Synthesis of the 2011 and 2013 Field Seasons at the Lord Ashley Site, Summerville, South Carolina.

Draft Report

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Introduction

The 2013 field season at the Lord Ashley Site (38DR83a) was conducted between June 10-28. Thirteen students from the College of Charleston participated. Andrew Agha serves as Principal Investigator and Field Director and was joined by Martha Zierden, chief curator of Historical Archaeology at The Charleston Museum and Ron Anthony, assistant curator of Historical Archaeology also at The Charleston Museum. This team was joined by Dr. Jon Marcoux, professor and co-chair of the Historic Preservation program at Salve Regina University in Newport, Rhode Island. Five students from Salve Regina joined the field school during the last two weeks of the project. Nicole Isenbarger of the Archaeological Research Collective, Inc. assisted the field school as a volunteer and peer mentor for the students. Lastly, trusted volunteer and friend Bob Welch was present to aid in screening and digging and also for help with logisitics.

Weather is usually not a topic of archaeological interpretation. June in 2013 was exceptionally wet and altered several initiatives for the field season. Investigation of Building 2 and Feature 46, the potential cellar feature identified in 2011, was thwarted due to daily standing water in the backfilled units from the previous field school. Three excavation units were completed on the edges of this large feature instead of a cross section through the middle as planned. These units recovered vital information regarding the presence of a structure in this locale, as well as architectural methods involved in this structure. Further studies of the moat were also hindered by daily rain fall. Although the soils were water logged and unit bottoms flooded regularly, we were able to excavate a 2.5x30' foot trench of units across the southern line of the moat feature and excavate to a depth of 3.0' feet below surface (bs). Marcoux and his students worked on opening up N950 E855 at the corner of the moat feature to expand on that unit and identify more of the moat. The effort was worthwhile as more of the moat feature was exposed and the excavations proved the magnetometry findings of a corner at this unit from 2011.

Because of water in the lower, deeper parts of the site, we opted to conduct more excavations than planned at the brick foundations found in 2009, named "Building 1" in the 2012 report. The 2011 field school reopened the excavations from 2009 to expose the chimney for more mapping and documentation, as well a few units to explore the space both in front of the hearth and just outside the chimney's external back wall. These units showed that subsoil in this location is shallow. I hoped that maybe units would be able to expose the corners of this building since probing efforts in 2009 did not find southern extents to the chimney. The northeast corner pier was found in 2009; we opened up a unit on this spot to study this brick feature more intensely. Luckily, years of light plowing in these shallow soils did not erase evidence of the southern brick piers for Building 1, as rough and partially destroyed brick features were identified. After measuring, these brick rubble features create a plan of 15' feet square.

Research Questions

The five research themes—Culture Contact, Defense, Architecture, Trade and Commerce, Agriculture—defined in the 2012 report are still applicable to the 2013 field season. Of these, Architecture, Defense and Agriculture were focused on more heavily in 2013 than the other two topics. These five themes are assessed below.

Culture Contact

Since no excavations were planned for the northwest locus of the site, where three units in 2011 recovered a large amount of Colono Wares and Ashley pottery, the topic of Culture Contact was not investigated through purposeful excavations. Rather, I hoped that evidence of Culture Contact would be recovered through excavations in other places of the site, indirectly and in association with buildings/features that were not seen as locations of enslaved African housing or Native American interactions based on the data from 2011. Based on the current 2013 field work, and research by Jon Marcoux, our understanding of contact between cultures at 38DR83a is complicated and marginal at best.

Currently, the ceramics known as “McKee Island” are being named “Danner-like” pottery in this report. Marcoux has spent the last two years researching this pottery type between the Carolinas, New England, and the Midwest regions of America. Because there are close similarities to pottery found in the Midwest, we are opting to call all McKee Island pottery at 38DR83a Danner-like pottery from now on (Marcoux 2015). These ceramics appear to have entered the site through trade after 1680, since it does not match any possible types, descriptions, or variants of what Westo pottery could have looked like. Woodward describes mica content in Westo pottery that made it shine like precious metals (Agha et al. 2012). We have yet to identify a single sherd of this particular ceramic quality. Currently, no Westo pottery has been positively identified; however, Danner-like pottery has. Since we know that a conglomerate of people, including the Shawnee, moved into the Westo’s political seat near Augusta, Georgia after the Westo War of 1680/1681, we align the Danner-like pottery to those second people; therefore, it’s presence at the Lord Ashley site helps to date the sherds to a post-1680 time frame.

After analyses and discussion with pollen analyst Dr. John Jones, the Ashley ceramics appear to be more aligned with a pre-St. Giles occupation or use of the landform than contemporaneous use with the colonists. It is found in roughly the same kinds of numbers in all units. We still have zero evidence that there were ever Native American slaves at 38DR83a, although we like to speculate that they were because of the connection with Henry Woodward. However, we also have no proof that Woodward traded Indian slaves out of St. Giles, or that he ever set foot upon the settlement we excavate. If the only Indian trade at 38DR83a took place after 1680, Percival, not Woodward, may have been involved.

We do know that 15 enslaved Africans were present at St. Giles Kussoe in 1681. Their material culture has yet to be properly identified. Although over 30 years of continuous work has been performed on slave settlements in South Carolina, absolutely no qualitative efforts have been made to match or even compare Carolina Colonowares with pottery from anywhere in West or West Central Africa other than linking symbols between continents. Until more Atlantic World-oriented work is attempted on this Atlantic World phenomenon, saying that any Colonoware belonged to or was made by enslaved Africans at 38DR83a is speculative; likewise for locally produced contemporary Native American pottery. We have been trying to identify African influences by utilizing Prehistoric Native American pottery techniques in Colonoware analyses for way too long and it is time to attempt new ways of scrutinizing this important pottery in order to unlock the true cultural, ethnic origins of these wares. For the sake of this report, such attempts were not employed or attempted.

Instead, I followed the advice of Leland Ferguson (1992) and call all hand built, low fired, unglazed ceramics found at 38DR83a "Colonoware." All of the type names crafted by archaeologists, such as "Lesesne Lustered, Yaughan, River Burnished," or any other variety are not being utilized in this report. Each of these "type" names are loaded with meaning that detracts from the proper discussion these ceramics actually represent: the material manifestation of colonialism and the contact spurned by forced interactions (Isenbarger 2012: 71-83, in Agha et al. 2012). Due to the lack of consistency in clays, sizes of sand grains and availability of other tempering materials throughout the coastal regions of South Carolina, observational variations in paste and sherd thickness within each type listed above have been seen and noted on several sites. Culture has been equated to specific qualities in paste based only the understanding of one particular, broad culture group—Native Americans—and not anyone else. There are no publications from South Carolina that attempt to align, describe or define West African potting traditions, techniques and technologies to Colonowares found on archaeological sites. Danner phase and Ashley pottery types are used in this report because of their links to sites that have little to no European contact, and because they have decorations, paste qualities, and other attributes that set them completely apart from the vast majority of plain wares found on site. The plain wares pose a problem because there are no qualities that set them apart for the easy attribution to culture groups, as stamps/surface treatments and specific types of temper rarely found in the Lowcountry (i.e., Danner-like pottery) can be attributed to ceramic traditions that have been linked to Native Americans through decades of archaeological studies and closed contexts. In the future, I hope that more research into African pottery allows us to finally learn what African-inspired ceramics look like so that we can begin to finally attribute material culture to the enslaved Africans at not just the Lord Ashley site, but all of the southeastern United States.

Defense

A large focus of the 2013 field season was defining the moat and excavating a cross section through it to learn of its internal shape and depth. The only known seventeenth century English moat is at 38CH1, Charles Towne Landing. Found in 1969 by Stanley South, his investigation of the moat consisted of 15 unique cross section unit excavations that sampled the depth, fill, artifact content and shape of the walls of the feature. No palisade line was identified at or near this moat; instead, an embrasure or soil embankment was likely in place to support a battery of cannons that could fire at the mouth of the Ashley River. South's methodology to find the moat was based on colonial records that proved a moat and cannon battery was built in the 1670s (South 2002), and that a feature like a moat would be so large that a trench-unit excavation plan would likely find something as large as a moat; thus, his methods positively identified the location of 1670 Charles Towne (South 2002).

We have consistently referred to the large linear anomaly found through magnetometry at St. Giles Kussoe as a "moat" and in our discussions, the word "moat" means "defensive moat." Although I interpreted this feature as a defensive moat in the 2012 report, and link the 1679 indentured servant runaway accounts of the defenses they saw at St. Giles while fleeing Carolina for Spanish Florida to 38DR83a, further interpretations of this feature as being defense-related need reevaluation and reclassification. It is possible that this moat feature did serve a defensive purpose during its functional lifespan before it was backfilled. However, based on artifacts, pollen analysis, and the unique nature of the way it was backfilled, it seems most likely that the moat was either a short term attempt to control rising water from wetlands south and west of the settlement, or, it was simply a major quarry for clay to make bricks. Chapter 2 details the soils found in the moat and Chapter 3 discusses the artifacts, pollen, elemental analyses between the clay and brick found at the base of the moat, and macro botanical remains identified that help to define the moat as a functional feature for the plantation and settlement, and not as a defensive fortification.

Architecture

Weather allowed us to unintentionally study the architecture more extensively than we had originally planned. Both Buildings 1 and 2, identified in 2011, were further studied with great results. All four corners of Building 1 were identified, as well as the north and south walls of Building 2 and the northwest corner. Verifying the size of Building 1 and its architecture can now lead to further interpretations of who occupied/utilized it and what the building's function was. Although the dimensions of Building 2 have been identified but more work is needed confirm its size and orientation, evidence of its north and south walls, along with a posthole pattern denoting a corner, is enough evidence to show that a building truly was in this location, and that Feature 46 may have indeed been a cellar.

Units were placed in locations to explore the potential for other buildings based on data from 2009 and 2011. While no new buildings were positively identified, structural features were found that hint at potential locations for other buildings in the settlement. These are discussed later in this report.

Trade and Commerce

Many more glass beads were recovered this season, along with rare glass buttons and other artifacts that are "firsts" for the site. This material culture helps to evince networks of trade and patterns of consumerism that will allow us to interpret what the people of this "frontier" settlement needed and wanted. We have already found artifacts that are representative of wealthy elites in an urban setting, whether from the 1670s or 1770s, along with a structure that was erected on brick foundations. Current interpretations at Charles Towne Landing State Historic Site, modeled after known history and interpretations of the area, mention that brick would not have been used in the early town because there was no need for permanent architecture: town plans were to move to the peninsula and to not stay on the south side of the Ashley River. However, recent discoveries made at the site of former Old Towne Plantation (c. 1694-1732), known as the Miller Site, are proving otherwise. Intact brick foundations that can only be from the 1670s have been found at the Miller Site, disproving the decades-old belief that early Carolina sites had no permanent architecture. (Agha and Isenbarger 2015). This not only "shakes up" our interpretations of the first town in South Carolina, but our understanding of the Lord Ashley site. The presence of intact brick foundations at the Lord Ashley site also show that, although it can be classified as a "frontier settlement," permanent architecture was employed. This changes the nature of the site in regards to the material culture that is "expected" and that which is actually found.

If brick architecture was not expected at the town of Charles Towne, then is it even more important that it was discovered at this settlement roughly 25 miles upriver and into the frontier?

Does permanency equal cultural and social refinement? Are the trade and commerce activities responsible for the need for firm, stable buildings? If we found the silver artifacts and not brick foundations alongside them, would it change our perception and interpretations of what this "frontier" settlement was and especially the people within it? Items that denote refinement (gold plated firearm decorations, Spanish silver reals, finely carved stone buttons, etc.) have been found at the Miller Site, all in association with the 1670s contexts that include the brick foundations. These discoveries when paired with the Lord Ashley site beg the question: Can elements of certain levels of trade and commerce be seen not only through small finds but through architecture as well? Basically, our understanding of everything we know concerning the 1670s in Carolina must change and be updated based on recent discoveries at these two sites. Lastly, Andrew Percival earned over £1,000 salary a year for his work for Shaftesbury and as Grand Council board member in Carolina's early government. This knowledge forces me to question what we mean when we say 38DR83a is a "frontier site" especially in comparison with other sites, both known and theorized, that fit the definition of frontier settlements/sites in historical archaeology of the last 40 years.

Agriculture

Our understanding of the crops grown and foods eaten by the inhabitants of this site have increased dramatically thanks to paleoethnobotanical (p-bot) analyses conducted on samples collected in 2011 and 2013. Also, a large number of pollen samples were analyzed, and when paired with the pollen report from 2011 and the p-bot analysis, the botanical profile of the site reveals some of the most interesting and important information recovered in the five years of work on this site. Besides these studies, Colonoware sherds and their associated *in situ* soil matrix were processed for their lipid profiles. Lipid analysis recovers the amino acid profiles of past foods that were cooked and served (or, stored, if liquid-based) in unglazed pottery. The recovery of the broad food types that once were in the vessels sampled can reveal not only how the food grown and raised at St. Giles Kussoe was used in consumption, but also reveal information about the people who ate the food. Major discoveries have been made concerning the p-bot and pollen results that tell us not only of the crops/plants that once grew here, but of potentially who was growing them. Also, these analyses assist in interpreting the site formation processes and functional assigning of certain features.

Originally a landscape approach was not used as a lens through which we should have been viewing 38DR83a. We treated the site as the only settlement that ever existed inside of St. Giles Kussoe. When we consider agriculture, and only look at the 23 May 1674 Shaftesbury letter to Percival, there are crop types that we did not recover evidence of through archaeology: orange trees and Irish potatoes being a few. We may have found wheat, which Shaftesbury suggested. We expected that all of the listed crops were grown in the vicinity of 38DR83a, even though there was another 12,000 acres within the plantation to try to grow things. Why should we believe that all of that property was not utilized? What was the purpose to have it? Shaftesbury did not believe in owning land that was to go to waste: as an early Royal Society of London fellow he was a firm supporter of the Improvers movement in England during this time period and would have never held land of this size for no reason other than to have it (Friedel 2007, Slack 2012, Drayton 2007, Locke 1960: Chapter V). Otherwise, why did he need the largest stock of enslaved Africans ever known, this early in Carolina's history? Or, why did he have almost 600 cattle, to keep them all near the swamp in the upper northern corner of the signiory? He did not even have proof that Africans were helpful in growing crops in Carolina yet, with only failures from the first four years to rely on as example. Once we begin to look at the entire 12,000 acres as the built environment that agriculture and cattle ranching created, the questions we can ask concerning these two activities expand exponentially. We must look at the Lord Ashley site as one of several such settlements within this vast plantation landscape, especially when considering agriculture.

Methods

The exact methods from 2011 were employed in 2013. The only changes were in screening strategies. In 2011, the site was very dry and we were able to safely recover artifacts from screens. Visibility was good. In 2013, the soil was so wet that we were unable to quickly discern artifacts in the screen and too much time was spent cleaning off every crumb of brick to see if it was a sherd, bead, pipe stem, nail, etc. To remedy this problem we bagged everything that did not go through the ¼" inch mesh hardware cloth. The bagged contents were then sprayed off in a window screen at The Charleston Museum by student interns, and the artifacts that are not brick rubble fragments were sorted out with ease. This method may have increased the bead and lead shot counts and the recovery of more residual Colonowares. Regardless of site conditions in the future, this method may be employed again since it has the potential to let us recover as many small finds as possible, and the small finds are what we need to find the daily activities, or the "small tasks," of everyday life. The people who founded and lived/worked at this site are giant figures in local, state, American, English, and world history, so finding out what their daily lives were like has an equalizing effect at reducing them down to regular people who labored, ate food, wore clothes, lived in buildings, and conversed with similar and different people—all things every person alive today does, too.

Chapter 2
Archaeological Excavations

Introduction
The purpose of this chapter is to provide a synthesis of the 2013 field season in context with the 2011 field season, in order to display the most comprehensive interpretations and understanding of the site. The majority of the 2013 field season excavations were clustered around units opened in 2011. Only a handful of 5x5' foot units were opened in areas based on the 2009 shovel test data. No 2013 excavations were performed in the woods near Potential Structure 2. The following chapter will detail units and their characteristics in relation to Structures 1 and 2, both defined in 2011, as well as three areas of the moat feature. One of these moat locations was discovered in 2011 and since that time a better understanding of the moat through geophysical survey provided us the chance to expand that spot through excavations in 2013. Two other locations were picked based on the geophysical survey: a location near the northern extent of the moat and a location along the southern line of the same feature. Artifacts found during the 2013 season will be discussed along with descriptions of the fieldwork and structures.

Because an extensive and thorough historical examination was laid out in the previous report (Agha 2012), this report will not attempt to improve upon the former work. However, pertinent historical data will be discussed in context with the structures found, the moat feature, the presence of distinct ethnicities at the site, and specific artifacts and their origins. No new historical research was undertaken for this report; instead, references to the research conducted for the 2011 field season were made and considerations for future research are discussed later in this report.

Field Methods
We relocated the datum stake placed in 2011 in order to find old units. We also located nails from several 2011 excavation units. After coordinating the datum with unit nails we learned that the datum coordinates are not N1000 E1000 but instead N995 E1000. This error was made during the 2011 field season. Unit names and coordinates are still the same, only the datum coordinate is wrong. Units were triangulated from preexisting 2011 unit nails if they were still intact and on-grid or were established with the standard transit. Jon Marcoux and his field school students from Salve Regina University joined us for this 3-week field season and Marcoux employed a Total Station during fieldwork to shoot in all available units from 2011 and new units from 2013, along with some landscape features that help to define the site.

