possibly extended two courses above the surface where it held a ledger stone (Thomas et al. 1977). According to Trinkley et al. (2011), the arch style vaults waned in popularity about the same time that tombs became popular. Brick grave linings, however, continued through the 19th century as they may have stabilized the soil above the grave and interrupted possible intrusion cuts by later placed graves (Mytum 2004; Trinkley et al. 2011).

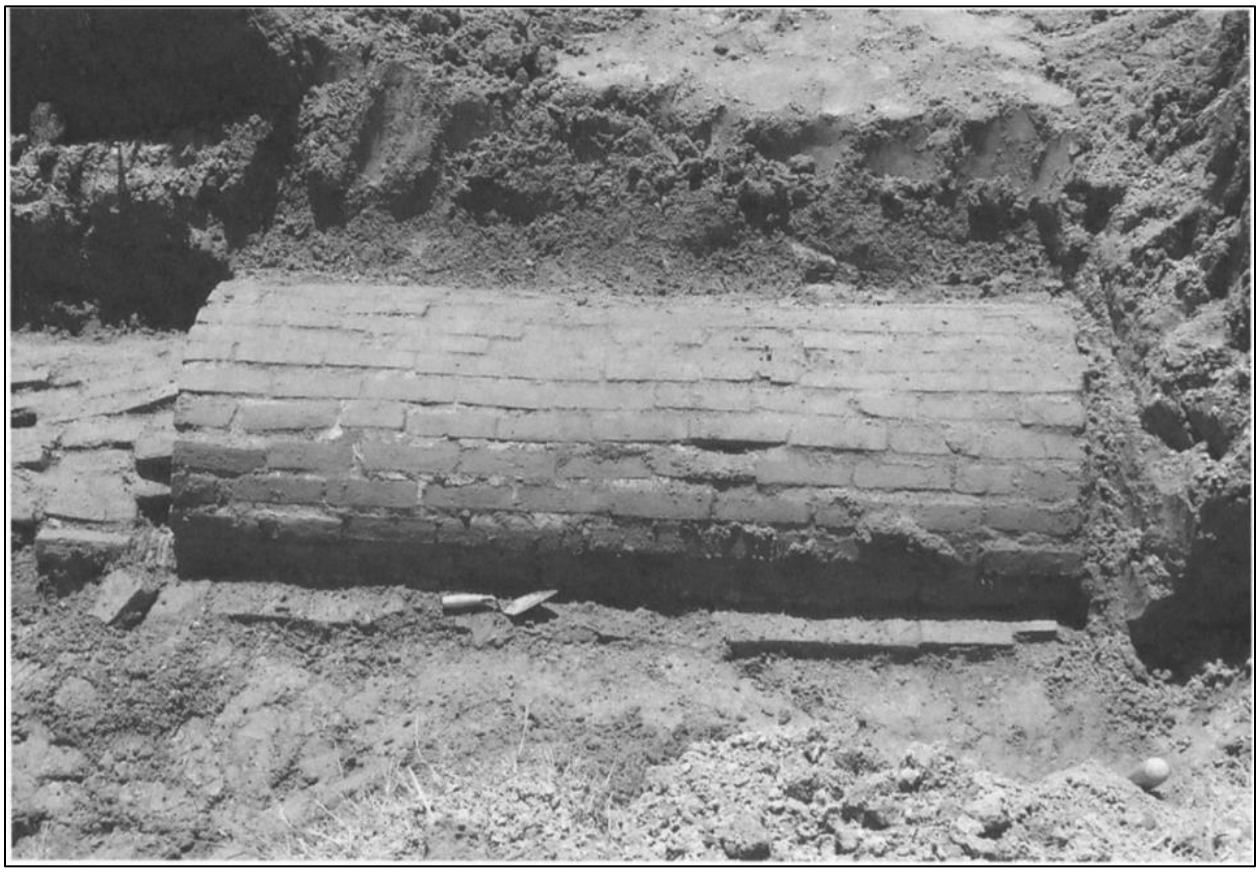

Figure 55: Common subterranean brick barreled vault. Graves are normally shallow, and the body placed in the empty void inside the crypt (from Riordan & Mitchell 2011).

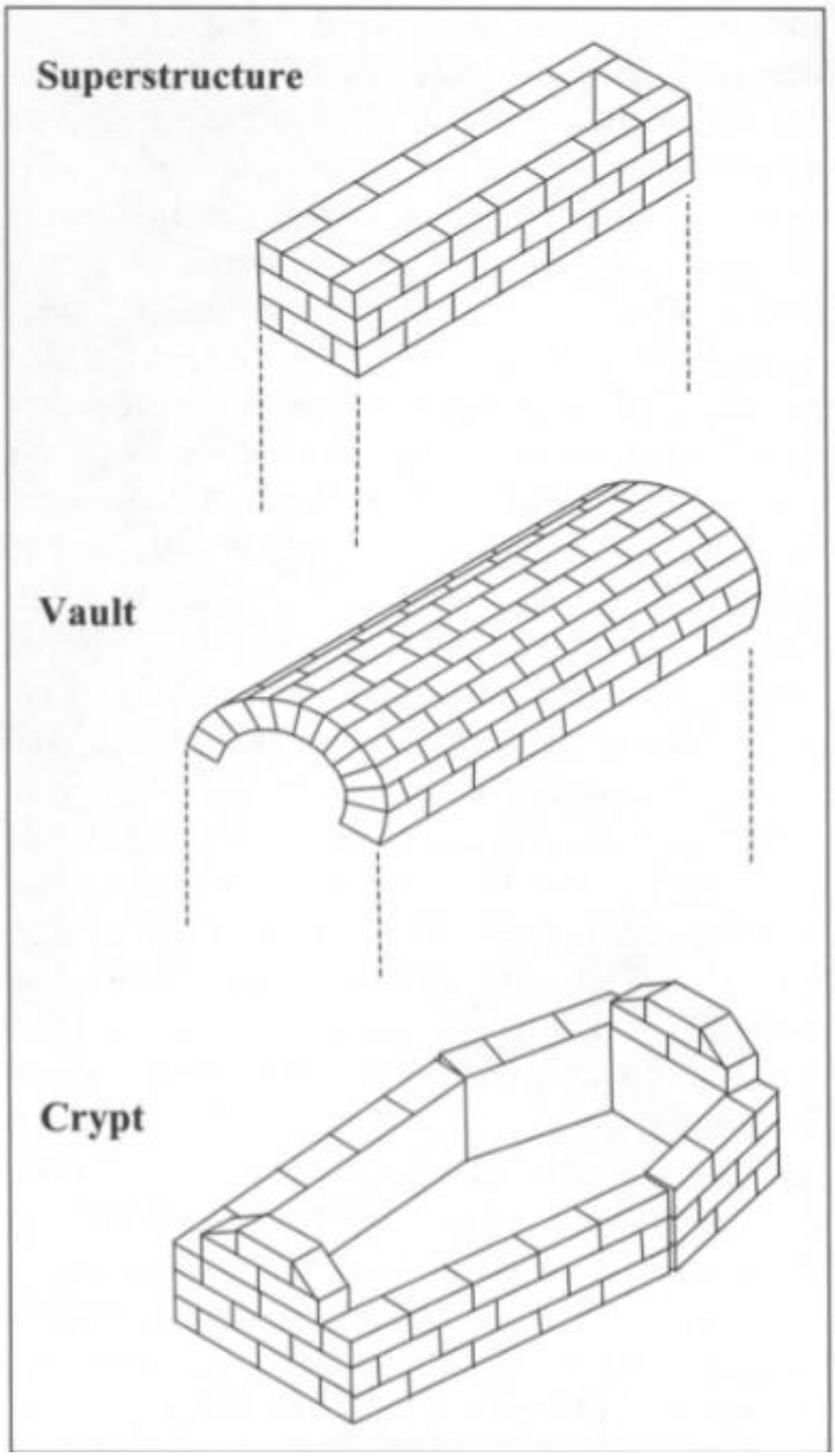

Figure 56: Exploded, stylized view of a commonly found vaults by Riordan & Mitchell (2011).

Figure 57: Found subterranean brick stanchion that was originally topped with flat ledger stone (from Thomas et al. 1977).

The Gause Cemetery vaults are unique from the aforementioned burial structures in that they resemble a merger of the tombs and subterranean barreled vaults characteristics, resulting in a style not yet observed in the literature. The archaeological investigations conducted through this study allow for a reconstruction of how the Gause burial vaults were built and looked in their prime. Excavations of Graves 2 and 6 followed the transactional dimensions of surviving brick structures, however the narrow confines of the grave cut, about 2 feet wide, would prove difficult to maneuver to the 5-6’ depth interments. Excavations in Grave 8 were expanded about 1.5’ northside, requiring the removal of the north wall of the structure (Figure 58), to access the grave as the brick vault was a tight 1’ wide. Profile of Grave 8 suggests grave cuts were slightly larger

nearing the surface and was shortened to the possible coffin dimensions nearer to the interment depths (Figure 59).