All soils were again screened through ¼" mesh hardware cloth. Elevations were kept in relation to the standard transit, datum and backsite elevations, all of which were used in 2011. In 2011 we dealt with extremely dry field conditions and the artifacts were sorted apart from rubble and other non-cultural items while the students screened the soils. This method was time consuming but reduced the amount of material in lab at The Charleston Museum. In 2013, I decided to employ a screening method that we experimented with during the data recovery excavations for E.I. Nemours DuPont and their plant along the Cooper River outside of

Charleston. This method of artifact recovery, called "Total Screen Collection," requires that every object that does not pass through ¼" mesh goes into an artifact bag for the provenience being excavated. In the lab, all of this material can be dry screened again or water screened through window screen. After the material dries it can be sorted in better ways versus sorting in the field: artifacts are cleaner and the identification of, for instance, ceramics instead of brick fragments is more accurate. Brick and shell that would normally be weighed in a bucket and discarded in the field now can have a more accurate weight in the lab. Also, small artifacts that might be missed, like beads, lead shot, and residual sherds, are easily recognized in the lab and not sacrificed due to time constraints in the field. Total Screen Collection was utilized for every provenience from the 2013 field season except for samples collected for water screening and flotation samples.

Following methods from 2011, a quadrant (2.5x2.5' feet) of every 5x5' foot unit was sandbagged for fine water screening. This method recovered important small artifacts from certain areas of the site versus others that produced very few. All notes were kept on unit excavation forms for The Charleston Museum. Daily elevation logs were kept by students using the standard transit, datum and backsite. All artifacts were put into archival quality mylar bags. The 2013 artifact collection was gifted to The Charleston Museum by the landowner in August 2013. A subsequent artifact analysis was undertaken by several 2013 field school students during the College of Charleston scholastic year 2013/2014; lab work was under the direction of Martha Zierden and Ron Anthony, respectively Curator and Assistant Curator of Historical Archaeology. Andrew Agha serves as Principal Investigator and Field Director for the project. Nicole Isenbarger is head Ceramicist for the project, and Dr. Jon Marcoux is the Native American ceramic expert for the site. Katherine Pemberton runs logistics and budgetary needs for the project.

Unit Excavation

Twenty one units were excavated during the 2013 field school at 38DR83a; seven of these were 2.5x5' foot units while the others were 5x5' foot units. The following discussion with outline excavation efforts to expose the dimensions of Structure 1 and Structure 2, the investigations into three distinct spots along the moat, and two other locations that were tested during 2009 and 2011. Artifacts for each area will be discussed in context with the stratigraphy and features that were encountered. Figure 1 displays all 2011 and 2013 excavation units on the current site plan.

Structure 1

Structure 1 was discovered first in 2009 when its large chimney foundation was fully exposed. This chimney comprises the northwest corner of the structure. As the chimney was being exposed, the northeast corner, also a brick foundation, was found through shallow probing and a test excavation. I had wanted to return to the northeast corner in 2011 to expose it further and hopefully define a builder's trench, but time did not allow for it. To properly define Structure 1 in 2013 the students installed a unit directly on top of the northeast corner brick feature. The units that worked on and around the chimney in 2011 became a shallow frog pond in 2013 due to

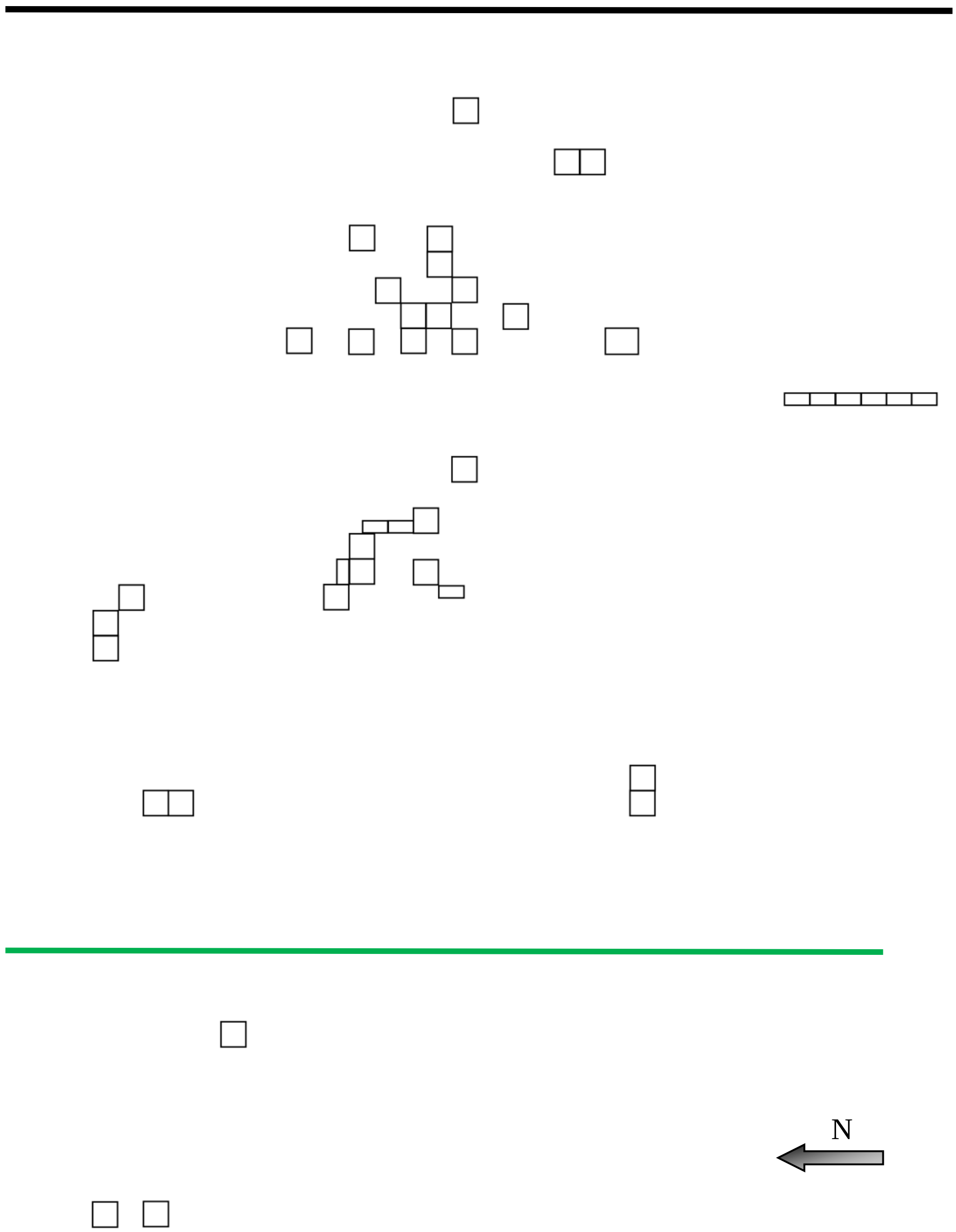


Figure 1. Excavation units from 2011 and 2013 field seasons (west of green line is woods, east of it is pasture; black line is a dirt road).

torrential rains the whole field season and we did not dig to expose the chimney again. Figure 2 displays the entire plan view of Structure 1 as we currently know it thus far.

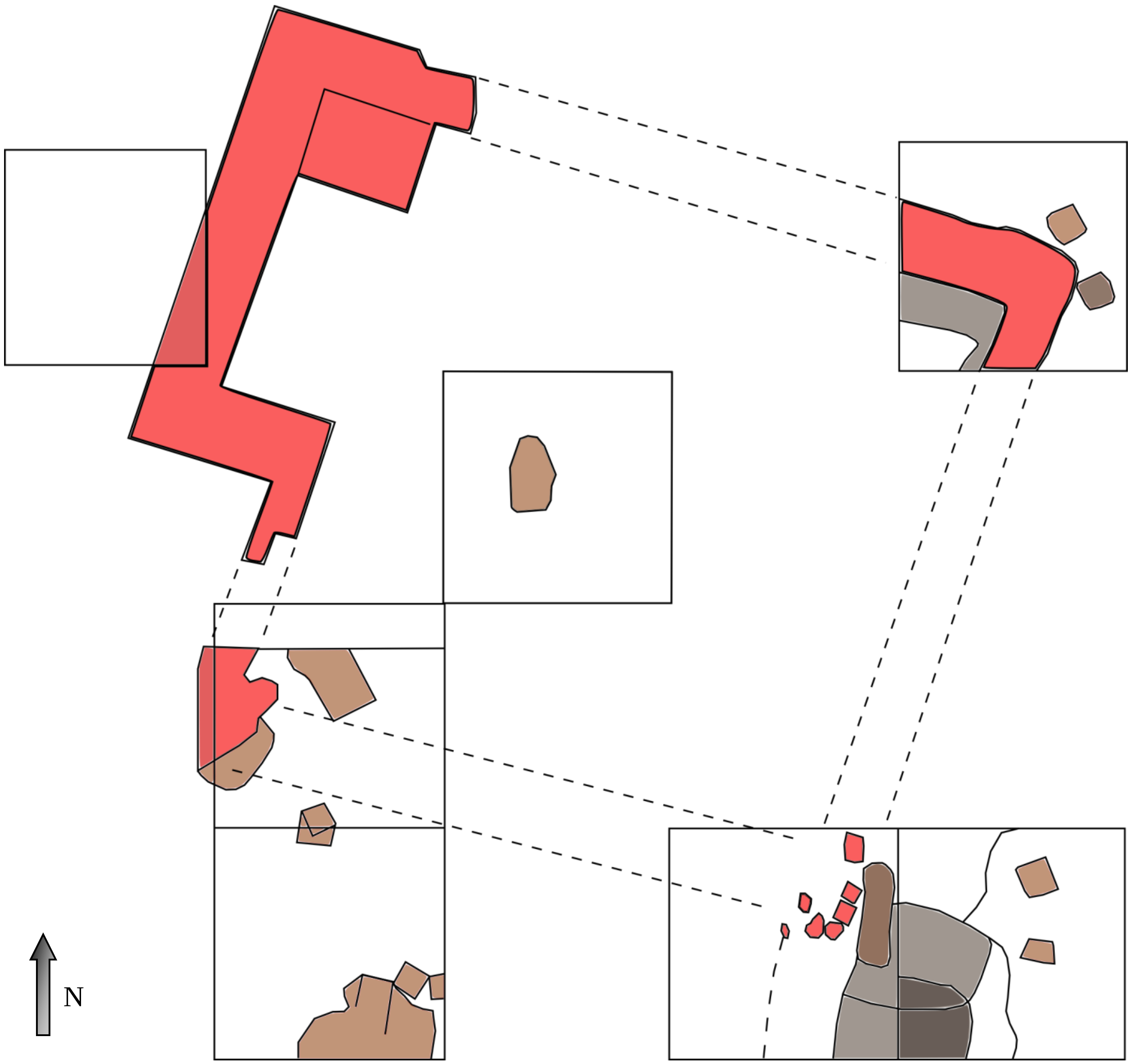


Figure 2. Structure 1 plan.

Unit N1005 E970 was excavated to a depth of 0.75' feet below surface. Figure 3 displays a photo showing the north wall of the unit. This unit was excavated in two zones. Zone 1 is a 10YR3/2 very dark grayish brown sandy loam and Zone 2 is a 10YR3/4 dark yellowish brown sandy loam. No other units were excavated west or south of N1005 E970; both directions would reveal the north and east walls of this structure. Feature 80, the brick foundation that is the northeast corner of the structure, was fully defined and drawn to scale. Figure 4 displays a photograph of this foundation in plan view. North and east of the brick foundation's corner lie three square shaped postmold stains. These match those seen near the chimney in 2011 and likely served as scaffold posts used during construction of the house. The thin builder’s trench was excavated as it sat against the inside corner of the foundation; no datable material was recovered, only scant brick rubble.

Figure 3. N1005 E970 north profile.

Figure 4. Feature 80 planview, brick foundation in northeast corner of Structure 1.

Two units were installed south of N1005 E970 to attempt to find the southeast corner of Structure 1. N990 E965 and N990 E970 did successfully expose a mostly destroyed pier or past wall foundation (Feature 107), and both field and scale map comparisons show that Feature 80 in the north lines up perfectly with Feature 107. The distance between these brick features is 15' feet. To the southeast of Feature 107 is Feature 61: a burned soil/charcoal rich deposit of artifacts and likely material from the demolition of Structure 1. Figure 5 displays a photo of Feature 61. Some of the best intact preserved bone from the pasture comes from this feature. Some scaffold postholes/molds similar to those seen in N1005 E970 and at the back of the chimney were identified in N990 E970. Feature 107 appears to have been a brick pier, but if that was the case, it should be more substantial and continue to the west. It is possible that Feature 107 mirrored Feature 80 in the past, but 20th century plowing, although light and minimal, destroyed the majority of the southeast corner of the structure. These units were only 0.5-0.7' tenths of a foot deep and Feature 107 was found in the most shallow part of both units.


Figure 5. Feature 61 planview.

Three units comprised a small block that investigated a few different questions. N990 E955 was placed north and cattycorner to 2011 units N985 E950 and N985 E960. Those older units exposed a potential wall trench feature that runs in line through both units. A potential wall trench feature was also identified extending into the northwest corner of N985 E960. The new unit in 2013, N990 E955, hoped to find a continuation of the wall trench. A large dark soil stain was identified in the southeast corner of N985 E960 and something that is either a narrow wall trench or wall sill stain, or large square posthole, was identified, which appears to lie in a north/south orientation. Two well defined square posts were identified adjacent to and east of the potential wall sill/posthole. It is possible that there was a collection of postholes and post replacements in this area, which would explain the larger asymmetrical soil stain and postholes inside and outside of it. These features are all less than five-feet north of the potential wall sill from 2011, making them all not related to each other in regards to architecture. The function of all of these features can be learned only through more archaeology of the remaining three units (N990 E950, N985 E955, and N990 E960).

The other two units of this small block, N995 E950 and N995 E955, successfully exposed and defined the poorly preserved southwest corner of Structure 1. Only a few brick bats and mortar rubble in a concentration is left for us after plowing has mostly eradicated this feature. Again, map work and line-of-sight studies during excavations prove Feature 110 was the likely southwest structure corner. Unit N995 E950 contains only the western edge of Feature 110 and no other features were exposed in this unit's plan view. In similar fashion, N1005 E950, a 2011 unit that exposed a large portion of the backside of the chimney, also did not have features other than scaffold posts. These units were roughly 0.7' feet deep below surface; again, shallow enough for light plowing to harm this brick feature.

These two badly damaged remnant brick foundations are in many ways unlike the chimney and Feature 80. All of these brick foundations have had the opportunity to be damaged by plowing and therefore should all look the same. The chimney is, of course, the most massive and most structurally complete foundation of all four: it has four intact courses of brick below subsoil. Feature 80 is only one course of brick, and this last course was lucky to have missed the plow blades. However, even if the southern corners were identical to the size of Feature 80, the brick rubble concentrations we identified should be more substantial; there should be dense brick and mortar rubble extending east and west from both features to meet in the middle, along the southern wall of the structure. Excavation in these units was performed with the utmost care, detail and patience. If dense rubble was present it would have been identified. One possible reason these southern corners contain such minimal amounts of brick, and are smaller in plan view than Feature 80, could be because they were merely small, square-shaped brick piers along the east and west walls of Structure 1. If so, then Feature 80 is a substantial northeast corner pier for the structure, and the features in N995 E955 and N990 E965 are center piers for longer walls. Excavations north and south of N990 E965 would prove or disprove this theory. The potential for Structure 1 to be a 15x30' foot structure is possible; more brick foundations would need to be discovered to the south of the damaged foundations. Coincidentally, a row of square postholes similar to all of the scaffold posts were found in unit N975 E955 in 2011, and when projecting the east wall south 30' feet from Feature 80, this row of three postholes could easily be scaffold posts for a southern wall that may still be under the ground.

Regardless of whether Structure 1 is only a 15' foot square room and building, or was larger, the fact remains that this structure's dimensions matches a recent structure of the same time period at Charles Towne. Current archaeological investigations at the Miller Site (c.1670-1680; 1694-1730) have exposed the earliest known tabby/mortar floor in South Carolina (Jones and Sheppard 2011). Although damaged from trees and 300+ years of natural events, the floor is being interpreted as a 15x15' foot paved surface. New brick foundations from the 1670s have been identified and the floor lies within these features. Here, the similar dimensions help to link these two structures on the Ashley River through time and space towards something that may have been an architectural "standard" or plan for structures of the 1670s/80s. Were 15x15' foot rooms the norm for almost all structures at 38DR83a? Was this a standard only for brick foundations and more substantial buildings? Did this measurement change during the 1670s, or 1680s? More work is needed at 38DR83a to verify the sizes of structures and their layout in relation to each other so that settlement layout for the originating 10 years of Carolina can be learned for the first time ever.

Structure 2

The second structure identified is called Structure 2. It was found in 2009 through a 50x50cm test that penetrated one of the most substantial features at 38DR83a: a possible cellar. In 2011, a block of units was opened up to expose this cellar (Feature 46) and attempt to find defining edges. A north edge was found, along with what appears to be a wall trench belonging to the north wall. This trench has a sharp, square-shaped termination that defines its east end, implying an entrance into the building. Figure 6 is a plan view drawing of all excavations to date that define Structure 2. After a line of 2.5x5' foot units revealed that Feature 46 continued south, and also produced the brass sword handle, it was decided in 2013 to install a 5x5' foot unit at the south end of these skinnier units. My hope was that the new unit would define a southern edge to Feature 46, and/or possibly a corner to Structure 2.

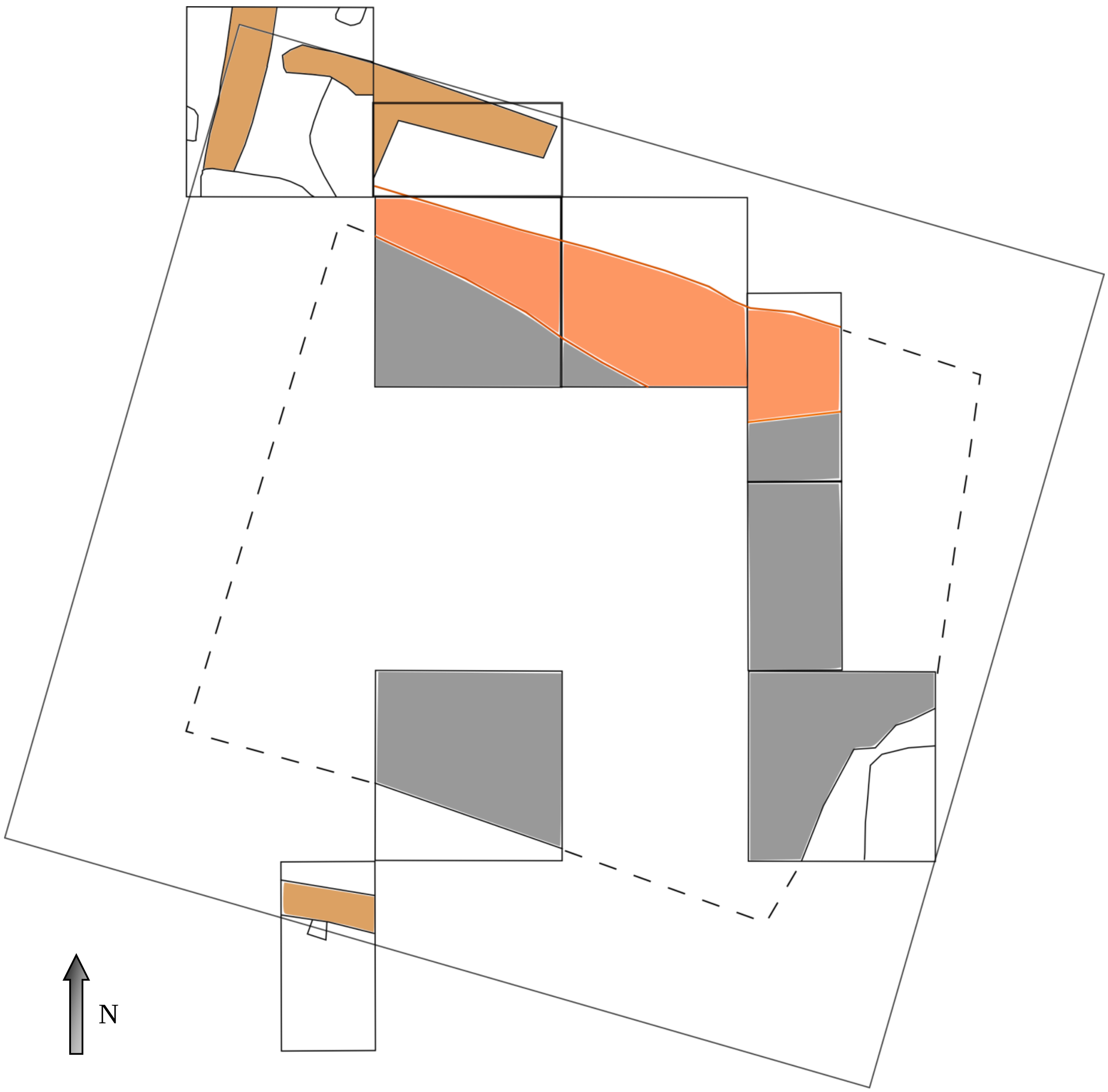


Figure 6. Structure 2 plan.

After much fighting with the heavy rains and flooding of the units at the site, we slowly got back to defining the cellar and Structure 2. N992.5 E915 is the name of the 5x5' foot unit that we all hoped would finally show us what Structure 2 was, and if Feature 46 was indeed a cellar. Zone 1 was standard and repetitive. Zone 2 (10YR4/3 loamy sand) was roughly 0.45' feet thick and terminated into a slightly intact transition to what we called Zone 2 level 2. This provenience is a 10YR3/3 sandy loam with some light clay content. As the excavation in Zone 2 level 2 went deeper, the soil was more intact and certainly below the depth the plow blades reached. Large brick fragments and larger artifacts, along with mottling of a 10YR2/2 clayey loam in the southeast corner, started to appear and a Zone 3 level 3/Feature 46 designation was assigned. At this point subsoil was starting to appear in the southern half of the unit. Figure 7 displays a plan view photo of excavations at this point. Darker Feature 46 soil started at the contact point between it and subsoil and as it was slowly troweled down, the rest of Zone 2 peeled away to completely expose Feature 46 soil at a depth of 1.3' feet bs. Figure 8 displays a plan view photo of Feature 46 against clear clayey subsoil.

Figure 7. N992.5 E915 planview of Zone 3 Level 3 and Feature 46.

Feature 46 was bisected along a north/south axis and each half was removed carefully with trowel and small tools. Several very large artifacts were found in this shallow southeastern edge of the feature. Subsoil comprised the southern half of the unit and Feature 46 tapered gradually to the south. Figure 9 displays a profile drawing and and Figure 10 displays a photo of Feature 46 and lists the soil variations recorded above the cellar fill. Although this sample of the cellar is shallow and small, the artifacts are interesting and help to demonstrate that it possibly is a cellar. Lastly, we collected a 10-liter flotation sample for paleoethnobotanical research.

Figure 8. Feature 46 contrasted against clayey subsoil.

Three additional units were placed strategically to find evidence of the walls of Structure 2. The units along the south wall of the building are N992.5 E905 (5x5' foot unit) and N987.5 E902.5 (2.5x5' foot unit). N992.5 E905 identified a clear southern edge to Feature 46 roughly midway between the interpreted building's south wall. Figure 11 displays a plan view photo of Feature 46 in this unit. N987.5 E902.5 was placed to see if a wall trench, similar to that due north, is present. After minimal excavation of only 0.8' feet bs and standard Zone 1 and Zone 2 stratigraphy, a clear wall trench was identified at almost exactly the same distance from Feature 45 (the heavy clay fill) on the north side of Structure 2.

The northern most 5x5' foot unit at Structure 2 opened in 2013, N1010 E900, was excavated to find a western extension of the wall trench, Feature 57, found in 2011 (refer to Figure 6 for the overall plan view of Structure 2). This unit encountered the exact same Zone 1 and Zone 2 stratigraphy and reached a depth of 0.9' feet bs before terminating into subsoil and linear stains that mimic several thin and heavily mottled wall related features that have been defined and excavated since 2011. This unit floor appears to be showing the northwest corner of Structure 2. Figure 12 displays a plan view photo of N1010 E900 (refer to Figure 6 for the drawing of the northwest corner). The excavation of Features 57 and 115 look eerily similar to all other wall sill/wall trench features found and studied thus far at 38DR83a: they are shallow, heavily mottled with subsoil and flat bottomed considering over 300 years of bioturbation. Figure 13 displays profile drawings of these features.

After the nine units and 162.5 square feet of excavation at Structure 2, I can safely say that this building was supported by a wall trench, but not in the manner that we normally see in the Lowcountry for buildings of this period. I believe this structure was a cratchet-style house, with corner posts and puncheons along the walls (Carson et al. 1981: 153-154). Carson et al. explain puncheons being supports "which were not set, but driven into the ground, hence the absences of postholes" (1981:179). Current interpreters at Charles Towne Landing State Historic Site created a cratchet house as a shed for firewood. The projected line of the wall was scratched out and topsoil was removed to an extremely shallow depth. When the puncheons were set, they were set into small holes made into the bottom of the plate (the plate is the cross beam that sits in the "crotches" of the wall posts and is the base of the roof) and then forced into the ground through scratching, pushing and jostling the surface that sits roughly 1-2" inches below surface. Human strength is what is used to get the puncheons into the ground, and it severely alters the subsurface soil. After seeing this with my own eyes, the strange “wall sill” stains now look like the rain water-swirled scratched out wells that are the “postholes” of the puncheons.

Figure 9. Feature 46 north profile with soil information.

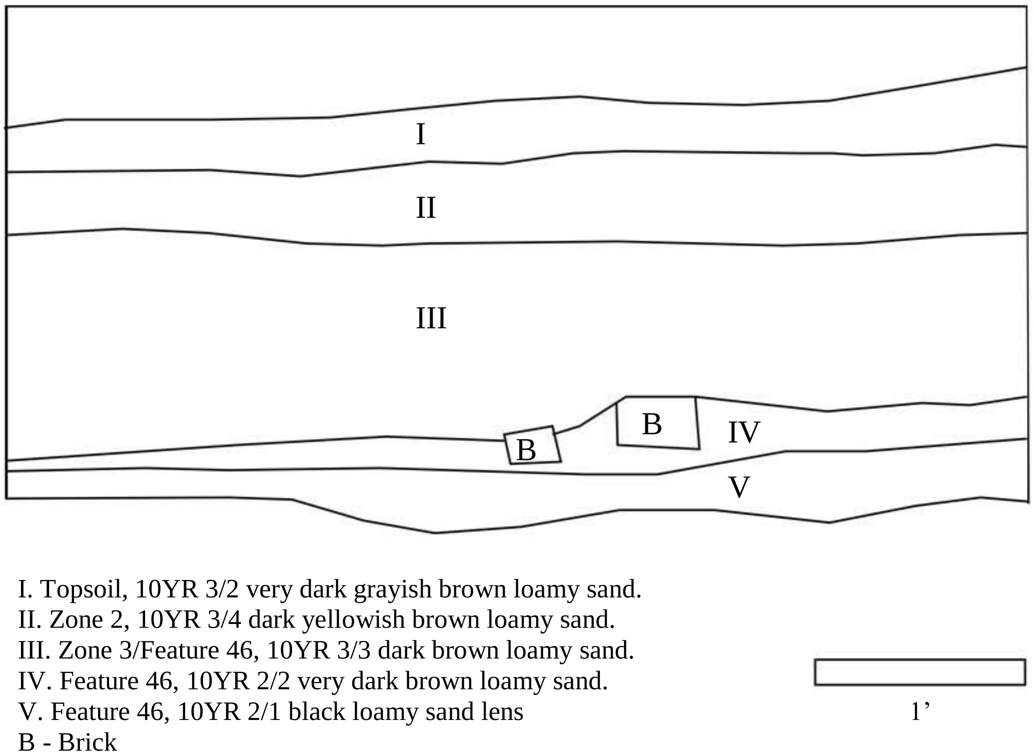


Figure 10. Feature 46 north profile.

Because the plate is what needs to be straight, the crotches at the top of all wall posts need to be aligned, while the base of the posts can be askew. All that matters is that the roof is set well;

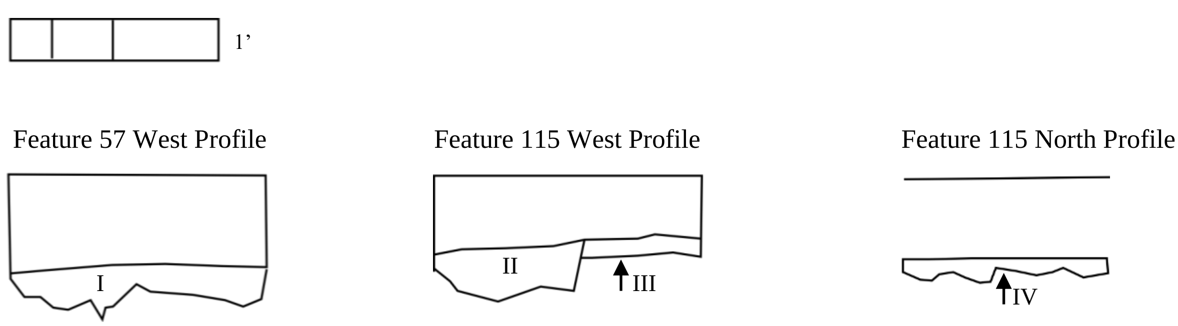
wattle and daub can be applied to slightly uneven posts—wattle is literally braided between the puncheons and posts, and clay and straw daub can be applied to literally any surface. The shed at Charles Towne Landing have posts that meet the ground in an askew way; Structure 1 discovered during the 2000/2001 excavations led by Michael Stoner and Stanley South have posts that do not occur in a straight line. Things look like postholes in the "trenches" we identify at the Lord Ashley site, yet they are shallow and exhibit traits of water-borne sands and silts.

The amount of nails and nail fragments (n=544) allow me to suggest that this cratchet was not finished with wattle and daub, but instead clapboards that ran both inside and outside of the building. Posts may have been selected for straightness; puncheons, then, may not have been needed. If clapboards were used to wall the building, then what we are seeing in the wall trench/sill features are not always puncheons but past water staining and soil washouts from rain water that ran down the walls and posts and affected the soil where the wall meets the ground. Feature 117, in N987.5 E902.5, has quite straight lines; however, as we have seen already through the excavation of several features, these straight lined features in subsoil do not always result in clear, crisp, easily interpretable architectural features. Roughly 40-45% of Structure 2 has been excavated, and with more precision-laid units, the complete outline of the building should become evident, along with hopefully an answer to the architectural style utilized.

Figure 11. N992.5 E905 Feature 46 planview.

Figure 12. N1010 E900 planview.

Figure 13. N1010 E900 Features 57 and 115 profile drawings.



I. 10YR 5/3 brown lightly mottled with 10YR 6/4 light yellowish brown and 10YR 7/3 very pale brown loamy sand.
II. 10YR 4/3 brow loamy sand mottled with 10YR 7/4 very pale brown loamy sand.
III. 10YR 4/3 brown loamy sand highly mottled with 10YR 7/3 very pale brown, 10YR 6/4 light yellowish brown, and 10YR 6/6 yellowish brown loamy sand , and 10YR 5/8 yellowish brown clay
IV. 10YR 4/3 brown loamy sand mottled with 10YR 4/4 very pale brown loamy sand.

The Moat

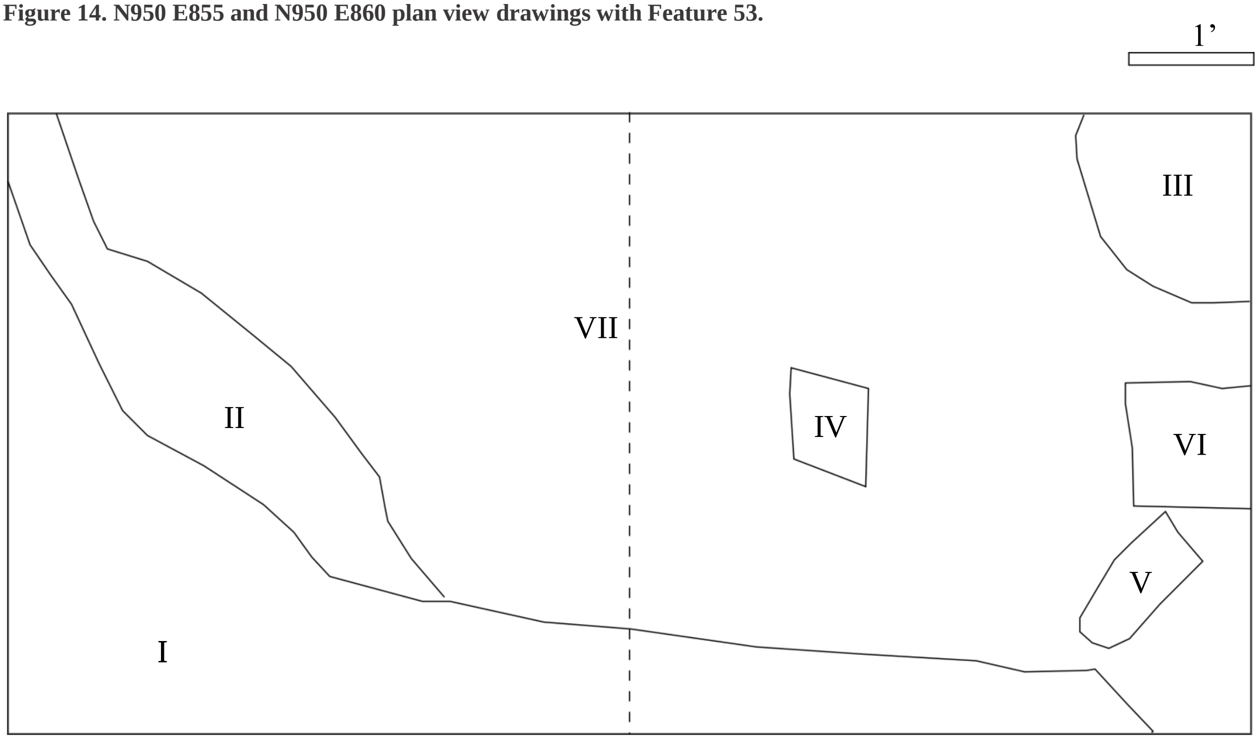
In January of 2012, Dr. Jon Marcoux, currently professor at Salve Regina University, came to 38DR83a to perform a magnetometer survey of the pasture. Nicole Isenbarger and Andrew Agha assisted Jon in the successful discovery of the feature currently known as "the moat." Along with this feature, Jon identified several other anomalies that appeared to be cultural features (Agha et al. 2012). Unit N950 E855 was originally installed to explore a brick rubble lens inadvertently discovered through the destruction and debris removal of the derelict cow pen in the southwest corner of the fenced-in pasture. Although the brick rubble was not encountered in this unit, a very dark soil feature—Feature 53—was identified. When Marcoux's magnetometer showed us a large linear stain that turned an angle, that angle fell on top of N950 E855, and the shape of the feature started to make sense as an element of the corner turn of this "moat" line.