Figure 58: (Left) Grave 8 burial structure and (Right) grave cut after wall removals.

Figure 59: Grave 8 uncovered showing grave cut profile.

Grave shafts may have thus been dug following a "grave vaulting/arching" pattern (a vernacular burial grave cut form) seen in other 19th century cemeteries (Davidson & Mainfort 2011; Trinkley et al. 2011). Grave vaulting consists of excavating a wide primary grave shaft with a narrower secondary shaft dug at the base (Figure 60). The secondary shaft would be wide and deep enough to receive the burial container and may be covered over with a platform to prevent soil from falling directly onto the coffin, not to upset the grieving audience. A pedestal may have been placed at the bottom of the shafts to allow slack for the removal of the lowering

rope. This stand could be made of brick, as in Grave 8, or wood which would have decayed to a point indistinguishable from the broken dilapidated coffins, explaining failure to recover the pedestal in Graves 2 and 6.

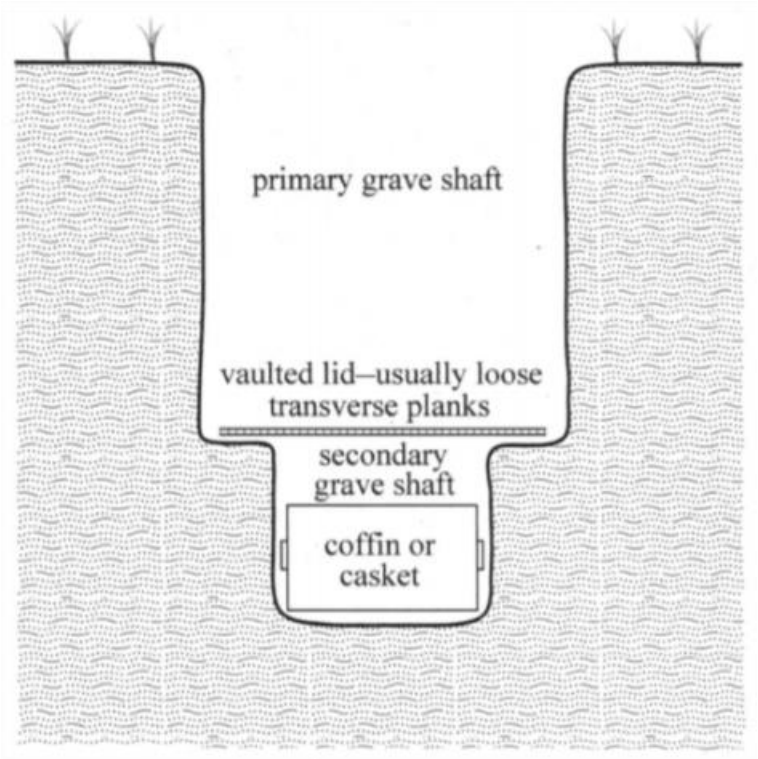

Figure 60: Schematics of an arched grave cut from Davidson & Manifort (2011).

After lowering the body, soil would then cover the shaft for about 3’ before brick was laid to form the vault and closed with a barrel roof. The vault walls stretched about 1.5-2’ deep from the surface, composed of five to eight stacked courses of bricks and two courses thick, mended in a common bond pattern. Bricks may have been imported from Europe as seen in other contemporary brick tombs (Mytum 2004)—possibly imported through the Gause owned and aptly named Brick Landing—or locally made. Thomas et al. (1977) uncovered a similar stanchion to those found at the project site dating to 1859 from Georgia made from "tabby"

brick, probably locally manufactured of lime and oyster shell. The walls may have been coated with a layer of mortar/marlstone as buildup was noted on the interior walls and large flat panels with brick impressions were recovered from the surface rubble (Figure 61-A). Large, less-refined pieces with no identifiable shape were found at the surface, possibly used to fill and support the domed cavity (Figure 61-B). The exterior bricks would then be covered with a finishing, demonstrated by the thick curved marlstone pieces found (Figure 61-C). There is no evidence of ledger stones, suggesting inscriptions may have been engraved on the domed tops as the Historic Site Survey (2009) reports.

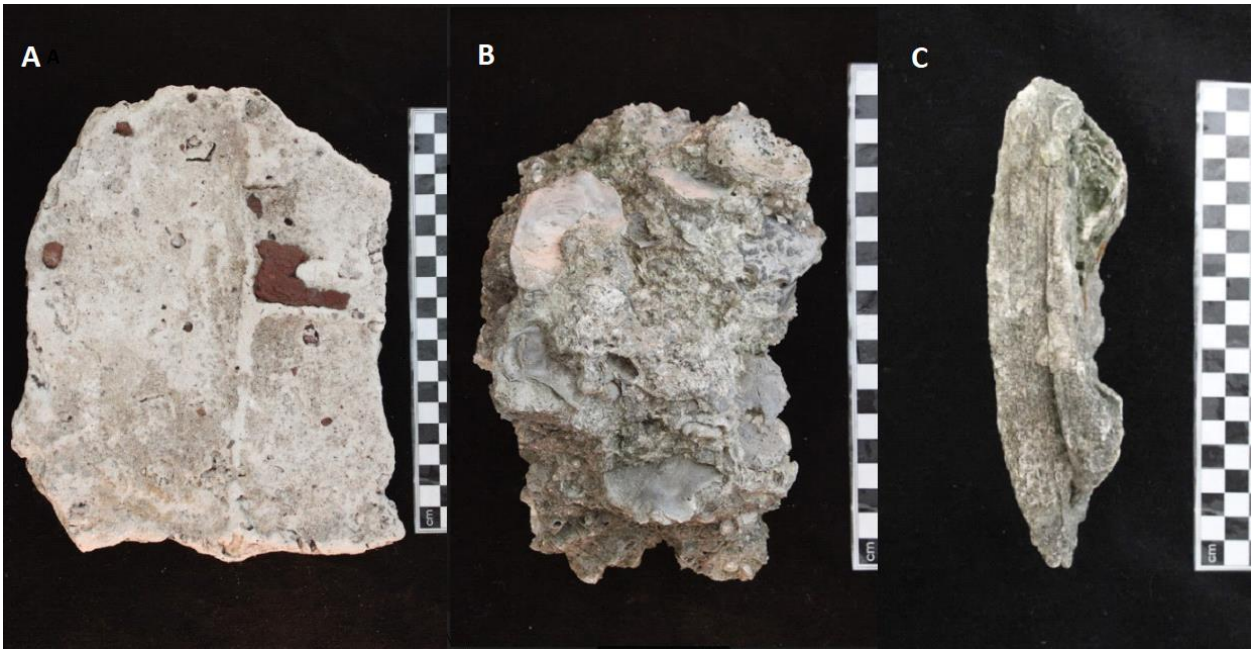

Figure 61: Large pieces of marlstone from grave rubble.

It is possible that discontinuing the vault construction to the coffin level was a means to deter looting since there would be nothing present when the grave vault "ends", much like our

confusion during initial excavations. Looters target tombs in search of perceived valuable goods buried with wealthy families. Fears of grave robbers and desecration were justifiable and not unheard of, as later proven by the large Gause Tomb near the project site having been robbed and desecrated by unknown parties before its rediscovery. Additionally, small false-tombs with empty voids seen throughout contemporary cemeteries, such as in Brunswick Town, have also seen damage by grave looters. However, the tomb styles employed were just as likely, if not most probable, merely grave marker with the additional benefit of stability for the upper sections of the shaft for burial, akin to modern grave liners, and provided a foundation for the resulting superstructure.

Moreover, though the coffin wood was heavily deteriorated and nails found were heavily corroded, and failed to display any particular pattern, inferences about coffin types in which the Gauses were buried can be made. All graves contained vaguely rectangular coffin shapes ruling out possible hexagonal coffins. Additionally, metal staining was noted in two parallel locations in Grave 2, at the head end of the coffin wood and at either sides the lower limbs. The midline location of these stains would not make much sense if the coffin lid were flat thus suggesting their location as fasteners for a gable-lidded design. Likewise, the large piece of intact coffin lid from Grave 8 did not have the broken-jagged characteristic at one of the long axes, resembling more like edge of a wood plank. Its location above the chest of the skeleton suggests the need for some form of adjoining to other planks to complete a lid. Thus, coffins recovered were probably of a gabled design that existed well throughout the 19th century (McKweon & Owsley 2002; Riordan.2009).