When Marcoux and his students came down from Rhode Island to help at the Lord Ashley site in 2013, the first order of business from he and his students was to open a new unit to learn if Feature 53 would extend to the east. Unit N950 E860 was difficult to excavate, as the loamy soils in this part of the site have more clay content than most other locations in the pasture. The heavy summer rains bogged the unit down through the whole span of the three-week field season, but through continuous work and determination, the Salve Regina students managed to not only interpret the complex stratigraphy, but reopen N950 E855 to show that Feature 53 does indeed extend to the east/southeast. This was clear affirmation that the magnetometer and the features in the units complement each other.

Excavation of N950 E860 began with Zone 1 Level 1, which was screened until we realized that this soil was backfill from the 2011 excavation of the neighboring unit. Once solid dark homogenous Zone 1 soil was found, Zone 1 Level 2 was removed to a depth of 0.2' feet bs. Zone 2 Level 1 followed, characterized by a 10YR4/3 sandy loam. This lens was taken down 0.3' feet until a 10YR3/2 sandy loam was identified; this new soil is Zone 2 Level 2. For control, only 0.2' of a foot was taken down, and features began to appear near the east and north walls of the unit. These were possible posts, but as excavation of Zone 2 Level 3 was started, some of these stains went away and others remained. This last level of Zone 2 was taken down roughly 0.4-0.5' feet, reaching a depth of 1.5' bs. A 10YR6/4 light yellowish brown sand subsoil was identified at the base of the unit, with Feature 53 showing up strong along the southern edge of the unit. To be sure this was Feature 53, the neighboring unit from 2011 was opened back up. This resulted in a very well defined moat corner appearing in both units. Figure 14 displays a plan view drawing and Figure 15 a plan photo of both units and Feature 53.

These units were confusing during excavation, but after taking time to study the profiles, the soils make perfect sense. Figure 16 displays a drawing of the south and west profile together end to end and Figure 15 displays a photo of the south wall. There are lenses of mottled subsoil and lighter fill, seen higher up in the unit, that underlie the darker Zone 2 matrix. Underneath these lighter soils is Feature 53. We were unsure if this was possibly a later disturbance, which made us question if the moat was an old feature from the 1670s or something cattle related from the 1970s. Luckily, this kind of stratigraphy was observed in the other two cuts on the moat. When the moat was first dug out in the 17th century, the fill was piled up on either one or the other side, or both sides simultaneously. If the moat served defensive purposes, this fill would most likely have been along the north side of the feature. If the moat had an accompanying embrasure, like Stanley South interpreted at Charles Towne (2002), then this embankment would have been pushed back into the moat at the time of site abandonment; while we have no proof of this historically, the fill in the moat from the other two cuts seems to show evidence of this kind of soil movement. At Charles Towne almost all of the profile cuts South made in the 1670 defensive moat show lenses of lighter fill sandwiched between lenses of dark fill within the moat. It looks like fill came in from both sides based on South's profile drawings; however, standard interpretation of Charles Towne and its fort is that the embrasure that supported cannons sat to only one side of the moat (South 2002).

Figure 14. N950 E855 and N950 E860 plan view drawings with Feature 53.



I. Feature 53, 10YR 3/2 very dark grayish brown loamy sand with high concentration of charcoal.
II. Feature 53a, 10YR 4/3 brown loamy sand mottled with 10YR 6/4 light yellowish brown sand.
III. Feature 81, 10YR 4/3 brown loamy sand mottled with 10YR 7/3 very pale brown sand.
IV. Feature 82, 10YR 4/3 brown loamy sand mottled with 10YR 6/4 light yellowish brown sand.
V. Feature 83, 10YR 4/3 brown loamy sand mottled with 10YR 6/4 light yellowish brown sand.
VI. Feature 86, 6/4 light yellowish brown loamy sand mottled with 10YR 7/4 very pale brown sand.
VII. Subsoil, 10YR 6/4 light yellowish brown loam sand mottled with 10YR 7/3 very pale brown sand.

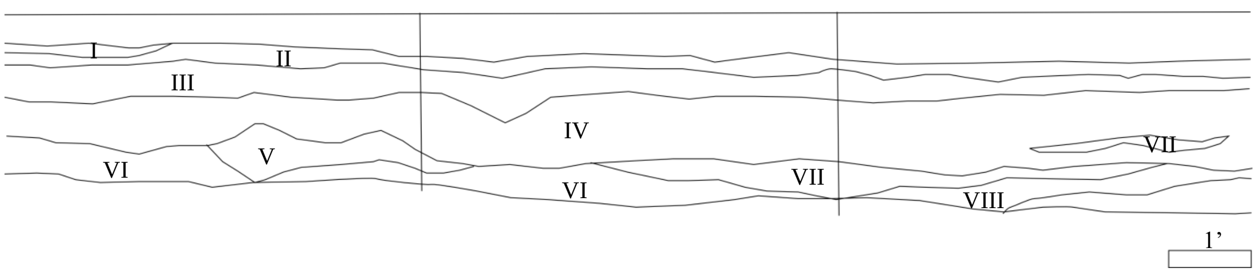
Because we did not excavate units south of the N950 line to see the southern edge of the moat corner, it is impossible to predict the internal shape of the moat in this locus. Future excavations will be able to see what the moat corner actually looks like, and how it was dug in the past. The moat's function may also become clearer once more excavation is completed.

The southern cut on the moat is currently the most important window into understanding the

Figure 15. N950 E855 and N950 E860 south profile showing Feature 53.

feature's past function. Since we are fueled by the runaway indentured servants' accounts of the High Chancellor's plantation and the four cannons, moat, palisade and drawbridge, it was easy to

Figure 16. N950 E855 and N950 E860 South and West profile drawings.



I. 10YR 3/2 very dark grayish brown loamy sand mottled with 10YR 5/6 yellowish brown clay loam and 10YR 7/3 very pale brown sand with high concentration of charcoal flecking.
II. 10YR 3/2 very dark grayish brown loamy sand.
III. 10YR 4/3 brown loamy sand.
IV. 10YR 3/2 very dark grayish brown loamy sand.
V. 10YR 5/4 yellowish brown loamy sand mottled with 10YR 4/3 brown sand.
VI. 10YR 6/4 light yellowish brown sand.
VII. 10YR 4/4 dark yellowish brown loamy sand mottled with 10YR 3/2 dark grayish brown sand.
VIII. 10YR 3/3 dark brown clay loam.

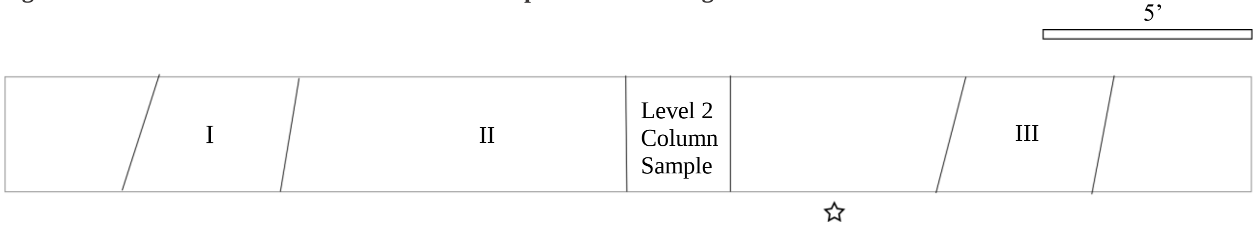
say that 'this is the moat described by the servants.' But, was it? When reading John Hash's deposition to the Spanish in St. Augustine in 1679, the translation says "he had been taken about ten leagues up the river from the boat in which he came to a plantation belonging to the Chancellor of England, where he saw a curtain and a moat with four artillery pieces" (Gallardo 1936: 134). To me, it seems that Hash saw this fort as it sat along the Ashley River, not over a half mile inland through dense riverine swamp. Thomas Jibe described a similar feature of "trench with a moat and bridge with four pieces of artillery" (Gallardo 1936:135). This translation specifies a trench with a moat, meaning two distinct subsurface cuts. If the moat at 38DR83a is indeed the physical connection between these runaways' stories, where is the other trench to go with the moat? It has not appeared in the geophysical or archaeological surveys and excavations.

If we found a defensive moat, then this southern profile should look similar to the 16 moat profiles recorded by Stanley South at Charles Towne. This feature at 38DR83a is the only other potential 17th century defensive moat ever explored in South Carolina outside of the original 1670 town. To maximize time and student effort, six 2.5x5' foot units were dug in a row from south to north through the magnetometer reading. To make sure we were going to see the moat from its extreme southern and northern edges, I used a 1" inch soil core/probe to find subsoil along the E940 grid line. Quickly, I was unable to reach subsoil in depths of up to 3' feet bs, signaling evidence of the moat feature. Units N895 E940, N900 E940, N905 E940, N910 E940, N915 E940 and N920 E940 were taken down simultaneously, in order to have them all down to subsoil and, hopefully, clearly defined edges of the moat.

Zone 1 was stripped and removed unscreened, and Zone 2 followed, looking similar to almost all Zone 2 soils across the pasture. In all six of these narrow units Zones 1 and 2 ranged from 0.6-0.8' feet bs. At the base of Zone 2 the moat feature appeared and was roughly 15' feet wide, given the fact that its north and south edges occur at an angle to our excavation grid. Because of this we knew that we would not be cutting the moat on a good perpendicular angle as we dug down into the feature. Two "buffer zones" of dark soil were identified on the north and south sides of the central moat feature. The moat is Feature 99, while the staining to the north is Feature 98 and that to the south is Feature 97. A heavy clay subsoil was defined as the termination of excavation in the southernmost unit and abuts Feature 97. To the north of Feature 98 is a pale silty subsoil. While excavating Zone 2, we reserved three 2.5x2.5' foot quads for water screening; these were spaced 10 feet apart from each other. The central one happened to fall almost dead-center on the moat feature, so Zone 2 was taken for water screening and everything below it—Feature 99—was bagged by arbitrary level for water screening and flotation samples. Figure 17 displays a plan view drawing of all six units and where the features were defined.

The excavation of Feature 99 was unique. Since we had a massive column sample subdividing the moat feature in half, we decided to excavate Feature 99 in accordance to each excavation unit that fell in line with it. Because of this we have several proveniences for Feature 99 and all of its six levels; when one unit terminated into subsoil that level of Feature 99 was the last dug, and the next unit either north or south picked up with the next level of excavation. Units N905 E940 and N910 E940 comprise the center of the moat; N910 E940's southern half contained the large column sample. These units made up the majority of excavation into Feature 99.

Figure 17. N895 E940 to N920 E940 base of Zone 2 plan view drawing.



I. Feature 97, 10YR 4/3 brown loamy sand.
II. Feature 99, 10YR 3/2 very dark grayish brown loamy sand.
III. Feature 96, 10YR 3/3 dark brown clay mottled with 10YR 5/8 yellowish brown and 10YR 5/3 brown loamy sand.

The moat was excavated through six arbitrary levels. The levels did not adhere to specific soil changes and were mainly for control. Since the profile shows differences between the west and east walls—walls that were only 2.5' feet apart—this discussion focuses primarily on the nature of the fill and potential origins for the soils observed during excavation and after the profiles were interpreted.

The most important thing to know about this feature is that subsoil was encountered on the north side: excavation of cultural fill terminated at a recognized and regular silty sand that is consistent with the majority of the landform and nearly all units excavated since 2009. When excavations of the southernmost units in this cut encountered solid, thick orange clay, we called the clay "subsoil" and ceased excavation. This clay subsoil was also roughly the same elevation and depth below surface as the base of Zone 2 in the northernmost units. Although we had not seen clay subsoil like this in any other part of the site, we, in many ways, expected to encounter clay subsoil at some point at 38DR83a. Land along the Ashley River does have substantial clay deposits, as past fieldwork at other sites on the river has shown (Drayton Hall, Charles Towne Landing, Colonial Dorchester, etc.).

Because we have been calling this feature "the" moat since the magnetometer survey first discovered it in January 2012, I have been expecting it to behave below the ground similar, if not identical, to the defensive moat discovered by Stanley South at Charles Towne Landing in 1969 (South 2002). At Charles Towne, South excavated 16 trench cuts through the 1670 moat that provided support for an embrasure that mounted several cannons. These cannons were to defend the entrance to Old Towne Creek, the deep water creek that the original British settlers landed on to create Charles Towne. Eleven of these profiles show a sharp "U" shaped moat cut with vertical walls. Figure 18 displays a few of South's profiles. All of these profiles also show that the moat had an extremely flat bottom. While these moat elements are important, the most critical element of this moat is that the nature of the fill within the moat supports South's interpretation that a massive embankment/embrasure was on the land-side of the moat. All of South's photos and most of his profile drawings show fine lenses of dark and light fill overlaying each other. These micro lenses provide evidence of water washing the embrasure into the moat over time, slowly but surely, so that sometimes a pale silty sand was washed in, and other times, dark fill. He even mentions identifying a "thin black layer of dark humus, lying on snow-white subsoil sand at the bottom of the ditch, apparently the first fall of leaves from the winter of 1670" (South 2002:83), and that there was "water laid yellow sand" at the base as well (South 2002: 115, figure 4.1F). In all of the profiles South displays in his 2002 publication, they all show a regular depth to the moat at roughly 3.0-3.5' feet below the top of subsoil.

In clear contrast, the south cut of the moat feature at the Lord Ashley site shows the opposite of South's findings. Figure 19 displays the east profile drawing of the south moat cut. First, the center of the moat only displays three distinct soil types that are thick, more homogenous, and lacking much more subsoil than what South encountered. South's photos show dozens of small lenses of soil overlaying each other. Figure 20 displays a photo from his 2002 publication. Below Zone 2, "Layer 1," (listed as C in the drawing) a perfectly mottled 10YR4/2 and 10YR4/1 sandy loam comprises the topmost

Figure 18. Examples of Stanley South's moat profiles.

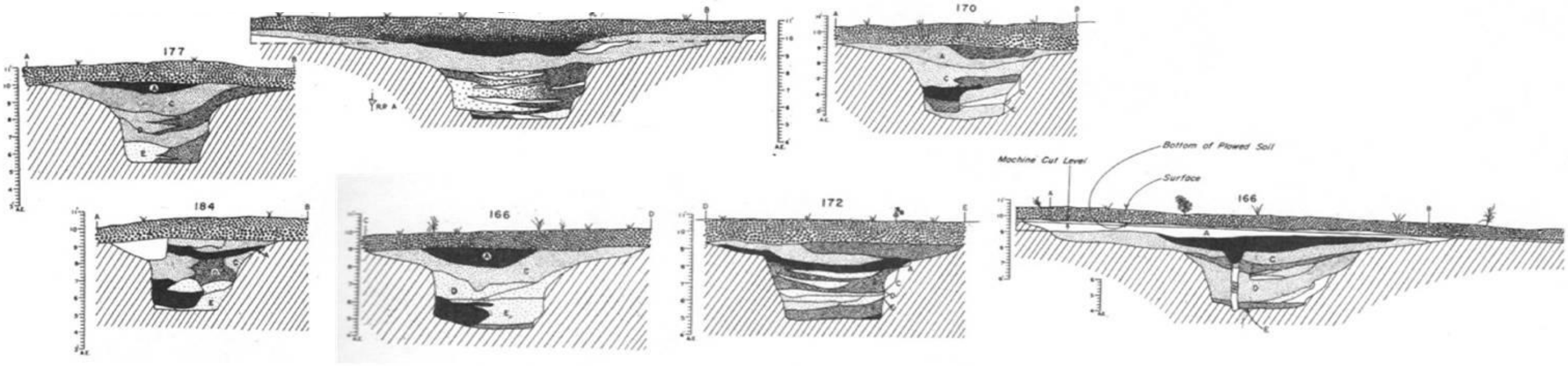
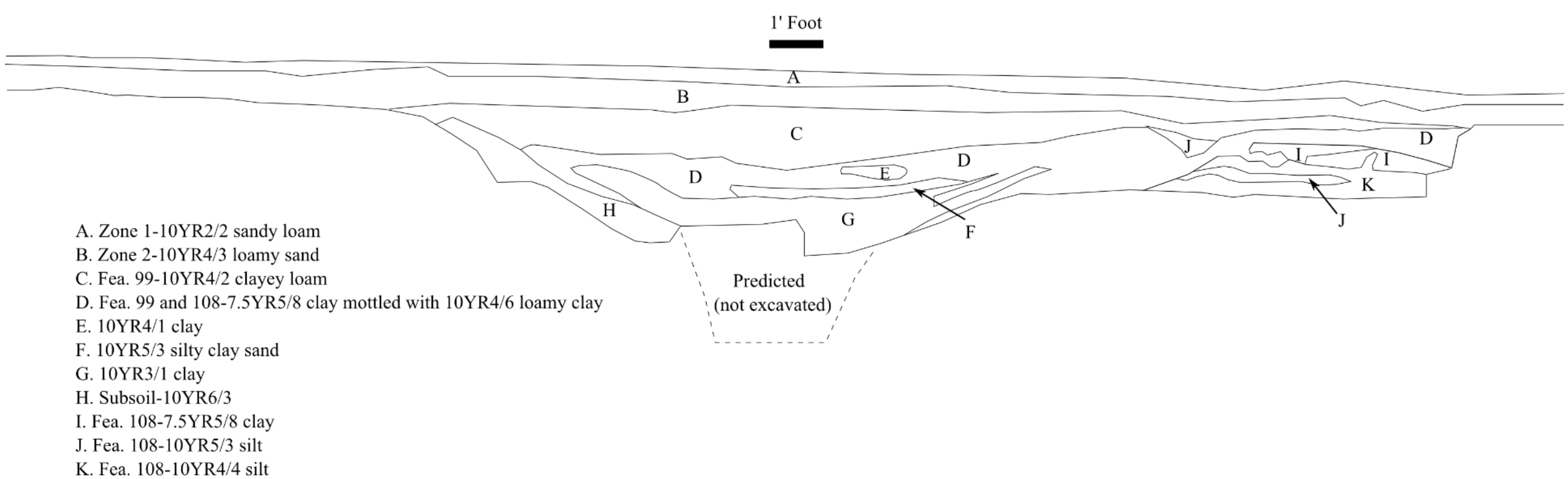
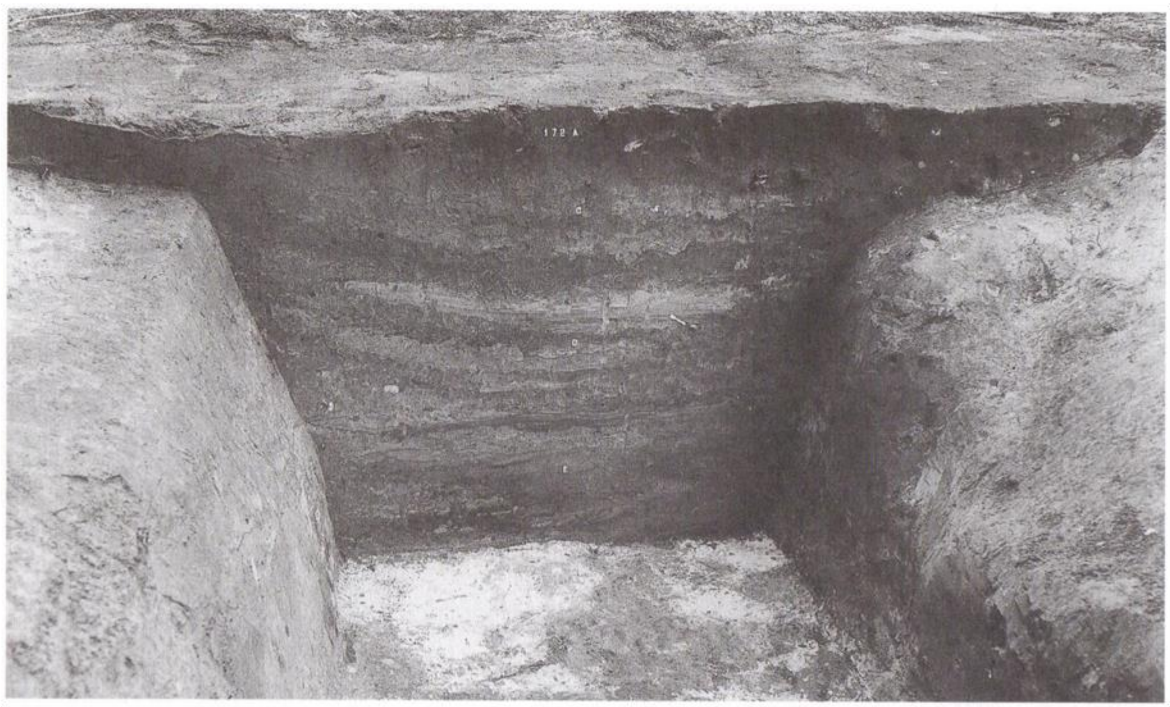


Figure 19. East profile drawing of south moat cut.



layer of soil that denotes the moat. After excavation we learned that this soil terminates against an intact sloping wall of subsoil, showing the beginning of the north wall of the moat feature. However, this soil extends south far beyond the interpreted center of the moat. Layer 1 overlays the “clay subsoil” in the two southernmost units of this block excavation. While the east profile of the center of the moat shows a homogenous Layer 1, the west wall appears to show a more complicated stratigraphy; however, the colors and textures of the soils in the west wall are all consistent with the fill as it was excavated. In other words, although both profiles look different, they are capturing the random nature of how the moat was backfilled by the colonists.

Figure 20. Photo of moat profile (from South 2002).



The soil under Layer 1 is key to interpreting and understanding the moat feature and what its function may have been. Layer 1 was taken down and then a thoroughly mottled 10YR4/3, 4/2, 5/6 and 5/4 mottled clay and sandy loam was encountered. This is called Layer 2 (D, E and F in Figure 19). Below Layer 2 at different elevations is a very heavy gray clay. This 10YR4/1 clay is called Layer 3 (G in Figure 19). As Layer 3 was being excavated, the students pointed out that it appeared as if Layer 3 was going into the southern wall (subsoil) of the moat excavation. At this time we thought that it was residual Layer 3 that had migrated into the excavated wall of the moat, filling in a space created by the colonists when they first made the cut. Layer 3 continued downward until we terminated excavation at 3.3’ feet bs, or 2.0’ feet below the start of subsoil/base of Zone 2. At this depth we could not go any deeper and we collected the soil from the 2.5x2.5’ foot column sample, in order to expand the floor to dig further. At this depth the dark gray clay of Level 3 was extremely plastic and so thick that no progress was made removing it with flat or round shovels. The last day of the 2013 field school came just as we faced this clay. Occasional brick fragments found in it proves it to be fill. To know the depth of this clay, and if it indeed was fill or subsoil, this author and Nicole Isenbarger used a 1” inch soil corer to learn the depth of the clay. After several core samples and much exertion trying to get the corer to penetrate the clay fill, a final depth of the moat was reached at 5.2' feet bs. The Layer 3 clay stayed consistent and hardly changed color in any of the 1' foot core samples seen in the field. A large sample of clay and brick chunk that the core encountered together was saved for SEM and Neutron Activation analyses for clay and brick sourcing (to be discussed later). A very pale 10YR7/2 fine silt was reached; we did not core further. This silt may or may not be subsoil below the cut of the moat. We probed 1' foot east of the N910 E940 nail. We did not probe anywhere else.

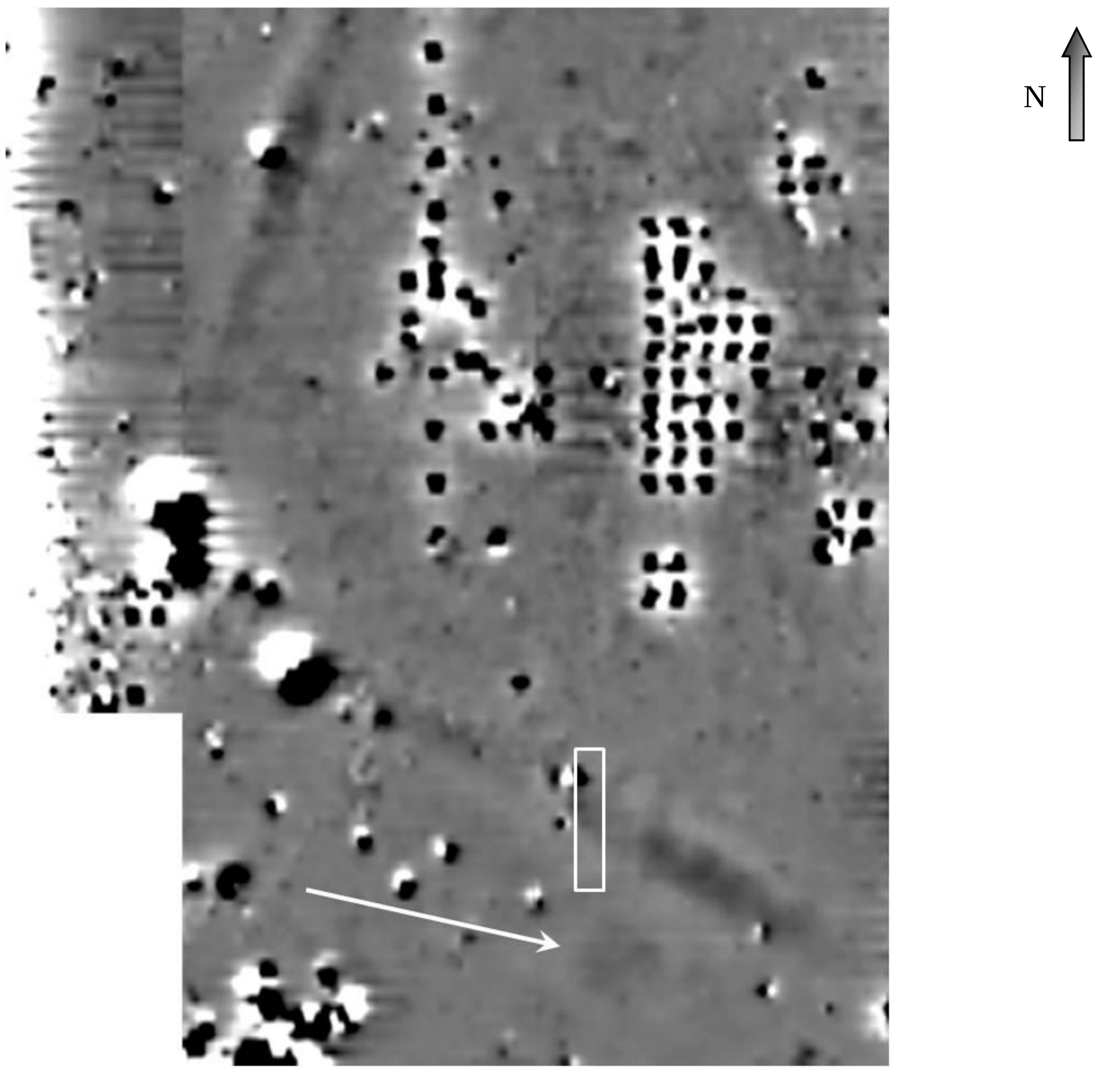
As mentioned earlier, the dark clay the students pointed out that was left on the southern wall of the moat appeared just below the clay subsoil of the southern units. They started cleaning the clay vigorously with trowels because the clay started to appear to be mottled. When first encountered almost two weeks before, the clay was wet and then inundated with water from heavy rains. By this point in the field season the same clay had been exposed to the air, which made it crack and change appearance. After about a half of a tenth of a foot was removed, brick rubble and distinct 7.5YR5/8 strong brown clay mottles were seen against a 10YR4/6 dark yellowish brown loamy sand. Figure 21 displays a profile photo that shows the soils encountered. There are also mottles of 10YR6/3 silty sand subsoil mixed into this fill. The students began to excavate this clay lens as Feature 108. The clay lens excavation was roughly 0.4' feet thick and surprisingly gave way to a 10YR5/3 brown silt. There was also a pad of 7.5YR5/8 strong brown sandy clay that contained nail fragments lying in the brown silt; this silt and clay matrix had a moderate amount of iron concretions. The presence of silt and mottled clay with artifacts under a clay lens that appeared to be subsoil was quite a shock. However, the discovery of a mass of bricks in an unmortared fused lump was a huge surprise—a surprise that may actually reveal the purpose of the "moat" feature.

Figure 21. West profile photo of clay and silt lensing.

This fused mass of bricks (Figure 21) appears to have been an error produced during brick firing. Brick anomalies or bricks showing no use at all only occur in South Moat; nothing like these have been found elsewhere on site. While flint pebbles associated with ballast have been found at the site, the idea that brick was ballast has not been considered. Brick was expensive and likely not used as ballast in the last quarter of the 17th century. This mass would have been hard to move from the river, wherever the dock was located, and would have served unknown historical functions. I rule out that this fused mass of at least seven bricks was not ship ballast.

Since this mass of bricks contained no mortar at all, it was not a manufactured pier for a foundation. If it was a misfire in a kiln, would it have been strong enough to stand in for a constructed brick pier? Marcoux has pointed out that there is an anomaly that appears south/southwest of the location of the E940 line moat cut, and that our string of units are close to it. Figure 22 displays the magnetometer results map and this anomaly in relation to South Moat. During the excavation of Layer 3 on the south side of the soil column, there was a whole brick recovered that actually had a curve that warped it. This brick has no mortar on it and appears to have absolutely no wear, abrasion or erosion—it was as if this brick was fired, thrown away and buried instantly. The clay core with brick fragment associated mentioned earlier was sent to North Carolina State University for SEM analysis to reveal elemental signatures. Zack's findings show strong evidence that the thick gray 10YR4/1 clay was parent material for brick making at the site. The magnetometer anomaly, then, could be something related to brick making, possibly even a brick clamp. The brick mass was left *in situ* and on a pedestal of soil since it went into the west profile and we did not have time left in the field season to open more units to chase it out.

Figure 22. Image of magnotometer results.



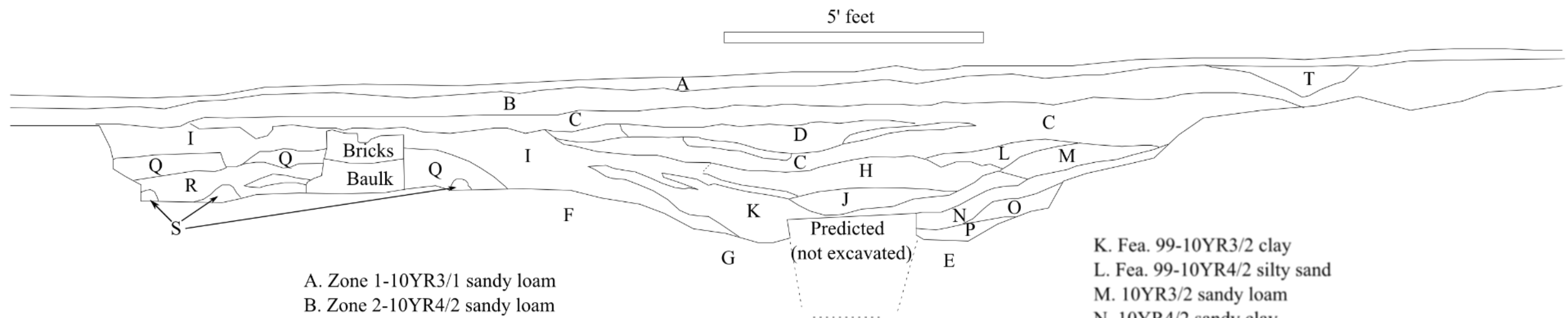
Below the brown silt and strong brown clay sits another anomaly: a 10YR4/4 dark yellowish brown silt. We called this new soil “Feature 108-dark.” This silt is darker than both the brown silt and clay above it. Soils are supposed to get lighter in color the further down into the earth we look. This discovery was impossible to understand in the field; now, however, the soil episodes on the south side of the moat are clearer. The clay layer is pinched thin between the 10YR4/4 dark silt and 10YR5/3 lighter silt, and then thickens immensely between the base of Layer 1 and the base of the excavation (refer to Figure 19 for this part of the east profile). It is angled downwards toward the center of the moat. This fill also partly overlays and underlies the dark gray thick clay. Because of the stratigraphic sequence, this clearly shows that Feature 108 soils were backfilled at roughly the same time as the dark gray thick clay. We were unable to excavate more of Feature 108-dark and subsoil below it was never reached.

Figure 23 displays the west profile drawing of South Moat. When looking at the center of the profile, the slumping of soils on the north and south side of the central core seem to point to the base of the moat being directly below. A dotted line has been added directly below the soil column we took as a sample. If the Feature 108 soil was not fill but instead subsoil, this predicted shape of the moat would be believable. However, Feature 108 is in the floor of the excavation and in the profile for 4.4’ feet, where it feathers out and fades underneath the dark gray clay towards the deepest part of the moat (Figure 23 shows Feature 108, highlighted by red arrows). This fill, then, shows that the gray clay is not the center of the moat, but instead, is possibly further south. Figure 24 displays a photo of this part of the moat. Or, the base of the moat is very wide and sloping gradually to the south. If Feature 108 is one foot deeper, its base will be one foot higher than the probed base of the moat. This possibility makes the base of the moat potentially up to 5’ feet wide or more. South’s profiles show a consistent 3.0-4.0’ foot width at the base of his moat excavations (refer to Figure 18).

The hallmark of the Charles Towne moat are its vertical walls. The moat at the Lord Ashley site has walls that slump more gradually to an unknown basal shape. If the moat at the Lord Ashley site was a water feature, and if water-induced erosion made the once-vertical walls slump and decay to the state they are in as seen through our excavations, then we should expect to see the fine lenses of silt and different colors of fill just at South found at Charles Towne. If the moat at Lord Ashley site did have a massive embankment associated with it, either with a palisade wall, cannon embrasure, or both, and if the slumping seen in the moat profiles is indicative of water-induced erosion, then we should see evidence of the embankment washing down into the moat similar to what South saw at Charles Towne. Lastly, if the moat was open for 10 or even just three years, and was filled in during abandonment, then some evidence of rain-deposited silt lenses should be present in both North and South Moat: the colonists would not have cleaned out rain deposits right before they filled in the moat, they would have just thrown fill on top of those silty bands. This did not occur as we did not find the silt bands in our probing efforts to find the base of the moat.

The last hypothesis to introduce deals with the presence of reverse stratigraphy as evidenced by Feature 108 and the silts below its clay layer. In my past inland rice embankment excavations, I have seen clay cores in dikes, and have always seen reverse stratigraphy (Agha 2001, 2010, 2015). If the original ground surface was much lower south of the moat, then does the

Figure 23. West profile of south moat cut showing Feature 108.



A. Zone 1-10YR3/1 sandy loam
B. Zone 2-10YR4/2 sandy loam
C. Fea. 99-10YR4/1 and 10YR4/2 mottled clay loam
D. Fea. 99-10YR4/2 sandy loam
E. Fea. 99-10YR4/2 sandy loam
F. Fea. 99-10YR5/3 clay mottled with 10YR4/2 clay
G. Fea. 99-10YR4/4 clay sand mottled with 10YR4/1 clay
H. Fea. 99-10YR5/4 & 5/6 mottled clay
I. Fea. 108-7.5YR5/8 clay mottled with 10YR4/6 loamy clay
J. Fea. 99-10YR4/1 silty clay sand
K. Fea. 99-10YR3/2 clay
L. Fea. 99-10YR4/2 silty sand
M. 10YR3/2 sandy loam
N. 10YR4/2 sandy clay
O. 10YR5/3 clay sand
P. Subsoil-10YR6/3 sandy silt
Q. Fea. 108-10YR5/3 silt
R. Fea. 108-10YR4/4 silt
S. Fea. 108-7.5YR5/8 heavy clay
T. Zone 2 disturbance-10YR4/3 sandy loam

Figure 24. Photo of west profile of south moat cut.