Finally, though it is unlikely to have been explicit, the burial structures are a physical reflection of the societal beliefs the Gause family adhered to. The visible components of the

graves are suggestive of their wealth and identity, more elaborate than simple pits in the ground marked by a wooden cross. They are for the public sphere and establish a legacy for the Gauses, reminding those who would lay eyes on the burial site of their importance and refusal to be forgotten or erased. Contrariwise, the most private aspect of the burial, where the deceased rests, is reserved for the dead and their gods. It lacks any of the ornate embellishments of the mortuary monuments, respecting traditional Christian burials. It is as if the physical separation between the mortuary structure and the dead are an attempt at distancing their lavish, and inherently sinful, pasts from the pious expectations needed to enter paradise. In effect, a dead Gause was to be revered by those left behind but humble only to God.

Osteobiographies

The skeletal data from the remains of the three uncovered graves from the Gause Cemetery at Seaside allow for general statements about the health and lifestyle of this rural elite family from antebellum North Carolina. The bone and dental health from the skeletons suggest the Gauses led an influential life with relatively little heavy labor and poor quality diets. Evidence of access and preference towards dental hygienic practices further display their lifestyle from those of lower socioeconomic status. Poor dental health was not uncommon for early nineteenth century plantation populations regardless of race and whites sometimes displayed evidence of dental care—though not preventative measures such as tooth-polishing would be assumed to be—not accessible to blacks (Thomas et al. 1977; Angel et al. 1987; Rathbun 1987; Little et al. 1992; Trinkley et al. 2011; Seeman et al. 2011). Along with malnutrition, high levels of dental pathologies, such as caries, has been attributed to increased consumption of carbohydrates, refined flour and sugars, and less real meat and fish protein

carrying fluoride (Angel 1976; Angel et al. 1987; Rathbun 1987; Little et al. 1992; Seeman et al. 2011). The investment in oral health and low number of skeletal pathologies seen in the Gause sample are consistent with those from the Foscue Plantation burial vault, the only other known study detailing a contemporary privileged North Carolina family (Seeman et al. 2011). The Foscues also displayed relatively low skeletal pathologies indicative of a sedentary lifestyle, despite the detrimental effects farming has on the body, afforded to planter elites through an enslaved labor force. High amounts of non-specific indicators of stress, associated with rigorous, load bearing and repetitive activity notable of farming life, as well as malnutrition and parasitic infections leading to anemia are relatively absent in the Gause and Foscue samples but have been noted in white tenant farmers and slaves (Thomas et al. 1977; Savitt 1978; Clark 1985; Angel et al. 1987; Rathbun 1987; Rathbun & Scurry 1991; Trinkley et al. 2011; Seeman et al. 2011). However, the pathologies discovered in respective Gause skeletons—acquired in life or innate from birth—also hint at diminished quality of life personally suffered by individual in varying degrees, undeterred by wealth or social standing.

The older male (31BWGause-ECU-1) exhibited osteophytic lipping, a lip-like configuration of bone spurs around the edge of vertebral bodies, and Schmorl's nodes, protrusions of the nucleus pulposus material of the intervertebral discs into the adjacent vertebral bodies (Ortner 2003). These pathologies suggest he may have been involved in some sort of trauma, possibly from heavy lifting or mechanical labor on the spine that caused a compression injury and subsequent disc herniation in his lower back (Rathbun 1987; Fascia & Williams 2008). However, without mechanical stress pathologies on other joints or bone surfaces there is no evidence for sustained heavy physical activity expected on a plantation. It is further doubtful that this individual was doing debilitating farm labor leading to degenerative skeletal pathologies

expected from plantation work, considering the Gauses' socioeconomic status and the enslaved labor force the family commanded. Still, the presence of osteophytes, in combination with Schmorl's nodes, have been linked increase the reporting of back pain suggesting this individual probably experience bouts of lower back pain throughout his life, affecting his activity patterns and quality of life (Fascia and Williams 2008).

This individual also had exposure of the middle ear on the right mastoid process with irregular bone proliferations and massively enlarged cells. The inner ear infection resulting in osseous changes in the pneumatized mastoid cells which may cause perforation of the outer surface of the mastoid because of abscessation, mastoiditis was a common disease of childhood and adults in pre-antibiotic times (Flohr and Shultz 2009). It is unknown if the disease was asymptomatic or expressed clinical symptoms, though it would not be unlikely for the heavy alteration seen in this individual to have caused discomfort or pain. Regardless of ailments, 31BWGause-ECU-1's cause of death remains unknown. His age at death (30-39 years old at death), however, fell within or just below Hacker's (2010) antebellum life expectancies.

The only female of the sample group, BWGause-ECU-2, did not express some form of disease related skeletal pathology or mechanical stressors associated with extensive labor, most likely the result of a sedentary lifestyle, though the absence of thoracic elements hinders a full assessment of activity patterns. The heavy deterioration/decomposition of the thoracic cage do not necessarily point to any disease or post-mortem cultural alterations as similar states of osteological preservation biases have been attributed to natural taphonomic processes, such as the periodic soaking and drying resulting in the disintegration of fragile bones like ribs and verts, in other studies (Walker et al. 1988; Matternes 2010). While cause of death remains uncertain, 31BWGause-ECU-2 (25-34 years old at death) fell below Hacker's life expectancy model for

antebellum females. It may be possible to explain her death through the osteological paradox (Wood et al. 1992). Osteological manifestations of disease or physiological stress such as DEHs only can be observed when an individual was strong enough to survive the disease. Additionally, those who succumb to the disease faster than it would take for disease to inscribe on the skeleton leaving no evidence of infection. Furthermore, she was at childbearing age which could factor in mortality during this time period.

She also had a craniovertebral abnormality presented as occipitalization of the atlas which offers insight into her quality of life and possible death. Atlanto-occipital fusion, while rare with the occurrence of 0.12% to 0.72% (Sharma et al. 2017) and of a congenital nature, is one of the most common osseous anomalies of the craniovertebral junction characterized as reduction in dimensions of the foramen magnum leading to acute or chronic neurovascular compression (Barnes 2012). Individuals affected can exhibit phenotypical anomalies similar to spina bifida and Klippel-Feil syndrome, such as a low hairline and neck abnormalities including torticollis, restricted movements, and a shortened neck. Neurological symptoms include headaches (which can be aggravated by simple everyday Valsalva maneuvers), neck and limb pain, numbness of the limbs, lethargy, tinnitus, visual disturbances, and lower cranial nerve palsies leading to trouble swallowing (dysphagia) and motor speech disorder (dysarthria). Neurological symptoms usually appear in the second decade of life or a little older and may lead to sudden unexpected death (Sharma et al. 2017). It is reasonable to assume that despite the wealth and family recognition, this individual would have suffered in life. The physical characteristics may have affected her psychology, self-worth, and standing within the family and social circles, though hopefully her family's status may have afforded her a social safety net. Yet the neurological problems could not possibly be controlled by societal influence, becoming an

unwelcomed surprise in her 20s and severely decreasing her quality of life when symptoms could be triggered by simply yawning, coughing, sneezing or straining, bending over, getting up suddenly, laughing, or crying (Sharma et al. 2017).

The younger male, 31BWGause-ECU-3, (20-25 years old at death) fell sharply below life expectancies by almost half, even lower than Civil War life estimates. Like 31BWGause-ECU-2, the man exhibited no signs of mechanical stress or disease (though also missing thoracic elements) which are attributed to his privilege. Without evidence of trauma or infection, coupled with his young age at death, a disease not inscribed in his skeleton may be the cause.

Interestingly, this individual also displayed congenital abnormalities, though fortunately without the severe potential consequences affecting 31BWGause-ECU-2. His left M_1 displayed radix entomolaris. The extra mandibular molar root presents no symptoms or complications that would have affected his life. Only problems associated with radix entomolaris is when undergoing a modern root canal, but this endodontic procedure was not created until 1838 by Edwin Maynard introducing the first root canal instrument created by filing a watch spring (Castellucci 2004; Calberson et al. 2007). However, the trait is rare in Caucasians, found in up to 4.2% of the population, and is suggested to have a high degree of genetic penetrance, the extent of a gene or set of genes expressed phenotypically in a population (Calberson et al. 2007). Presence of this trait in other graves should allow for a better construction of 31BWGause-ECU-3's familial relationships with others interred. His left PM^2 also seemed to have been missing congenitally. While probably shifting dental occlusion, it is highly unlikely the missing tooth affected or was noticed by the individual. His feet, however, would have a greater impact as his left and right calcanei were not fully developed leading to os calcaneus secundarius. This condition forms during morphogenesis, wherein the calcanei fail to fully ossify leading to a

separated ossifying center of an ossicle which usually attaches to the primary bone by fibrocartilaginous tissue. (Barnes 2012). The condition can present localized pain on weight bearing or when palpitated and restricted subtalar motion (Krapf et al. 2015).