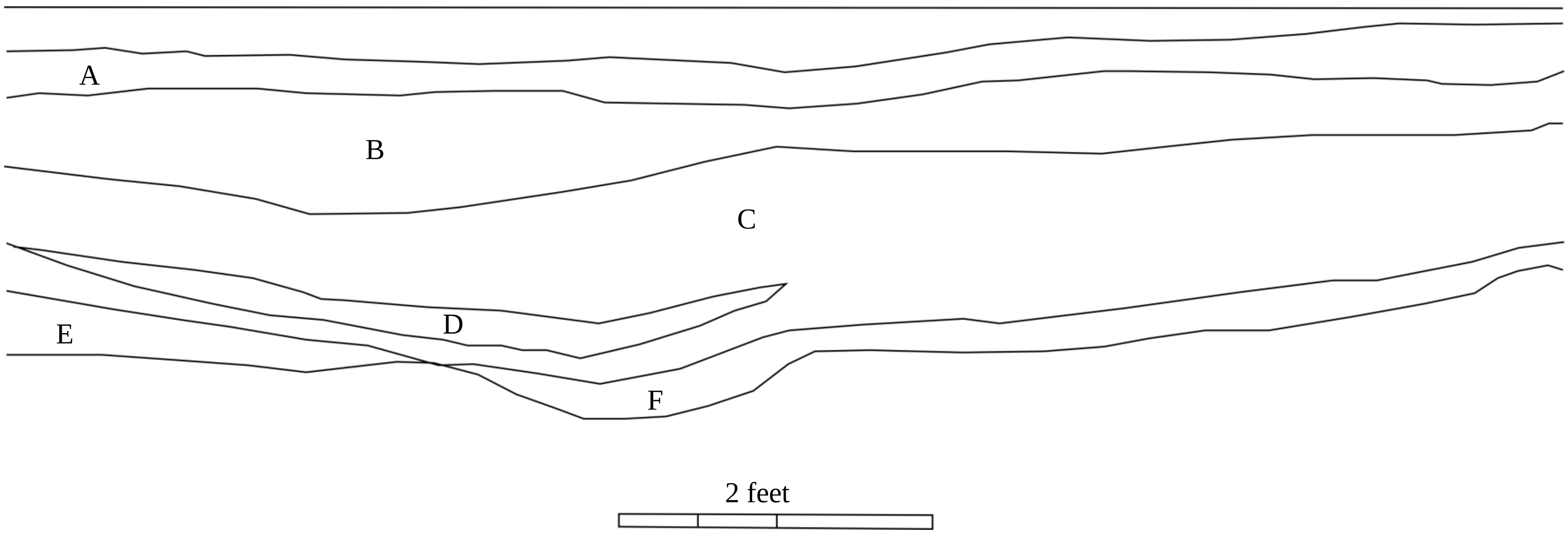
possible reverse stratigraphy seen in Feature 108 represent the actual embrasure/embankment from a cannon battery? This is not impossible. However, the old ground surface that this embrasure sat on would have been several feet lower than the ground to the north of the moat—not a likely scenario. Given the fact that Structures 1 and 2 would have been directly in the line of fire of the cannons if the embrasure was on the south side of the moat, assumedly trained on the Ashley River towards Charles Towne, then these buildings would have been incinerated if the cannons were ever fired. Cannons were cleaned regularly by firing charges of powder—regular cleaning events would have provided a firestorm for Structures 1 and 2 and anything else nearby. This hypothesis is only plausible if the buildings did not exist in tandem with the moat and its cannons.

Before exhausting the theories on how this moat feature might have functioned, a discussion of the northernmost inspection into the moat is required. This area is referred to as North Moat in this report. The magnetometer survey shows the feature extending at least up to 15-20' feet south of the northern fence line (we were unable to scan too close to the metal fence as it throws the magnetometer's signal off). Before excavations at the north part of the moat began, we had a few working hypotheses to support this effort, the main one being that if the moat tied into the swamp, it could fill with water when and if the river was at a high enough tide. A defensive moat does not have to be water-filled; however, given the landscape at 38DR83a, this was a possibility and could support the defensive moat hypothesis.

One unit was set up at N1055 E885 after probing with a 1" inch soil core and finding deep mottled soils in line with the magnetometer results. Zone 1 (10YR3/2 loam) and Zone 2 (10YR4/2 sandy loam) were mostly standard and similar in accordance with the site; the base of Zone 2 is roughly 0.8' feet bs here and was excavated through two arbitrary levels. A change to a slightly darker soil signaled the need for a new provenience that we called Zone 3. This zone is primarily different from Zone 2 only because it has 10YR4/3 brown sandy loam mottled into it. Otherwise, Zone 3 could have been called "Zone 2 Level 3." As Zone 3 was taken down, a soil that appeared to be subsoil was reached in the northwest corner of the unit. At this point, everything outside of this subsoil was called Feature 106 to designate moat fill from the rest of the unit. Because the northwest corner looked like mottled subsoil, and contained artifacts, we called it Feature 109. Excavation of Features 106 and 109 occurred at the same time, dropping each provenience one to two tenths of a foot at a time, in order to see if Feature 109 would eventually become sterile subsoil, and also to see the interface of subsoil and the moat fill. The unit started to get too deep to properly and carefully excavate these features and the unit was expanded to the east through N1055 E890. Digging Features 109 and 106 would resume after the neighboring unit was dropped to the same elevation.

Once all three zones were removed in N1055 E890 we were able to see quickly that the east edge of the moat, Feature 106, was mostly contained in the first unit dug. Figure 25 displays the north profile drawing of both units here. The eastern unit provided us with a larger profile to study. Although we did not have a 30' foot long view below ground like we did of the southern moat cut, these 10' foot long profiles clearly demonstrate what the moat shape is in this northern view of the feature. The stark differences in not just the base of the moat but the soil types that occur here help me to interpret this feature in new ways.

Figure 25. North profile of N1055 E885 and N1055 E890.



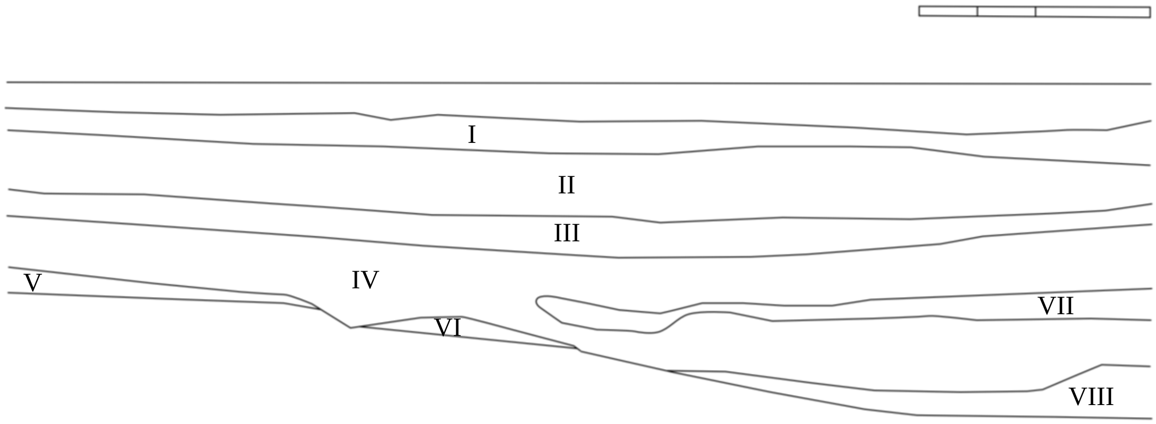
A. Zone 1, 10YR 3/2 very dark gray loamy sand.
B. Zone 2, 10YR 4/2 dark grayish brown loamy sand.
C. Zone 3, 10YR 4/2 very dark grayish brown loamy sand mottled with 10YR 4/3 brown loamy sand.
D. 10 YR 5/6 yellowish brown clay mottled with 10YR 4/2 dark grayish brown loamy sand.
E. Subsoil, 10YR 5/4 yellowish brown loamy sand mottled with 10YR 4/4 dark yellowish brown loamy sand.
F. Subsoil, 10YR 4/2 dark grayish brown loamy sand mottle with light brownish gray loamy sand.

Figure 26 displays the south profile of this 2-unit block while Figure 27 displays a south profile photo. While the north profile shows a shallow basin type base to the moat, the south profile shows only a broad and flat “base” that slopes into the southwest corner. The moat line runs through these units at a northeast/southwest angle, so the profiles capture that perfectly: the moat base is more centrally located in the north profile, but not completely in the southern profile. Regardless of these observations, the most important observation to note for this part of the moat is that it literally has no shape to it at all. It bears little to no resemblance to Feature 99. Feature 106 terminates into clear subsoil at a depth of 2.3’ feet bs, and it is only 1.3’ feet deep in the south profile. There is a mottled subsoil/clay lens that shows up in both profiles; this fill is reminiscent of Feature 108 in the south moat units. However, Feature 108 in the south was clearly fill and contained artifacts, while the subsoil/clay lens in the north moat cut is an isolated lens. Subsoil in the north does not contain artifacts and does not look like Feature 108: it is mostly a 10YR6/3 silt, which is exactly the same color and texture as the clay-free subsoil seen in the south and corner moat units.

Zone 3 in the north profile extends from the west to east unit corners at almost the same thickness. The difference between the base of Feature 106 and the subsoil/clay lens is just 0.2’ feet thick in the north profile and 0.6’ feet thick in the south profile. This drop of 0.4’ feet in basal depth of Feature 106 shows a north to south drop in elevation for the moat. This trend, then, if continued to the corner and down to the southern moat cut we excavated, makes sense. However, if this moat was “the” moat as described in 1679, then this northern arm of it would be a mere puddle that would require hardly a jump to surpass.

One additional unit was excavated to the southeast of N1055 E890: N1050 E895. This unit was excavated to document what was occurring on the “inside” of the moat. It was also dug to see if there is evidence of a palisade. Zone 1 was thrown out, Zone 2 was screened as one level, and subsoil was found at only 0.6’ feet bs. This is in contrast to the top of Zone 3 in the southeast corner of unit N1055 E890, where the top of Zone 3 is also 0.6’ feet bs. The soil stains in the base of N1050 E895 are mostly amorphous and indeterminate. None appear to be posts and nothing that looks like a palisade is present.

Figure 26. South profile drawing of units N1055 E885 and N1055 E890.



I. Zone 1, 10YR 3/1 very dark gray loamy sand.
II. Zone 2, 10YR 4/2 dark grayish brown loamy sand.
III. Zone 3, 10YR 3/2 very dark grayish brown loamy sand.
IV. Feature 106, 10YR 2/2 very dark brown loamy sand.
V. Subsoil, 10YR 5/6 yellowish brown clay mottled with 10YR 5/4 yellowish brown and 10YR 4/2 dark grayish brown loamy sand.
VI. Subsoil, 10YR 4/3 brown loamy sand mottled with 10YR 5/6 yellowish brown loamy sand.
VII. Subsoil, 10YR 3/2 very dark grayish brown loamy sand mottled with 10YR 5/4 yellowish brown loamy sand.
VIII. Subsoil, 10YR 5/3 brown loamy sand.

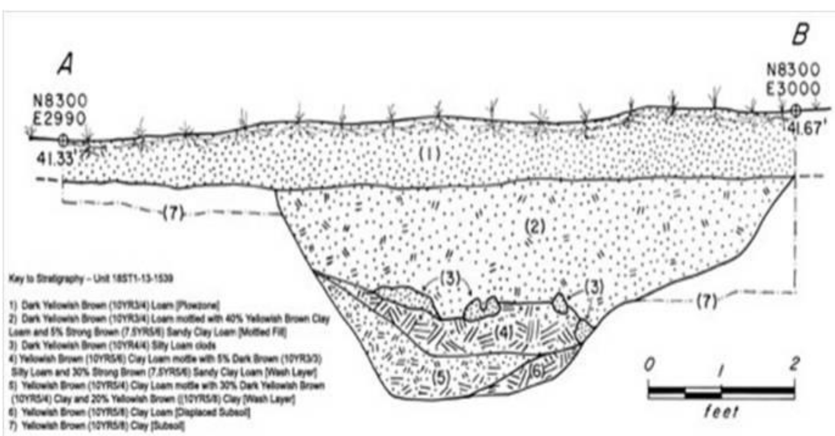
Figure 27. South profile of N1055 E885 and N1055 E890.

Interpretations

Since the indentured servants listed a moat, four cannons, and a palisade all together, we take the document at face-value and assume that all of these elements were in context with each other in the same place. Magnetometer survey of the entire pasture east of the road that cuts through the landform found no evidence of the moat. In 2014, Jon Marcoux returned to the site twice for Ground Penetrating Radar (GPR) surveys, one formalized through the site grid and the other non-formal. The non-formal GPR survey only looked at the moat and the reflections of subsoil as they appeared on the viewfinder of the unit. We walked 5' foot transects from the moat corner north to the fence, and then walked the same intervals north of the fence into the cemetery. Before the fence was reached the signal for the moat disappeared. On the other side of the fence no trace of the moat or anything remotely similar was found. The moat also does not turn a corner to the east/southeast, as the magnetometer survey would have found this turn, and the GPR would also have detected the shift.

The extremely shallow nature of the moat in the N1055 E885/890 block, and the strong possibility that it disappears before the swamp to the north, brings into question exactly what this "moat" was and the function it served. If it was defensive, then why is the northernmost part of the moat only 1.4' feet lower than the top of subsoil, while other parts of the moat are deeper? A moat that is only 1.4' feet deep, and over 10' feet wide, does not sound defensive. It also does not provide the steep wall that works in conjunction with a palisade wall. At St. Mary's City, archaeology at the Calvert house and associated fort discovered a moat and palisade line from the 1640s (Henry M. Miller, accessed January 2016, https://www.hsmcdigshistory.org/pdf/Forts.pdf). This moat was 3' feet at its deepest and between 9-10' feet wide at its top. Figure 28 is Miller's profile drawing of this moat feature.

Figure 28. Miller's profile drawing of moat feature.



There is a slight similarity between the south side of the South Moat cut at St. Giles Kussoe and Miller's profile where the moat steps up to be broader rather than deeper. If Miller's profile findings match the South Moat's southern side, the cannons would have faced the buildings—a dangerous set-up. However, the main difference is the fill episode. Feature 108 and the intact silt layers below it displays the record of how people were unearthing certain kinds of intact soil and then depositing those layers unmixed onto a surface just south of the moat. If soil was removed and put into an embankment, then there would be erosion into the moat; the layers of fill at the base of Miller's moat are the slumped in remnants of the embankment that worked with the palisade wall they found. Miller says that the palisade they found was 5' feet from the interior edge of the moat, and fill from the moat was piled up against the palisade to create a massive wall against enemies. The northern units of the South Moat excavation exposed between eight to nine feet of feature-free subsoil from the north edge of the moat to the north profile of N920 E940. Forts can be different, and the 17th century saw a great deal of change in the way forts were designed and the materials used in their creation. However, the lack of palisade posts in all three windows into the moat makes me say that currently there is no evidence of a palisade wall at 38DR83a. Lastly, if there was a wall closer to Structures 1 and 2, at some distance from the moat, the magnetometer and GPR surveys would have detected the trench that would have supported it.

Recently at Charles Towne Landings State Historic Site, I discovered a new palisade line and ditch from the 1670s at the Miller Site (Agha and Isenbarger 2015). A vertical-walled trench that is roughly 1.8' feet wide at its highest elevation and 14" inches wide at its flat base was discovered in the vicinity of Johnny Miller's original 1968 excavations. Johnny Miller found a massive trash pit that contained, besides 17th century artifacts, fragments of a suit-of-armor (South 2002). Roughly 5' feet south of the trash pit lies the new palisade line that may have been the 1674 expansion and rebuild of the first town's defenses (Agha and Isenbarger 2015). This palisade trench extends to 4.0' feet bs, and is 3.4' feet below subsoil. It looks identical to South's profiles of the 1670 moat: dozens of fine lenses of different silts, sands and clays. Stanley South also found the 1670 palisade line that he said had a support ditch that was between 2-4' feet in depth. If there was a palisade wall, it would have left either a deep row of postmolds, a very deep trench similar to what South and this author found at Charles Towne, or both a deep trench and deep line of posts. The GPR and especially magnetometer would have detected any or all of these features had they been associated with a palisade that sat north and east of the moat at Lord Ashley site.

Final Words on the Moat

If the settlement predates the moat, then this site began as a semi-domestic/plantation labor related place within a massive 12,000 acre built environment. When we dig plantation sites across the Carolina Lowcountry, we seldom get the opportunity to study a settlement within a 1,000 acre property, and anything over 1,000 acres is considered extremely large. When the plantation space is smaller, there is less high ground to inhabit. Besides habitation, high ground can be utilized for growing subsistence crops; some crops require quite dry conditions and wet, boggy soils can diminish or ruin certain kinds of cultivars. Here, at St. Giles Kussoe, we are dealing with an enormous landscape that housed large amounts of people and cattle. 38DR83a should not be viewed any longer as "the" site for anything we read about in the historic record. This site is likely but one of many developed places within the 12,000 acre landscape. It is infantile reasoning to assume, and expect, that the largest known number of enslaved Africans and cattle during the early 1680s, an untold number of indentured servants, all organized Indian trade, all site managers, the ship captains, and barns and other required structures for every aspect of plantation agriculture was all centered at 38DR83a. The site comprises almost two acres of space, leaving 11,998 other acres of land that the colonists had the opportunity to develop and improve.