The dental health of the skeletons also speaks to general health and lifestyles for the Gauses. The heavy labial abrasions on teeth for all three skeletons reflect an investment in dental hygiene from tooth polishing. Tooth polishing removed tartar from teeth using acidic and abrasive ingredients. Prior to the popularity of toothbrushes after 1850, the substances were rubbed onto the teeth with a cloth, "cleaning" the teeth from calculus buildup and subsequently thinning the tooth enamel (Mattick 1993; Owsley & Bruwelheide 2009; Seeman et al. 2011). The lack of enamel and harsh substances meant the Gauses traded sensitive teeth for what they believed was good oral hygiene. Given the similar behavior seen in the Foscue skeletons (Seeman et al. 2011), it may factor that tooth polishing was common amongst planter elite families in the region.

The two males retained most of their teeth at the time of death. 31BWGause-ECU-1 was only missing both M^1 and 31BWGause-ECU-3 was missing his right M^1 due to antemortem tooth loss (ATML), though the latter was also missing six mandibular teeth without associated alveolar bone in order to assess time of loss. Adults of the period were commonly missing over a third of their teeth and suffered from severe tooth decay by the age of 40 (Phillips 2001). However, the older male showed a greater tooth retention than should be expected for his age group. The younger male had a lower caries and abscesses count/severity than the older male which could mean better nutrition for the former or merely a bittersweet affliction on the latter for reaching an older age. The frequency of caries can be attributed to their being rural agricultural peoples and their access through wealth, consuming large amounts of carbohydrates,

sugars, and meats, variable to seasonal availability and storage capability/longevity (Navia 1994; Lingström et al. 2000; Volo and Denneen Volo 2004).

31BWGause-ECU-2 had the highest number of teeth missing, 12 teeth total, due to ATML. She also showed a largest number of caries in ratio of remaining teeth, with similar severity to the older male, and the largest number of abscesses of the three skeletons. It is possible she experienced a less nutritional diet than her male counterparts due to her sex or congenital abnormality. It could also be that this individual partook in a greater carbohydrate loaded diet, such as sugars, than the male specimens, leading to poorer oral health from consumption of sugars available to her because of her family's wealth.

All three skeletons displayed similar levels of childhood developmental stress. Indicators of stress from nutritional stress, fevers and infectious disease experiences during dental growth can be seen in the form of Harris lines. The dental enamel hypoplasias (DEH) are marked as thin lines of mineralizing enamel on developing teeth from birth to about ten years old (Ubelaker 1978; Goodman & Rose 1990). DEHs most commonly occur during weaning and antebellum lower socioeconomic populations have been noted to occur between 2.5 to 4 years old (Lanpher 1990). 31BWGause-ECU-1 and 31BWGause-ECU-2 had DEHs indicating intermittent stress between the ages of 1 to 6 years old. 31BWGause-ECU-3 had a shorter DEH correlating with ages 1 to 5 years old. The high quantity of DEHs suggest that in their childhood, they experienced significant nutritional or disease stress. The socioeconomic standing of the Gause family would allow them plenty of access to foodstuffs, therefore nutritional deficiency is unlikely. DEH scores most likely stem from stress of weaning and/or diseases survived in childhood. Due to the similar DEH ages for the three individuals, the Gauses may have practiced a longer weaning period than other populations, including the Foscues which presented similar

scores to lower status populations (Seeman et al. 2011). Given the regional, socioeconomic and overall osteological similarities between the Foscues and Gauses, a later weaning period is not representative of status but rather a familial behavior/tradition. However, the frequency of epidemics such as Yellow Fever, Malaria and Cholera in the period (Volo & Deennen Volo 2004) and the location of the Gause territory make it much more likely that the Gauses were more frequently exposed and susceptible to local diseases.

A Paucity of Data

The archaeological literature is not without an impressive array of cemetery studies throughout the world, from bioarchaeological analyses of human remains to the mortuary archaeology of the burial grounds and customs. However, within the historic context of the United States, in-depth cemeteries studies are much more limited in scope. As we further limit study requirements to match those of the Gause Cemetery—an antebellum, elite family burial ground—the paucity of comparable data becomes quite apparent. The lack of data may be attributed to site circumstances and the negligence by the archaeological community

A majority of historic cemetery studies have resulted from salvage projects via cultural resource management (CRM) (Owsley 1990). This client-driven model of archaeology may be more concerned with the assessment of site impact to the project timeline/funds than the bio-cultural knowledge it contains. Many of these surveys are often the result of cemetery relocation or salvage excavations and produce reports limited in the opportunistic nature of recovery of these skeletons or confined to scoping the boundary of cemeteries for avoidance and offer little in terms of cultural knowledge. Mitigation reports often result in boilerplate excavation methodology and an inventory of cemetery recoveries akin to the archaeological processual

period the discipline has long moved on from; meeting the basic requirements under legislation for relocation and deposited in a state archive-repository to gather dust.

The lacuna of research on antebellum cemeteries compared to other time periods can also be partially attributable to the types of graveyards composing 18th and early 19th century cemeteries. As explained previously, early American burial grounds included pioneer graves, domestic/homestead burials, churchyards and Potter's/paupers fields (Sloane 1991). The churchyards are the most likely to survive, often with burial markers and maintained by continual generations of parishioners and clergy as the burial grounds remain with the property. The remaining three are uncommonly lost as burials are obscured and forgotten over time through property exchanges, weathering and overgrowth on markers, or the purposeful erasure of presence by unethical entities. They are therefore more frequently found unintentionally through ground disturbance from modernization and thus subject to the troubles of CRM discussed above. Consequently, it is without question that antebellum cemetery studies are predominantly conducted on churchyards which represent a biased sample of a denominational sect, class, and/or ethnic group (Stilgoe 1982; Sloane 1991; Mytum 2004; LeeDecker 2009).

Further obstructions for data arise from long standing criticisms to historical archaeology and bioarchaeology. Though the former is now the leading archaeological trade (Little 2016), most of the discipline's history in the United States focused on precontact peoples, ignoring the potential for archaeology of the historic period. The written record was—and often continues to be—used as the valid source for history, glazing over the notion that incomplete, deceitful, and exclusionary histories serve to conceal the truth about the past; traditional archaeology was the "true" archaeology while historical archaeology was thought of as frivolous work already

covered by historians. In truth, the antiquated archaeologists' line of thought had served to embolden the desecration of indigenous graves for the sake of "knowledge" (i.e. collections). On the other hand, historic burials did not garner the same attention for recording when encountered unless they were considered important figures in the historical record. This in turn further perpetuated the faulty idea of the written record's legitimacy as the historic graves systematically investigated were already individuals well recorded in the literature.

Thusly, the unfortunate but merited consequences of archaeology's turbulent roots have engraved the public image of bioarchaeologists as grave-robbing ghouls with a perverse interest in indigenous graves. A further unintentional result is the erroneous idea that historic period burials are fair game, freeing them to abuse by misinformed or unethical entities because of perceived insignificance due to archaeological disregard. Descendants of these communities are left feeling slighted by the seemingly disinterest in their ancestors or disturbed that the insults conducted on native peoples' dead will be committed on their own like when the practice conflicted with the descendant communities of the controversial African Burial Ground project in lower Manhattan, New York City (Little 2016). These attitudes hinder public outreach for bioarchaeological investigations and the bridges burned are hard to mend. Communities that have moved to rebuild relationships and cooperation with archaeologists continue to abstain from acknowledging/approving the study of their deceased due to the perceived disrespect and fetishization of their dead by discipline's past, as was emphasized by tribal group representatives in the panel talk "Beyond Compliance: Building Partnerships with Tribes" at the 2018 Southeastern Archaeology Conference (Bird et al. 2018). Meanwhile, historic period burial investigations are obstructed by public decry over desecration or government bodies fearing a ghoulish perception. While we try to distance the modern field from its origins and repair the

damage with the public much cemetery data containing prehistoric and historic contexts has been lost and will remain untouchable due to negligence attributed to destructive interest over prehistoric peoples and disregard for the more recent cultural history. We may never know how many cemeteries serving this study went undocumented when disturbed in pursuit of our predecessors' archaeology.

Furthermore, in correcting our wrongs, we have continued the errors of the past. As the subfield developed, archaeologists focused on the study marginalized groups in the historical record. This moral-mission archaeology sought to give voices to the disenfranchised often being written about rather than providing their own histories, such as the poor, women, slaves, and post-contact native groups amongst others (Little 2016). This pendulum swing, while with noble intentions, shifted intellectual interest rather than casting a wide net for investigations of all past peoples irrespective of historical presence. Consequently, in efforts that romanticize the discipline, populations analogous the study's interest are overlooked. Avoidance of these subsets has omitted new discoveries about our past and perpetuated the erroneous notion of a pristine historical record wherein the historically prevalent are known about and are of no need to subject to archaeological investigations. It needs to be stressed that within these disregarded groups existed individuals without voices in the record (i.e. women, children, and men without distinction). Likewise, as evidence by the Gause and Foscue families, names of those of notable standing may be glossed over in documents but hold no information on life histories necessary to understanding the individuals. Additionally, entire burial grounds like the Gause Cemetery and Tomb are not exempt from the erasure of identities in despite their living fame. Neglecting the study of such populations due to disinterest furthers dissent by their descendant communities, offers no remedies to mend public relations, and are a disservice for the science. Case in point,

the three individuals unearthed for this study have no clear identification and may not exist in the record uncovered thus far, yet the study on the cemetery grounds and the skeletons interred have yielded fruitful information for the interested community and expand on the historical and archaeological knowledge.

Finally, there is the tendency to believe that all cemeteries and burial practices of the antebellum period are immutable. As previously discussed, the well documented early Puritan New England mortuary behaviors provides the template to inform on antebellum burial customs despite the diverse cultural groups in the young United States (Gedes 1891). Researchers continue to combine mortuary data of sites nearing the American Civil War with earlier centuries or the rapidly-evolving Civil War mortuary customs when discussing the antebellum period immediately preceding the war. The early 19th century is thus presented as an amalgamation of distinct period customs of indistinct cultural identities rather than given its due respect. Understandably, research is conducted within the limited confines created by the previously mentioned circumstances, yet the practice is reinforced with each new conflation of customs rather than acknowledging and working to correct the oversight.

For these reasons, this study strongly argues for the in-depth study of antebellum elite family cemeteries. In the case of the Gause cemetery, though there are myriad studies on different population groups around the time of the cemetery's use for a broader inter-cultural comparison, there is little data on contemporary populations with similar life stressors and behaviors to allow for an extensive intra-cultural comparison between groups of similar standing in the region — namely Southern antebellum elite family burials. Seeman et al (2011) was the only study found in the literature allowing for direct comparison. The limited resources present a disservice to the invested communities and the discipline. It is therefore imperative to stress a

change in the discipline to reinvest in the study of all communities when possible, offering the same attention to all cemetery studies regardless of the population's presence in the historical record if we are to claim stewardship over history and heritage. There also needs to be a revitalization within CRM, as the archaeological community with greatest access to such sites, to pursue and publish thorough bio-cultural studies on encountered sites rather than the red tape submitted with a modicum of cultural information to build upon. Whereas the academic sector is better at publishing theoretical and substantive studies on cemetery sites, it is important to recognize the need for equivalent fervor and implemented investigations on these increasingly neglected sites rather than focus solely on the chase for the "exotic" or never-ending collection studies.

CHAPTER 6: CONCLUSION

The Gause Cemetery at Seaside and Gause Tomb are two identified family burial grounds owned by the early planter elite family of North Carolina. Certain members of the family, particularly the patriarch William Gause, Sr. and most of his sons, are remembered for their affluence built on the naval store trade, governing influence, and military achievements. Multiple Brunswick County sites relate to the historic family and local lore. Despite their importance, little is known about the family in the historical record, including their deaths or burial locations. The aforementioned burial grounds have since become sites of interests by descendants including J.R. Robinson. Contacting East Carolina University, Robinson sought an archaeological investigation for the Gause Cemetery which sits within the former Gause landholdings, inquiring about the presence and identity for located burials, period of use, and information for the reconstruction of the mortuary brick complexes. Utilizing bioarchaeological methods to understand the small sample from the cemetery site, this project has attempted to answered Robinson.'s questions and shed light onto the lives of the rural plantation owning families of high social and economic standing in the Southeastern U.S. during the antebellum period and the individual stories for the members skipped over in historical documentation.

The cemetery is currently enclosed by a wooden fence believed to have been put after construction of the adjacent roads. Ground Penetrating Radar revealed the remnants of an old stone feature beyond the north road. Assumed to be a stone wall, the structure is interpreted a portion of the original cemetery boundary. The modern cemetery bounds do not reflect the original borders which has been intruded upon by modernization without proper documentation on possible burials removed. The visible surface structures are also not the only internments in the cemetery, with another vault discovered north of Grave 2, obscured by humus. Another

possible unmarked burial was located just past the western fencing. The new information yielded proposes a larger cemetery than originally thought with an unknown number of burials lacking the above-ground brick structure pinpointing some of the graves. Presence of undisturbed remains was confirmed in Graves 2, 6 and 8 chosen for the study while Grave 1 may have been misidentified due to its surface rubble.

The intricate mortuary structures indicate higher socioeconomic status which the Gause family certainly had. The original vaults are evidenced to have been barrel vaulted, resting above the rectangular stanchions penetrating halfway into the burial (Figure 62). The original design would have been covered or decorated with a thick layer of mortar. Without any evidence of tombstones or other markers, and the description by Pezzoni (2009) of an inscription on a piece of mortar not found in our study, information the individual entombed would been recorded on the mortar. Elaborate burial monuments are a common display of wealth with a myriad of styles found in other antebellum cemeteries. The Gause Cemetery tombs may be a form that has yet been described in the literature.

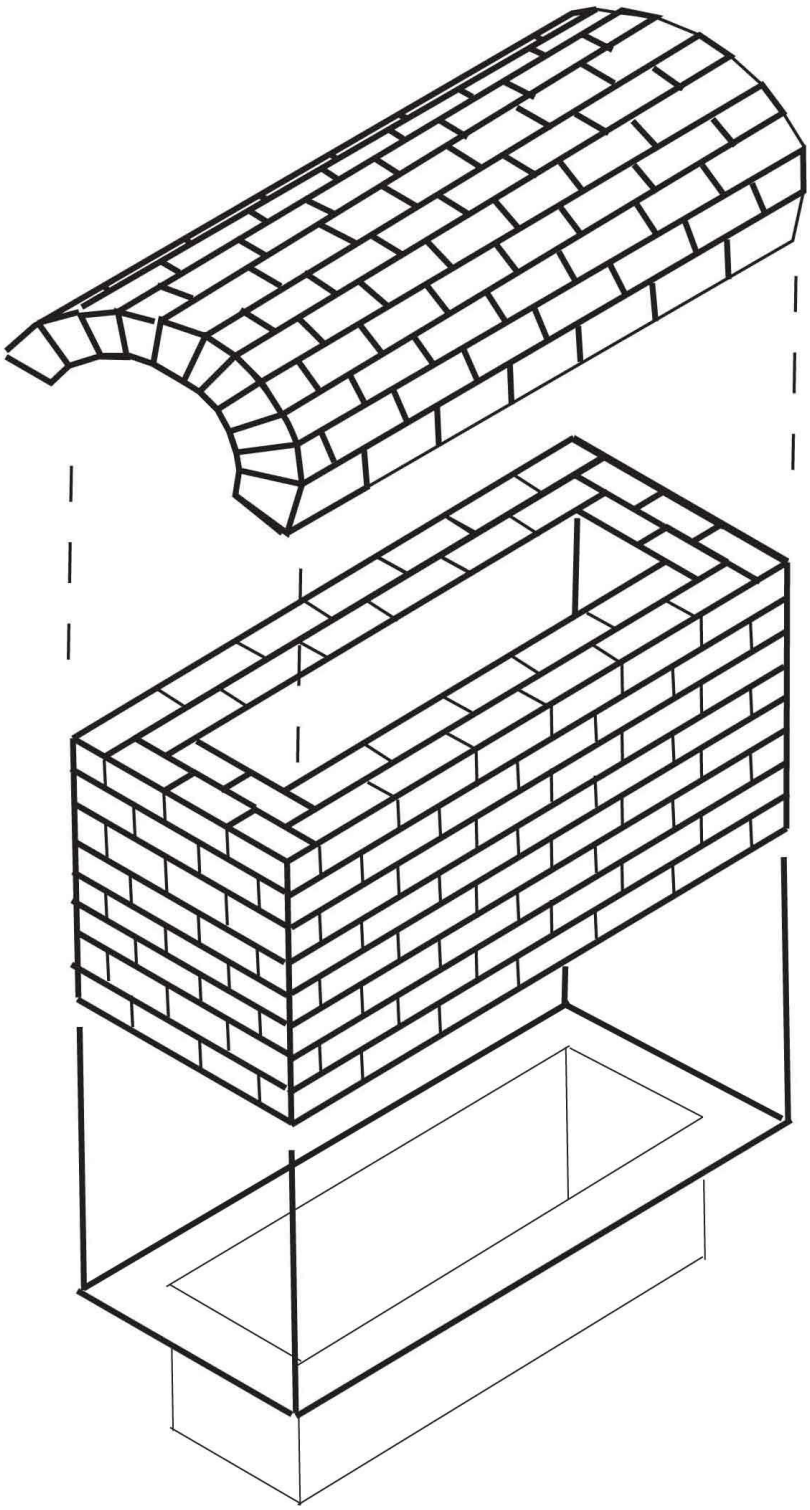

Figure 62: Exploded view of Gause vaults. The arched grave cuts are covered by brick barreled-top tombs composed of a rounded tomb ceiling supported by a submerged rectangular stanchion. Walls seize half way into the burial. Lime mortar covered the bricks and may have provided the surface for inscriptions about the deceased (drawn by author after Riordan & Mitchell 2011).