Therefore, we should not say that we found "the" moat that was in the 1679 indentured runaway depositions, but instead say that we found "a" moat within the enormous landscape of St. Giles Kussoe. Currently, the moat has no palisade. The moat shape below surface is amorphous, irregular and ranges from shallow to deep. While a little similarity can be seen, technically it does not match the known 1670 moat at Charles Towne. It does not match the two known 1670s era palisade support trenches found at Charles Towne. The fill episode at 38DR83a shows rapid backfilling with minor mottling. The fill episodes at both the moat and the Miller Site palisades at Charles Towne exhibit micro lensing of silts and clay, which demonstrates that these features were open for a longer period of time than the moat at St. Giles Kussoe—itself potentially a 10-year occupation exactly like Charles Towne.

What if the moat was a massive hunt for clay? Zack Stroman's SEM analyses showed a strong correlation between the very dense gray clay and brick from the site (see Chapter 3 for Stroman's analysis). Something very unique and peculiar has been seen on the south side of the moat and the magnetometer survey produced signs of potential buildings or organized activity areas in this same area (refer to Figure 22 and what the white arrow points to). Roughly 200' feet to the south lies a spring head that up to a few decades ago had flowing water and sat at the center of a low, boggy swamp. The land owners recounted stories of their mother and grandmother getting water from this springhead to water the corn they grew in the pasture that overlays 38DR83a (Agha et al. 2012). In summer of 2014, Dr. Marcoux and his field school from Salve Regina University assisted this author with minor excavations and also shovel testing. A line of shovel tests at 20' foot intervals was excavated on the south side of the tree line that comprises, in part, a natural "site boundary." This tree line is roughly 50' feet from the southern edge of the South Moat unit block. Salve Regina students did not reach subsoil in most tests until over 2.5' feet bs, and the old original humus was encountered around 2.0-2.5' feet bs. Lying on top of the old surface is a massive episode of modern fill, as little to no historic artifacts were found. Instead, the soil contains modern gravel and occasional pieces of plastic. During rainy months it is hard to park a vehicle in this area below the treeline.

Was the moat, then, dug to protect the settlement from rising water from the springhead? There are two springs near 38DR83a: the one previously mentioned and another roughly two hundred feet to the west at the location of a modern cow pond along the head of a seasonal stream. Both of these springs sit opposite and roughly perpendicular to both arms of the moat. Since archaeology shows that Indian trade occurred at the site throughout its occupation, and that enslaved Africans were most likely habiting this settlement after 1678, then many valuable things in the eyes of the colonizers in control were housed at this site. A massive ditch to protect rising spring water from a building that was storing thousands of animal skins that had Shaftesbury's name on them would certainly be more of a reality than a concept.

If the moat was a major ditch to protect the settlement, did it need an embankment? Which side of the moat would such a bank sit? If a bank was not needed, where did the dirt go? Was the soil from the ditch used to fill low, wet areas to make them usable? These questions can be answered through more archaeology.

If the moat was merely a clay quarry, then the discrepancies in its depth can be explained based on the presence of clay that was considered worthy for brick production: some spots in the moat would be deeper than others if clay was found that met specific qualities. If the moat was a clay quarry, then after the brick clay was finally extracted, it would have likely been filled in right away. This scenario matches the nature of the fill seen in the moat so far. More sample cuts through the moat may allow us to know more about brick making at this site, and provide more comparative data for known 17th century colonial brick kilns.

Chapter 3: Artifacts

The 2009 and 2011 excavations recovered **4,920** artifacts that can be attributed to a behavior function or category (Agha et al. 2012). From these combined field seasons, the artifacts were organized into the Revised Carolina Artifact Pattern (Wheaton and Garrow 1983:279). The artifact groups used in the 2012 site report, and this current report, are the Kitchen, Architecture, Clothing, Personal, Tobacco, Furniture, Arms and Activities groups. Table 1 displays the Revised Carolina Artifact Pattern for the 2009 and 2011 excavations at 38DR83a.

Table 1. 38DR83a Revised Carolina Artifact Pattern for 2009 and 2011 excavations.

	Kitchen	Architecture	Clothing	Personal	Furniture	Arms	Tobacco	Activities
Percentages	53.30%	30.60%	2.60%	0.57%	0.16%	1.79%	7.75%	3.40%
Count	2,260	1,540	126	28	4	88	381	169

In comparison, the 2013 excavations recovered **4,847** artifacts—almost the exact number of artifacts from the first two field seasons combined (n=4,920). The total number of artifacts for this site is now 9,767. The locations and sizes of proveniences differ greatly, as the 2009 dig consisted primarily of shovel tests, while the main sampling for both the 2011 and 2013 seasons were 5x5' foot units. Although we dug roughly 35% of all units in or at the moat—locations that most likely did not support structures—the artifact count is virtually the same. We suspected that the moat, and cellar at Structure 2 (Feature 46), would contain large amounts of trash from the settlement, and therefore, the artifact number should have been higher for the recent excavation than those prior. This is not the case. Even the targeted excavations at Structures 1 and 2 did not raise the artifact count by large amounts. The consistency of excavation sample size in relation to artifact counts for both the 2009/2011 and 2013 seasons allows us to predict the amount of artifacts we will recover from future units with better accuracy. This will help in estimates and planning for lab work requirements, budgeting, specialized analyses, and long range curation needs. Lastly, the similarities in artifact numbers show a redundancy between field seasons that requires a better research agenda in the future. If the same amounts and kinds of artifacts are going to be found every field season, our research questions will be answered sooner than later due to the inevitability that we will not recover new, unknown artifacts and quantities of them that have the potential to influence new hypotheses to test through the excavation of 38DR83a.

Even more surprising than the similarity in artifact count are the almost identical percentages of the South Groups between the 2009/2011 and 2013 seasons. Table 2 displays the functional categories of the Revised Carolina Artifact Pattern for the 2013 season. Table 3 displays the 2009/2011 seasons combined against the 2013 season. A few remarkable similarities instantly appear, while the differences can be easily explained.

Table 2. 38DR83a Revised Carolina Artifact Pattern for 2013 excavations.

	Kitchen	Architecture	Clothing	Personal	Furniture	Arms	Tobacco	Activities
Percentages	52.00%	25.40%	0.20%	0.58%	0.00%	0.80%	9.86%	11.20%
Count	2,518	1,229	12	28	1	38	478	543

The Kitchen group had the chance to either increase or decrease by several percentage points for a few strong reasons. The first is that we focused excavations at both Structures 1 and 2. Buildings are the focal points of some, but not all, plantation activities, and storage and other domestic activities can generate more trash than other open-air activity areas. Wooden floors provide perfect surfaces for glass and ceramic containers to smash into smaller pieces than if they fall on dirt outside. If spaces between the wooden flooring are present, small bits of glass and pottery can fall between and out of reach of clean-up efforts. The percentage points differ by 1.3%, which is not a noteworthy difference. Even though the first two seasons tested areas of the site where we did not know buildings were located, or large landscape features like the moat, the amount of Kitchen refuse hardly differs at all. This means that if we excavate in the same locales again in the future, or even new places units have not yet tested, we should expect to find relatively the same kinds and amounts of Kitchen materials.

Table 3. 38DR83a Comparison of Revised Carolina Artifact Pattern for 2009/2011 and 2013 excavations.

	2013		2009/2011	
	Percentages	Count	Percentages	Count
Kitchen	52.00%	2,518	53.30%	2,620
Architecture	25.40%	1,229	30.60%	1,540
Clothing	0.20%	12	2.60%	126
Personal	0.58%	28	0.57%	28
Furniture	0.00%	1	0.16%	4
Arms	0.80%	38	1.79%	88
Tobacco	9.86%	478	7.75%	381
Activities	11.20%	543	3.40%	169

The Architecture group dropped 5.2% because of the 2013 field season. Although almost half of all units were dug at Structures 1 and 2, and a large amount of nails were found in the three moat samples (n=669), the Architecture group decreased in percentage. Why? If we knew where buildings were before excavations started, and we dug them and found more evidence of those buildings' walls, then why did we not find more architectural materials than from 2009/2011? This question can be answered through our original research design, and the field work that identified the site and prompted future field school excavations: the site's architecture and structural layout has always been a driving force behind the reasons why we not only excavate the site, but choose where our excavations are located.

The chimney foundation/building corner and a brick element of another corner of Structure 1 were found in 2009. This prompted me to develop a major research agenda concerning the ways archaeology can reveal the sizes/shapes of buildings we knew were present, as well as differences/similarities between other 17th century examples from South Carolina and possibly other colonies on the Atlantic coast (Agha et al. 2012). Learning the architecture, and from that, settlement layout/organization, has been one of the most commonly asked question sets in historical archaeology but particularly of CRM archaeology of South Carolina. This bias drives research towards a common, redundant goal that predetermines the archaeology we conduct on historic sites: if we want to know about buildings, then we need to dig at buildings. But, what did people do in the past other than reside in buildings? Since St. Giles Kussoe was a massive 12,000 acre plantation, is it reasonable to assume that the slaves and servants, and even managers/overseers, spent more than 50% of their time everyday indoors? This hardly sounds like the "pioneers" discussed and defined by historian Peter Wood as he characterized the founders of Carolina (1974). Prioritizing the architecture of a site continues a decades-old tradition in our discipline of historical archaeology serving as the "hand-maiden to history" and especially architectural history. Once the architecture is learned, and compared and contrasted to known examples, what do we learn about the past people who lived at the site? Did architecture mold, model and influence culture as strongly as we suggest? What evidence do we have that says a settlement's architecture dictated the settlement's activities? Most importantly: did the past inhabitants of these settlements place as much importance on their architecture as we historical archaeologists have done for the last roughly 50 years of study? Defining and studying architecture is important, but more dynamic questioning and research is suggested for advancing our understanding of how architecture played a role in peoples' daily lives in the past.

If the Architecture group dropped by 5.2% after we excavated at structures, what does that mean? Does it mean that the buildings were torn down and thrown into the moat during site abandonment? If this happened, what does it tell us about culture? Does it inform us of some new behavioral practice? Or, does it continue to confirm our regularly questioned and answered research agendas: when people left a site in the past, they cleaned up and tore down structures and threw the debris into holes in the ground? Now that we have learned that the orientation of architectural features, walls, foundations and even postholes/postmolds trend in the same angle in relation to the landscape, and that we have found the relative sizes of two of the three known structures identified, what new questions can we ask concerning the architectural artifacts found on site? These questions point out the need to engage the archaeological, and historical, records with more vigor so that we can devise hypotheses and excavation strategies that move us around corners instead of down new pathways.

The biggest changes to the groups are seen in the Clothing and Activities categories. Clothing dropped from 2.6% to 0.2% while the Activities group jumped up drastically from 3.4% to 11.2%. This change is due to the fact that small glass seed beads—clear markers for Indian trade at 38DR83a—were placed in the Clothing group in 2011 and not Activities. These beads were most certainly not worn by anyone at the site. It is currently debated if Indian slaves were present at 38DR83a. Seed beads should not evidence their presence: slaves would not be allowed to wear expensive, meaningful clothing embellishments that were primary trade items. Enslaved Africans and the Europeans at the site also would have been less likely to wear such beads. Therefore, I have placed all seed beads into the Activities group, since trading with Indians was not just a simple "activity" but a primary one that may have been a driving factor behind the settlement and its location. Here, Stanley South's intended and biased South Categories show their true weaknesses. A beautiful glass bead surely was a "clothing" item in the 1670s. However, it was not something the inhabitants—most being slaves and servants—of this settlement would have worn. Indian traders may or may not have worn such beads during their commerce activities and interactions. The process of these beads being lost in order to enter the archaeological record evidence activities: the movement of barrels of beads and the unpacking of the beads into smaller vessels for transport would have created chances for seed beads to fall on the ground and be lost. Although the seed bead was *known at the time* as a clothing item, and its *intended* and final destination was on a Native American's clothing, at 38DR83a, they were *functionally* bound up with activities.

Another interesting difference is in the Arms group. This group dropped by one percent. Based on the theory that the moat's sole function was defense, and three different excavations were undertaken in three different places on the moat line, including two that excavated the moat from top to bottom, I expected the Arms group to have increased by at least 1% if not more. If a palisade line was present on the moat, then there should have been men standing guard at least some of the time, even if infrequently, during the use life of the moat. There should have been a platform along the inside of the palisade for men to stand on, or, the palisade was short enough for people to stand and look over the top of it. Line of sight was crucial for musket accuracy. Since these men were standing guard with muskets for defense, it is likely that they dropped musket balls/lead shot during their watch. I questioned if a skirmish occurred at 38DR83a due to the seizure of St. Giles' powder stores by Captain Fuller during the Westo War, and even questioned if the plantation was a location where violence occurred during that war. The amount of spent 60-calibur lead shot was one of the lines of evidence I used to arrive at these ideas about the Westo War and St. Giles' role. Having the opportunity to excavate the moat that may have actually been utilized during the war, I expected higher amounts of lead shot to be found than elsewhere in the settlement: the Westo Indians were armed and would have been attacking the palisade/moat combination.

Only 13 pieces of lead shot were found in all three moat samples. Seventeen pieces of lead shot have been recovered from Structure 1 alone, and based on preliminary results, Structure 1 did not serve a military/defense related function. Eighty eight lead shot were recovered in 2009 and 2011, while 38 were found in 2013. The presence of lead shot, then, is random and reflective of the day-to-day use of muskets at St. Giles Kussoe. Five of these new lead shot are 60-calibur and are all modified or show evidence of impact after firing; the other 33 lead shot are all 30-calibur for hunting. While I was the archaeologist at Charles Towne Landing (2012-2015), I had the chance to look at the lead shot recovered from the Miller Site. Recent excavations at the Miller Site have revealed a bastion-like corner for a palisade trench that encloses the trash pit Johnny Miller excavated that contained the body armor fragments. Although the military function of the Miller Site is becoming strong and sure, the ratios of large lead shot capable of killing a person versus small hunting shot are skewed. The small hunting shot is in the vast majority of all lead shot found. South and Stoner's analysis (Stoner and South 2001) does not list the sizes of lead shot that comprise the 1.4% of all artifacts from Structure 1 at Charles Towne Landing; 1.4% is higher than two known forts that South excavated in the 1970s (Stoner and South 2001:89). Therefore, the size of lead shot needs to be scrutinized based on function and activity and not blindly lumped into the Arms group. Shooting hunting shot, designed mostly for birds and small game, at a person might wound them, but bird shot was not designed to kill people. Should hunting shot go into the "Activities" group? In the future, size grading lead shot from 17th sites may prevent problematic interpretations that lead to distinct, functional assignments of structures and settlements.

Since Structures 1 and 2 have been nearly half excavated, the following discussion will look at the functional South categories for each structure to possibly learn their past uses. The

2009/2011 and 2013 excavations are combined for this interpretive analysis. Unique and important artifacts that differ between the field seasons will be discussed.

Structure 1

Following the organization of the previous report (Agha et al. 2012), South groups and relative percentages will be utilized for this discussion, in order to compare and contrast Structure 1 with Structure 2. Eight, 5x5' foot units provide the additional 934 artifacts for this discussion. Some units dug in 2011, lying south of Structure 1's footprint, are not included in this analysis. It is unknown if those units exposed part of another, as of yet undefined building, or if those units recovered trash from Structure 1. The units included in this discussion fall along the interpreted south wall of the building, parts of the east wall, the chimney and space inside the building in front of the hearth. The total artifacts being utilized to interpret Structure 1, then, total 1,299 (Table 4).

Table 4. 38DR83a Revised Carolina Artifact Pattern for Structure 1.

	Percentages	Artifacts
Kitchen	38.00%	492
Architecture	35.40%	459
Clothing	0.40%	5
Personal	0.90%	12
Furniture	0.20%	3
Arms	1.30%	17
Tobacco	9.40%	123
Activities	14.50%	188

Kitchen artifacts

A total of 492 kitchen artifacts comprise 38% of all artifacts at Structure 1. Similar to previous field season, the majority of these artifacts are ceramics, which total 341 sherds. Of these ceramics, 241 are Colonowares and 100 are European in origin. Table glass consists of 11 shards and are either clear leaded goblet or tumbler fragments. There are also 140 shards of olive green bottle glass.

Ceramics comprise 69% of the Kitchen group, with the clear and green glass fragments making up the other 31%. Colonowares are 70.6% of all ceramics and 49% of the entire Kitchen group. With the presence of the brick hearth—the only known on-site thus far—why are Colonowares so high in number and in percentage? If the brick architecture denotes white residents, and possibly elite white residents who were site managers, why are Colonowares the dominant ceramic type? Archaeology of 18th century sites usually uncovers Colonowares in both the planters' kitchens and residencies. Archaeologists have interpreted these discoveries as evidence of enslaved Africans utilizing their own cooking techniques and traditions to make meals for their owners, and the use of their own, familiar pottery was either fully accepted or negotiated in kitchens that were not theirs (Ferguson 1992, Isenbarger 2006). Here, in the late 1670s, were these social and cultural negotiations already figured out? If so, then were enslaved Africans allowed to cook in their Colonowares at the inception of Carolina? What of the Native American ceramics found throughout 38DR83a? While the vast majority of Colonowares cannot be typed according to cultural background due to their ubiquitous, plain surfaces and myriad paste compositions, there are Ashley and Danner-like potter both inside and outside of the structures identified; however, based on Leland Ferguson's definition of Colonoware, all Native American pottery types of the historic period are Colonoware (1992). Were Native American ceramics used in conjunction with African vessels while cooking for the white residents? Why would enslaved Africans need to use Native American vessels if they could make, and use, their own pottery? Because current techniques in historical archaeology are unable to sort out cultural typologies safely, I am unable to attribute the cultural affiliation of the undecorated pottery to any single group. Therefore, based on the history already known, the possibility of enslaved African cooks making meals for the plantation by using Colonoware pottery is the only interpretation that is safe to make; suggesting that there were Native American slaves present on the plantation is still a complete unknown.