Within the vaults, material and skeletal remains were found in various state of preservation but allowed for further analyses on the cemetery. Fasteners and buttons identified were rather simple and the skeletons or coffins lacked any ornate decorations. All coffin hardware consisted of cut nails which had a short period of use from the late 18th century until the mid to late 19th century (Hume 1974). The wood and shell buttons recovered have been found in colonial and antebellum sites (South 1964). The dead could have been buried in burial shrouds and/or simple burial clothing. The location of the buttons, lack of shroud pins, and the discovery of two metal artifacts reminiscent of suspender suggests the latter. All coffins are believed to be a rectangular form though the heavy deterioration hindered further detail. The coffin wood was identified as southern yellow pines which are prominent in the region. It is likely the coffins were made to order with readily available wood as simple burial vessels rather than the standardized, lavish investments that came about during the Beautification of Death (Bell 1990; Sloane 1991; LeeDecker 2001; LeeDecker 2009). The minimalistic mortuary artifacts and burial contexts are thus suggestive of antebellum internment, between the late 18th century to early/mid-19th century preceding the Beautification of Death.

Overall the skeletons from the Gause Cemetery at Seaside displayed good general health. The minimal mechanical or infectious pathological conditions reinforce their elite status in Southeastern North Carolina. Like their contemporaries, the Foscue family, they display almost no non-specific indicators of stress (Seeman et al. 2001). Despite owning a plantation producing labor intensive products, their bones reflect a sedentary lifestyle supported by slaves and plantation workers, sheltered by the financial ability. The Gauses also displayed relatively good dental health. Retention of almost all teeth and the moderately low number of dental pathologies in the men correlates with that of the Foscue family, emphasizing their socioeconomic advantage

with access to various foodstuffs and sheltered from malnutrition affecting those of lesser means. Their dental health shows aesthetic behaviors and dental care practiced by family, spared of the commonly poorer oral health through access to nutrition and dental health care affordable to the elite (Mattick 1993; Owsley & Bruwelheide 2009). The only woman recovered also displayed no evidence of mechanical stressors thus indicating high social standing. Though she had the same nutritional access and displayed evidence of tooth polishing, her dental health did not fit the pattern observed in the men. It is possible her deviation from the pattern resulted from increased carbohydrates.

Furthermore, while none of the skeletons have been positively identified, and causes of death remain unknown, 31BWGause-ECU-1's age at death is closest to the age of death for the youngest of the founding Gause males, Benjamin Gause. As a member of the elite antebellum plantation family with many slaves, it would be unlikely that he performed heavy labor throughout his lifetime. The lack of mechanical stress to his bones may have allowed his bones to maintain a youthful appearance, skewing age determination to a younger profile. However, until new evidence is found, claims of identity remain conjecture.

31BWGause-ECU-2's age at death falls within childbearing age which factored in female mortality during this time period (Loudon 1992; Kippen 2005; Hacker 2010). Death may have also resulted from her congenital defect (Sharma et al. 2017). Her identity remains a mystery as no such person has been found in the record. She may be the spouse or daughter of one of the early Gause members or possibly even Susannah Gause as her date of death is unknown. Lastly, 31BWGause-ECU-3's young age at death relative to antebellum estimates (Hacker 2010) and no of evidence of infection or skeletal trauma may suggest death by disease not inscribed in her skeleton (Wood et al. 2001). 31BWGause-ECU-3's identity remains unknown since the early

Gause males survived into adulthood. An exploration into the subsequent Gause children and spouses should help identify these individuals.

Future Research

As a research design, this study has set up the foundation for future studies to be conducted by East Carolina University graduate students or other researchers interested in the Gause Cemetery at Seaside. Following this study, research should continue to be conducted at the bequest and new questions proposed need to be subject to the approval of the descendants, aligning with their own inquiries about their ancestors. Due to the lack of detailed information on the Gause family and the genealogical interest descendants have on the cemetery, results disseminated will help supplement the historical record and build a healthy cooperation between the discipline and the public.

The next steps in studying the site correspond to the limitations encountered in this project. It is suggested that Grave 1 is revisited and dug until a depth of 5-6 feet where skeletal material was discovered to confirm if it was indeed misidentified because of early termination. Similarly, a full systematic search for unmarked burials should be employed. This project was limited to Ground Penetrating Radar in a rather small and obstructed space—due to mortuary structures, rubble, benches, and vegetation. The various trees and roots in the small confines also impeded for geophysical assessment of anomalies. The sandy nature of the soil did not allow distinguishing between the normal soil or those of possible grave shafts. Yet, the presence of vault structures hidden from view and possible unmarked burials in our investigations indicate there may be more graves hidden from view. Stripping the top-soil to reveal subsurface structures or soil silhouettes should reveal new graves and allow for more holistic study of the

necrogeography and highlight evidence of grave clusters for association inference. As stated earlier, finding fetal and neonate remains associated to Grave 6 would help clarify 31BWGause-ECU-2's cause of death. Moreover, following the stone wall found north of the modern cemetery confines should allow for the full scope of the original burial grounds and would indicate where to extend the search for other associated burials.

Further bioarchaeological investigations should look into other evidence indicating high socioeconomic status. As conducted by Seeman et al. (2011), a bone mineral density study would aid in analyses of activity and nutrition levels an individual may have had by their time of death on a radiographic level. An isotopic analysis of carbon and nitrogen isotopes would give insight into the Gause diet by establishing them on a particular trophic level within their regional food web. Finally, an interesting future project would be to develop a better understanding of familial relationships for the individuals within the cemetery utilizing DNA technology. Since the skeletons recovered were spatially distant from each other, it was impossible for this study to assume intra-site relationships. However, DNA studies on the uncovered burials, future burials investigated, and even the existing descendant community may allow for the construct of a strong family tree. DNA would also aid in identification of skeletons and allow for understanding of burial patterning behavior such as grave placement, who received the complex vault markers, and reasons for the difference between Grave 8's smaller and offset tomb and the other better constructed vaults seen in Graves 2 and 6.

Significance

This project not only shows the importance of bioarchaeological projects on studying the rural elite, but also demonstrates the social and professional implications the field has with the public. Despite claims of stewardship by the archaeological community, the study of populations akin to the Gause family has fallen short. There is still much to be known about the plantation elites of the antebellum period. The historical record highlights achievements of the notable few but excludes a majority of information on those featured and their relatives not deemed worthy of documenting such as women, children, and men without distinction. These populations have consistently been understudied because of their historical prominence yet the information gathered from rural elite cemetery studies can expand our knowledge on these people and give a voice to the individuals often conflated with others because of their wealth. This study also shows the need for further historical research on the Gause family. Their contributions to early North Carolina and the invested interest by their descendants are not reflected in what information is accessible. Much still remains a mystery which could be answered through archaeological means and cooperation with the affected communities. This project shows the faults of the written record, corrected or supported through the combination of biological and archaeological research.

On a more personal level, this project has allowed for Mr. Robinson to honor his ancestors. It has also fostered an ongoing relationship with the university and the descendants, allowing for future thesis projects and field school opportunities for students to learn proper bioarchaeological investigations. For most of our excavation period, Mr. Robinson (Figures 63-66) remained onsite eager to learn about our field discoveries and aiding anyway he could. Going forward, he plans to rebury the repatriated remains and reconstruct the cemetery to its original

look using the information gathered to give context of those buried there. The project site will be the next Gause heritage site to adorn Sunset Beach, NC and commemorating their importance to the region.

Figure 63: J.R. Robinson and Anthony Clemmons speaking to the media as project excavations brought attention to the Gause Cemetery and the invested community.

Figure 64: Archaeology team and descendant community working together to uncover history.

Figure 65: J.R. meeting his ancestors.

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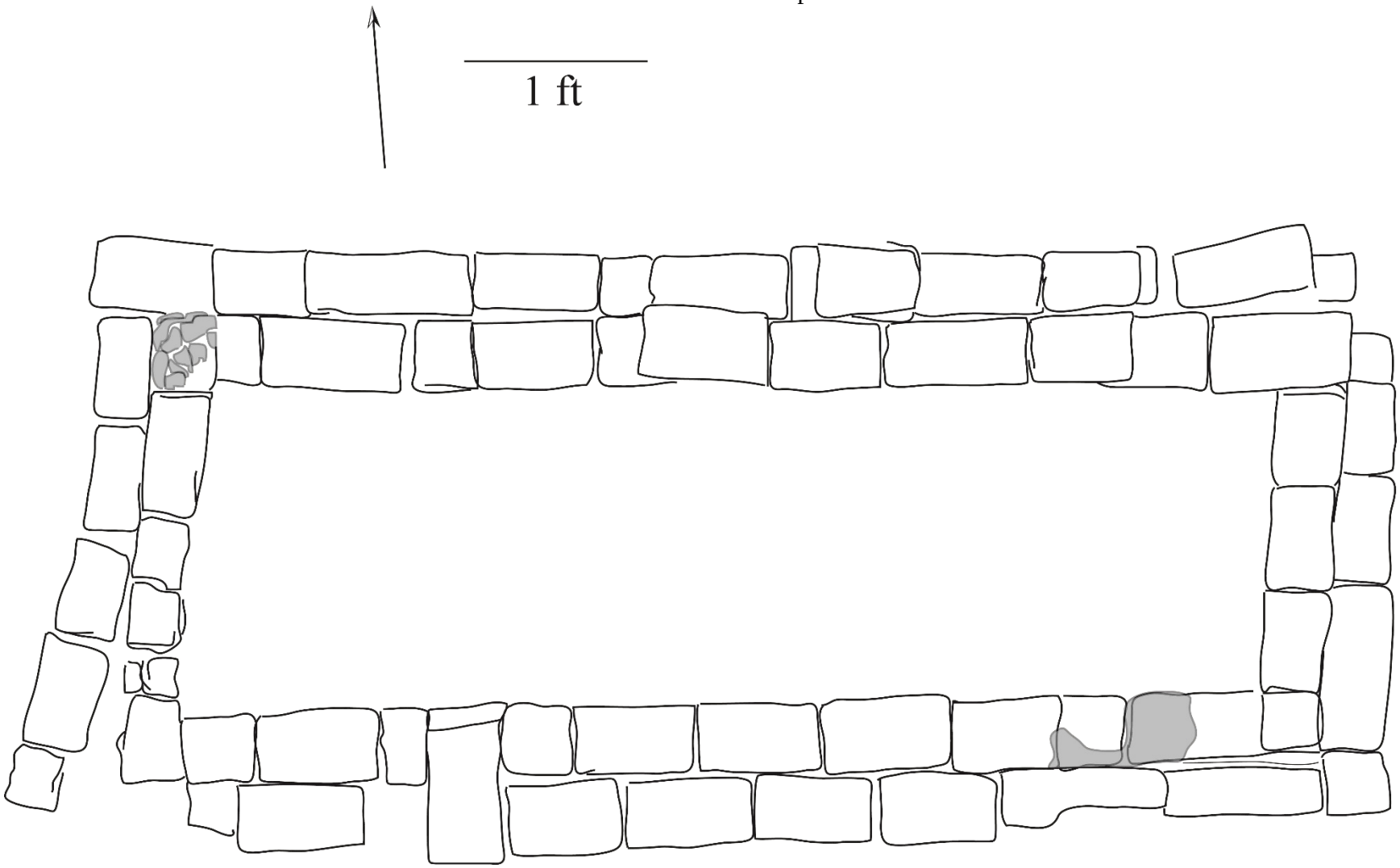
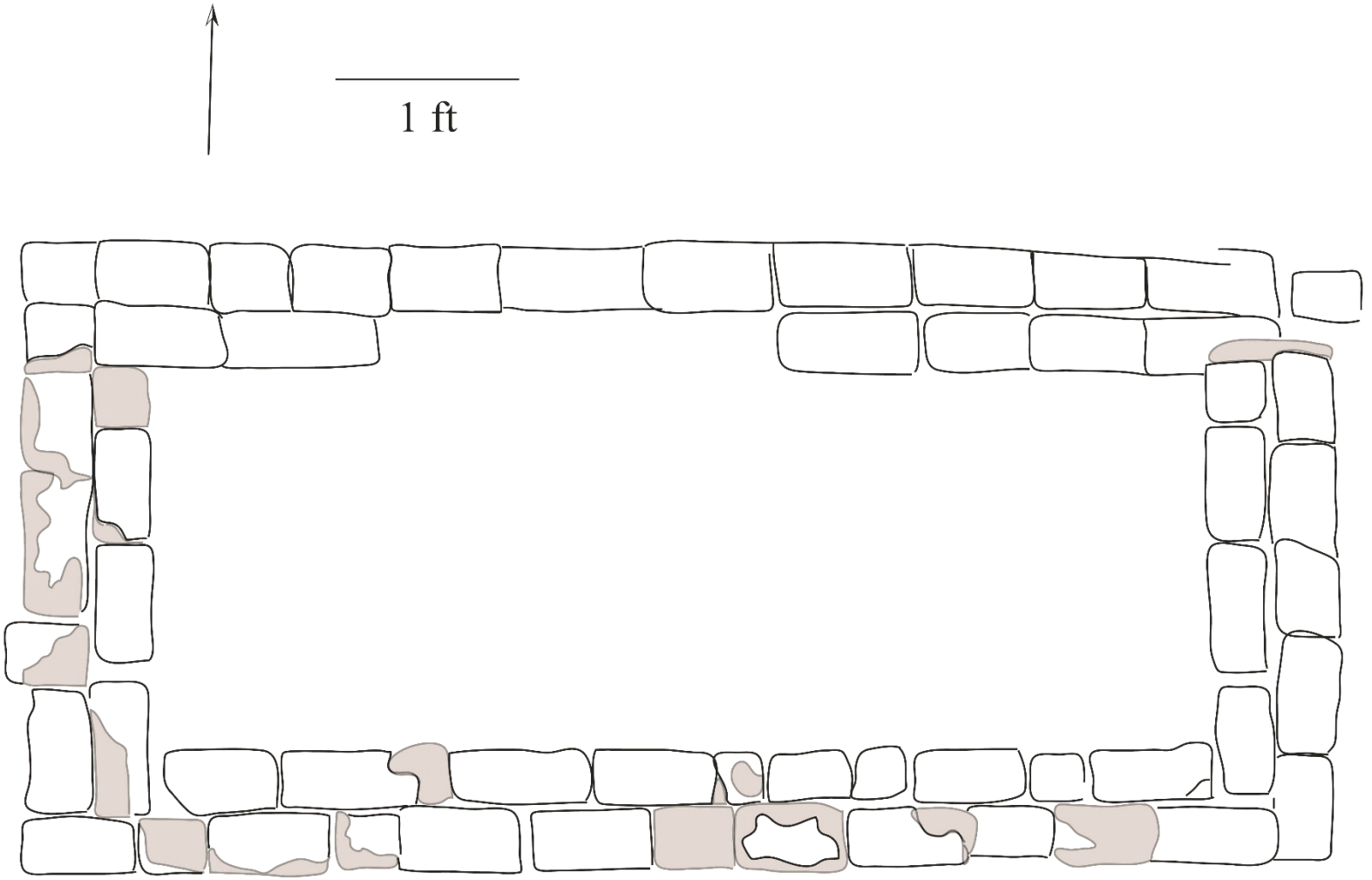
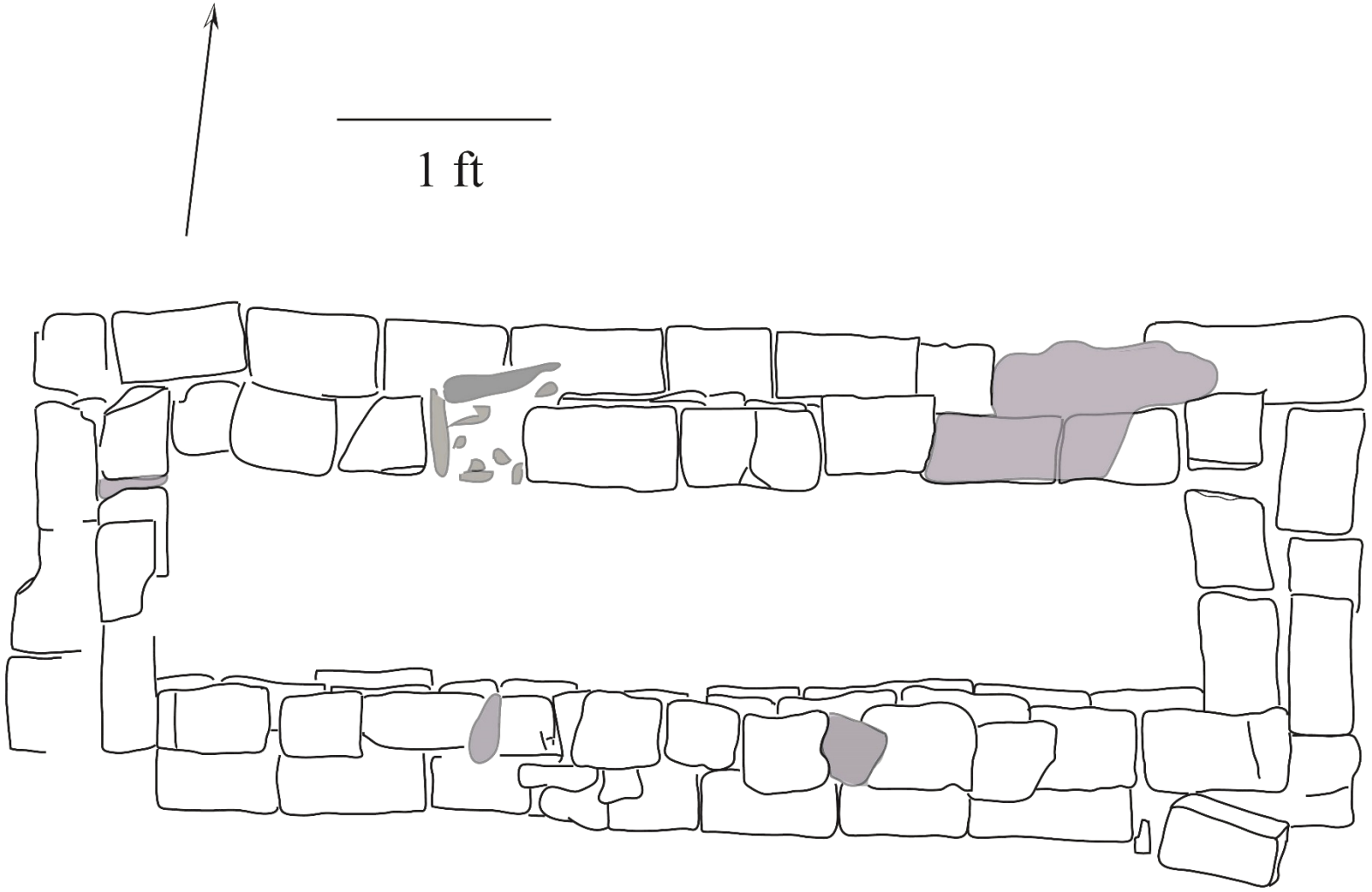
APPENDIX A: Grave 2 Top Profile



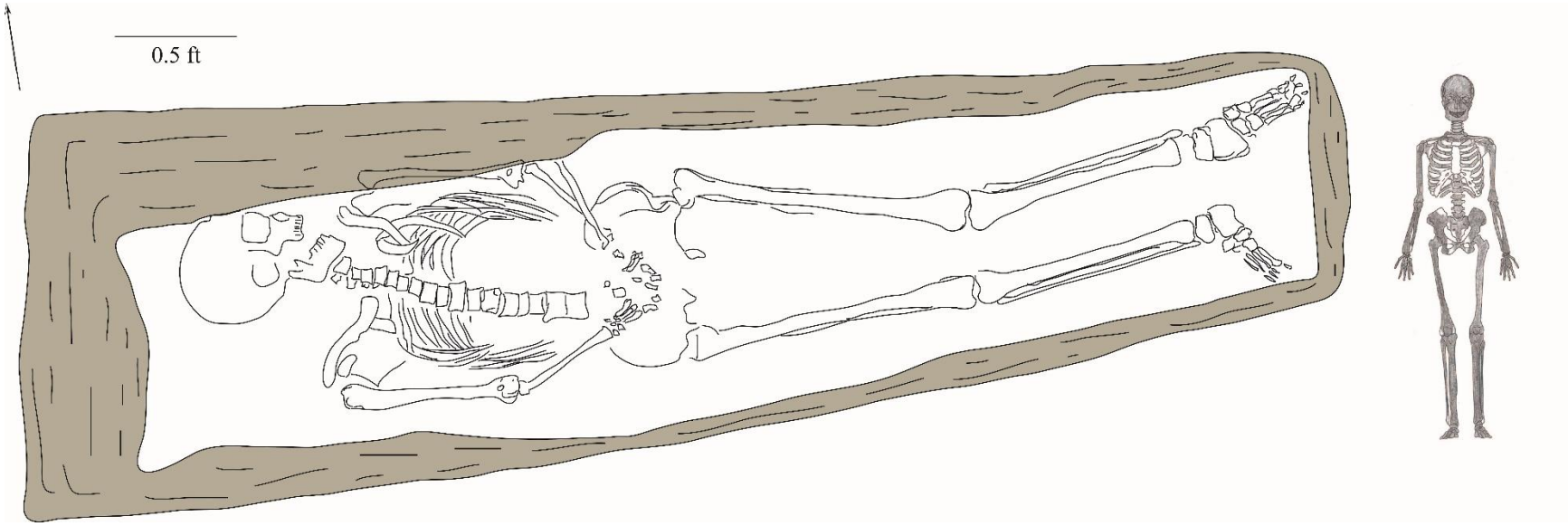
Grave 6 Top Profile



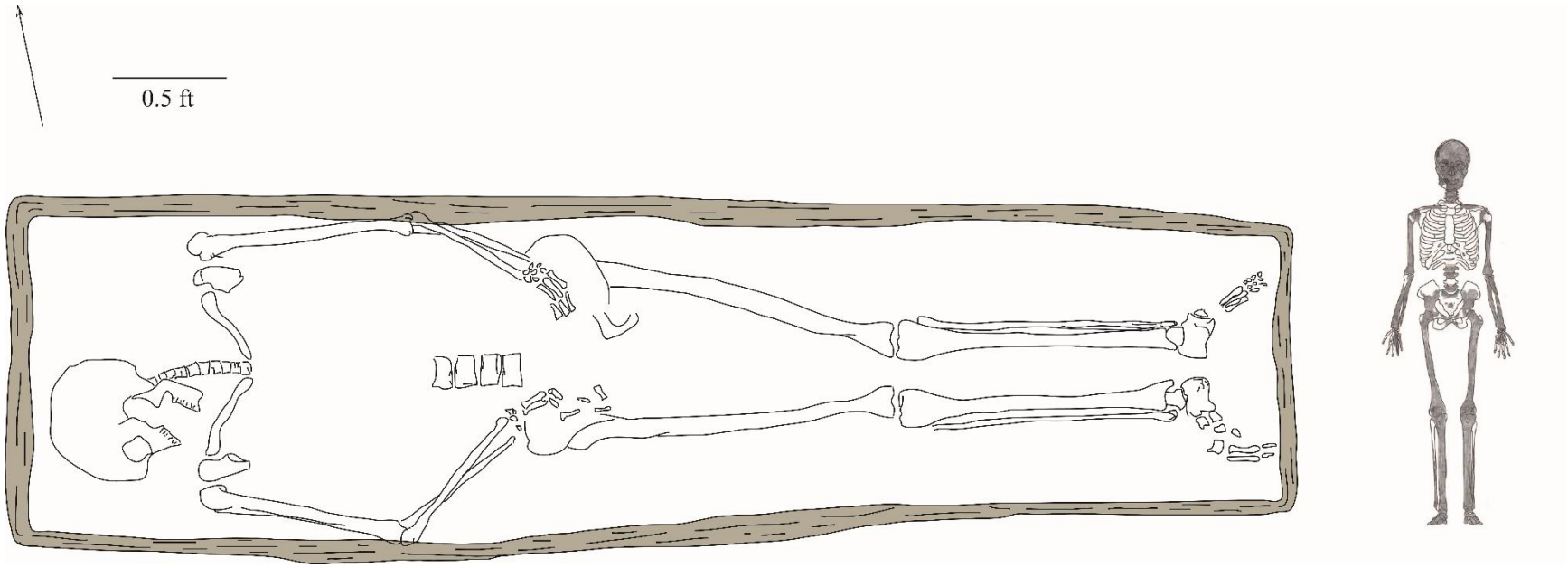
Grave 8 Top Profile



APPENDIX B: Grave 2 Individual (31BWGause-ECU-1)



Grave 6 Individual (31BWGause-ECU-2)



Grave 3 Individual (31BWGause-ECU-3)