The vast majority of the European ceramics are table wares (n=82) and are mostly Delft (n=77). Four pieces of Staffordshire combed and trailed slipware, two Rhenish stoneware sherds, and one Scraffito slipware help to diversify the table ware assemblage, but Delft dominates this category. In fact, Delft comprises 19% of all Kitchen group artifacts. Why is Delft so high at Structure 1? Utilitarian ceramics such as North Devon gravel tempered ware (n=4), lead glazed redwares (n=10), brown salt glazed stoneware (n=1), and Fulham brown stoneware (n=1) represent the activities of the kitchen beyond the formal table. These 18 ceramics pale in comparison to the dominant table wares, showing that Structure 1 was more likely a residency than a building utilized for plantation labor. The North Devon sherds could have been from short-term storage vessel(s) for dairy products similar to the stoneware vessels.

Architecture

Nails are the primary artifact type for the Architecture group at Structure 1. These artifacts total 459 whole and fragmented pieces and comprise 35.4% of the assemblage. Clearly, this amount of nails indicates a wooden framed building that sat on brick foundations. Several more whole nails recovered in 2013 show evidence of burning, furthering the interpretation that this building was burned either intentionally or through catastrophe.

Clothing, Personal and Furniture

These three groups compose a very small amount of the artifacts found at Structure 1. However, they are fascinating and important. Together these three categories combine to total 1.4% of Structure 1. Although they total only 19 artifacts, they allow me to understand who was at Structure 1, and possibly gain a better idea for the building's function. The clothing items are minimal but indicate someone of decent status was present at this settlement. A single, dome-shaped silver button found in 2009 along with three different brass buckles demonstrate an outward refinement for everyone to see. The silver jewelry setting was most likely displayed. The straight pin may have been used for clothing; however, similar straight pins currently bind the original Woodward Account book (1674-1678) currently stored at South Carolina Archives and History in Columbia, South Carolina. Based on this evidence through example, the straight pin may have served many functions. As suggested previously (Agha et al. 2012), the medicine bottle fragments could have been part of the set Percival listed as cargo bound for St. Giles Kussoe. Lastly, three brass furniture tacks have been found since 2009 and while small in number, they do suggest one piece of furniture was adorned with some refinement.

Arms

Ten more lead shot were found in 2013, bringing the overall count for Structure 1 up to 17. Nine of these lead shot are for hunting while the other, found in Feature 61, could be used to shoot a person.

Tobacco

The Tobacco group stays relatively the same as previous field seasons. While 60 pipe fragments were recovered in 2009 and 2011, 63 were found in 2013. Of the pipe stems that could be measured, eight are 5/64", 14 are 6/64", 12 are 7/64", and three are 8/64". No attempt to calculate a mean pipe stem date was attempted, as Noel Hume asserts that the statistics for the date calculation are designed for roughly 1,000 pipe stems (Noel Hume 1969). At 38DR83a we have not yet reached 500 measurable pipes; therefore, the sizes of the stem holes are being scrutinized not for dating. Instead, following King's recent interpretations (Flick et al. 2012), the larger holed pipes denote cheaper pipes for lower class people and the smaller holes represent the elites. At Structure 1, four sizes are represented. What does this mean? Did elites share this space with the indentured servants and the enslaved? Or, were pipes hard to come by and any and all pipes, regardless of quality or what quality meant socially, were purchased/acquired for smoking needs at St. Giles Kussoe? Lastly, the ratios of pipe amounts found between field seasons shows an ubiquity and uniformity at Structure 1 regarding this specific leisure time activity.

Activities

The last group to discuss contains some of the most interesting and unique artifact types on the site. The main artifacts of importance are the 34 trade beads. Most interesting is that 23 of these are larger while 11 are of the smaller seed bead variety. Normally the seed beads were what Native Americans desired to weave into their clothing, and this bead type is commonly attributed as evidence of Indian trade on historic period sites in South Carolina. With over twice as many larger beads, can we say that these beads were utilized for Indian trade only? Larger sized beads were not relegated to only Native Americans in the past. In West Africa, glass beads and their uses predates the settlement of Carolina by almost 1,400 years (Dubin 1987). Transatlantic slave voyage historians believe that glass beads may have been worn by Africans during the Middle Passage. Bead making in Sub-Saharan Africa dates as early as 600 AD (Dubin 1987). Just as beads were traded to Native American for skins, beads were traded in West Africa by Europeans in exchange for slaves; likewise, this beads-for-slaves phenomenon was also practiced by West Africans for their own slaves. Although we are unsure that 38DR83a was in part a trade post for Westo Indians and Woodward's exchanges, we do know that Native trade ceramics are present and trade of some sort occurred here. However, we cannot blindly attribute all glass beads found at this site to only Native Americans. Africans wore beads, used them in rituals and traded them as currency for hundreds of years before Europeans ever reached North America. By including enslaved Africans in the consumption and use of glass beads, these small yet important artifacts gain more context, more interpretive power, and more honesty in light of this early Carolina settlement. It is unfair to attribute these artifacts to only one culture group when another, who was also present, had over 1,000 more years of history and involvement with them than Native Americans.

Seventy unidentifiable iron objects were recovered from Structure 1. Most are parts of objects, like strap hoops for barrels and/or other utilitarian tools or implements. Some of these pieces might have been parts of furniture or other composite things like trunks, cabinets, chests or containers. Besides these iron things, 79 flakes of chert and flint ballast were recovered. Most of these flakes are unutilized while some demonstrate worked or retouched edges. A few appear to be strike-a-lights used to start fires, while others may be gunspalls that broke from gunflints during musket firing. Lastly, one lead seal and four lead objects were recovered. The lead objects are most likely raw lead that was cut into shapes to easily make lead shot in molds.

Structure 2

Structure 2 produced 2,010 total artifacts over the three field seasons. Three 5x5' foot units and one 2.5x5' foot unit were excavated in 2013, which is the exact same amount of square footage excavated at Structure 2 in 2011. The units in 2011 concentrated on the north side of the building while the 2013 units looked at mainly the south side, but also looked for and found the northwest corner of Structure 2. Therefore, these two field seasons combined provide an even view of the artifacts discovered to date, and the following discussion of the South groups and artifact percentages give a clear representation of what this structure may have once been in the past (Table 5).

Table 5. 38DR83a Revised Carolina Artifact Pattern for Structure 2.

	Percentages	Artifacts
Kitchen	58.00%	1,166
Architecture	27.00%	544
Clothing	0.07%	2
Personal	0.15%	3
Furniture	0.00%	0
Arms	0.60%	13
Tobacco	8.20%	165
Activities	5.80%	177

Kitchen

The Kitchen group dominates all artifact types as it comprises 58% of the assemblage or 1,166 artifacts. Ceramics total 921 of these artifacts, or 45.8% of all artifacts of Structure 2. Of ceramics, Colonowares are 887 sherds while European sherds total only 34. Colonoware, then, makes up 44% of all artifacts at Structure 2. There are 231 olive green bottle glass fragments, 11 pieces of clear leaded table glass goblets or tumblers, and three fragments of an almost opaque, white Venetian glass vessel. With Colonoware being so high in number, the European ceramics found in context with the hand built wares provides an interesting picture of what function(s) this structure may have once served for this small settlement.

Delft is the most common European ceramic with 19 sherds found thus far. North Devon gravel tempered wares total nine sherds, followed by four lead glazed redware sherds, one Stafforshire combed and trailed slipware and one rare sherd of Chinese porcelain—only the third found at 38DR83a. All of the non-tablewares can be attributed to dairy processing at Structure 2;

the same cannot be said of Structure 1. Delft at Structure 2 is highest in count similar to Structure 1. However, with Delft being high in number at both structures, and other ceramic types varying quite drastically, was Delft a marker of function at Structure 2 or happenstance? Was Delft simply the most common European ceramic at 38DR83a, and not specifically a marker of function?

Like Structure 1, Colonoware is the most common Kitchen artifact type at Structure 2. Structure 2 has no brick architecture and possibly had no hearth/fireplace/chimney. Why? What function, then, did Structure 2 serve without a hearth? The feature that distinguishes Structure 2 apart from Structure 1 is the large cellar. Currently, no cellar of any type or size has been uncovered at Structure 1, and while some units can still be dug to see the entire floor, space is limited. Did Structure 2's cellar serve a function that dictated the material culture required for that building?

Architecture

The architectural artifacts total 544 and are all nails and nail fragments, identical to Structure 1. Because I believe the architecture of Structure 2 to be a cratchet house, these nails show evidence of clapboard walls, possibly on both the exterior and interior. If Structure 2 is indeed a cratchet, it could provide an example for other potential 17th century structures of the same architectural style.

Clothing, Personal and Furniture

These three groups make up only 0.22% of all artifacts at Structure 2 (n=5). Two black glass buttons were recovered and are the only clothing items identified. Three medicine glass fragments were found as well, and no furniture related artifacts were recovered. Structure 1 produced buckles, silver items and even a straight pin; Structure 2 has none of these. Do status differences explain these artifacts? If enslaved Africans were present at both structures, did their activities differ between the buildings, which could have influenced who of the elites spent more time at either structure?

Arms

Thirteen lead shot were recovered from Structure 2 through all field seasons. This number is similar to the 17 found at Structure 1. All of the shot recovered in 2013 was for hunting purposes.

Tobacco

Pipe fragments total 165 pieces, or 8.2% of the total Structure 2 artifact assemblage. Although 123 fragments were found at Structure 1, a 42-fragment discrepancy makes tobacco use at both structures relative: the Tobacco group is 9.4% of all artifacts at Structure 1. Pipe stems that could be measured that were found in 2013 include 12 that are 5/64", nine that are 6/64" and six that are 7/64". Interestingly, if the social status theory concerning pipe quality and bore hole size is plausible, then larger holes were found where a brick foundation created a more permanent building. There are also more 5/64" pipe stems than the 6/64" or 7/64" separately. Taking the social status theory further, does architecture have more to do with the status of the people who occupied a "better" building or can pipe alone help to evidence the status of the people and where they performed activities?

Activities

The third highest artifact count that belongs in a South group is the Activities group, totaling 117 artifacts or 8.2% of everything found at Structure 2. Only 10 unidentifiable iron objects were recovered from this building, in comparison to 70 pieces found at Structure 1. Why are these numbers so different? Was there a difference in the ways things were stored at either building? Functionally, how did tool use differ? Besides these objects there are also 70 chert and ballast flake fragments, which is almost identical to the 79 similar artifacts found at Structure 1. When stone, both local and foreign, was found, modified and employed at 38DR83a, were the functional needs the same between the structures? If the activities were different, was the debitage and discard at each locale the same? Lastly, the 37 glass beads from Structure 2 mirror the 34 found at Structure 1 almost identically. Structure 2 produced 20 large beads and 17 small beads; Structure 1 produced 23 large beads and 11 small beads. Again, more large beads were found than small, and this difference is not due to sampling methods or soil processing. Unit quads were water screened equally between both structures, raising the potential to find more seed beads. But, only 28 were found between both structures. While these beads were likely not something that the colonists were clumsy with, the chance to lose such small items was probably the best in relation to every other object present at the settlement: they are smaller than even the bird shot we have found here.

If this settlement was the trading post for Woodward, why are there such few beads at the structures that may have housed them? From the historical documents, Woodward seems to have facilitated trade with the Westo once a year starting in 1675. It is unknown if trade occurred in 1679: we do not have record of his transactions as his account book ends in July of 1678. In winter of 1680 the Westo War began, and Woodward was implicated as an instigator who started the war and was barred by the Grand Council from being at places where Indians could be present. St. Giles Kussoe would be the first place the Council would ban him from residing as it was the first and only place where the Westo were trading. If Woodward managed three known, and possibly two additional unknown transactions with the Westo, and beads by the thousands were involved in these encounters, should there not be more beads in the ground?

The small numbers of seed beads recovered from the two clear structures we have identified so far point to an alternative hypothesis concerning the settlement and its function. It is possible that the settlement was not established until after the Westo War, which would have been sometime in the spring/summer of 1681. Shaftesbury and Colleton write to Percival to take inventory of everything Woodward had, and attempt to use it in the creation of a new trade alliance with other, non-Westo Indians. Does the Danner-like pottery represent the last vestiges of Indian trade at St. Giles Kussoe? If so, then Percival, not Woodward, was the agent who facilitated the contact. The small amount of seed beads at these buildings, if they were in anyway involved in the storage of goods for the trade, may help to explain and evidence the last trade that occurred before Shaftesbury quit funding the plantation when he fled for Holland in November 1682. No records exist concerning the Indian trade after the Westo War, and the Danner pottery in conjunction with these beads might help evidence post-Westo Indian trade.

The Moat

The moat feature was studied in three locations. A total of 2,394 artifacts were recovered from the three moat investigations in 2013, which comprises 49.3% of all artifacts found in this field season. For this analysis and discussion, 2,653 artifacts will be synthesized because unit N950 E855 is being added to this artifact assemblage from the moat corner, which was first investigated in 2011. I have compiled the information from that original unit, N950 E855, together with the unit extension that was dug in 2013, unit N950 E860. Table 4 displays RCAP percentages and artifact counts comparatively for the 2013 season (for Moat Corner the 2011 unit is added to the 2013 unit and shown in Table 4). The 5x10' foot excavation unit at Moat Corner is comparable to the two, 5x5' foot units dug to investigate the northern limits (North Moat) of the moat, which are units N1055 E855 and N1055 E890. A third unit was dug, N1050 E895, to expose more ground in order to identify either a palisade or other features that lie in context with the moat. The other set of units, the six, 2.5x5' foot units on the E940 line, cut through the moat along its southern arm (South Moat). These units also equal the same amount of space as the three that sampled the northern extent of the moat. Therefore, the north and south excavations are identical in the space that was sampled, and both reach the base of the moat cut. Only the moat corner has not tested the depths of the moat; more excavation is required to get the south and west limits of this part of the moat before it can be sampled properly. The following discussion looks at the moat as a whole but also through each area, as each locale provides slightly different artifact signatures that help to reveal more understanding of the entire site (Table 6).

Table 6. 38DR83a Revised Carolina Artifact Pattern for Moat excavations.

	North Moat		Moat Center		South Moat	
	Percentages	Artifacts	Percentages	Artifacts	Percentages	Artifacts
Kitchen	59.50%	766	74.60%	368	36.80%	287
Architecture	30.00%	385	18.00%	106	29.50%	230
Clothing	0.00%	0	0.00%	0	0.60%	5
Personal	0.46%	6	0.30%	2	0.38%	3
Furniture	0.00%	0	0.00%	0	0.00%	0
Arms	0.23%	3	0.50%	3	1.00%	8
Tobacco	5.90%	76	6.60%	39	10.60%	83
Activities	51.40%	51	12.20%	72	20.90%	163

North Moat Sample

A total of 1,287 artifacts were found in the three units that make up this sample. Two of the units dug Feature 106, which is the name of the moat in this part of the site. This section of moat is extremely shallow and as discussed in Chapter 2, is within 20' feet south of the northern limits of the moat feature. Although shallow, these units and moat sample produced the most artifacts of all three moat investigations: the moat corner produced 587 artifacts and the south moat cut produced 779.

The Kitchen group consists of 59.5% of all artifacts and the Architecture group is the next highest number at 30%. In the Kitchen group, 22.3% (n=171) pieces of olive green bottle glass pale in comparison to the 591 total ceramic sherds, or 77% of all artifacts in this group. Colonowares make up 70.8% (n=542) of the Kitchen group, and 42% of all artifacts in these three units at the North Moat area. Only three lead shot comprise the Arms category (0.23%), six pieces of medicine glass represent the Personal group (0.46%), while the Tobacco group makes up 5.9% of this assemblage with 76 pipe fragments. The Activities group is the only other substantive group but only represents 4% (n=51) of all the artifacts here. Twenty-seven beads, five unidentifiable iron objects and 19 ballast/chert debitage fragments comprise the artifacts of this group. These 27 beads are similar in number to both Structures 1 (n=34) and 2 (n=37).

The deposits, Zones 2 and 3, that overlie the defined moat (Feature 106) in these units contained 932 artifacts. The moat below these zones contained only 376 artifacts. For ceramics, these zone deposits contained 465 sherds while the moat only produced 123 sherds. The two units that expose Feature 106 paint an interesting picture concerning the theory of trash being dumped into the moat on abandonment—considering that the moat was open during the lifespan of the settlement and could be either a receptacle for trash all the time or only at the end of the settlement's existence. A total of 339 Colonoware and 31 European sherds were recovered from the zones above the moat. In contrast, the moat sample only contained 100 Colonoware and 23 European sherds. When ceramic types are combined, this provides a ratio of ceramics in zones above the moat to ceramics in the moat of 3:1. There are three times as many ceramics on top of the moat than inside of it. Why? One likely explanation for this discrepancy in ceramic counts is that the moat was indeed a clay borrow trench and after its function was met, it was filled in and life at the settlement continued. People moved about, created pottery, lived in and out of buildings, performed plantation and leisure time activities, and created the daily discard midden of trash and soil *on top of* the moat *after* it was filled in. The moat may have served several functions before being filled in, but the amounts of ceramics in it and on top of it can help in our interpretations of what purpose it served.

Tobacco pipe fragments, both stems and bowl pieces, trend the same as the ceramics do between these two different deposits. There are 83 total pipe fragments in the zones above the moat and only 17 pipe fragments in the feature. Archaeologists believe that pipes broke during their use: they were dropped on purpose or on accident, the stems were snapped to open the airway from trapped resins, and smoking occurred during both leisure and work activities. Therefore, pipe smoking, and eventual breaking, occurred during habitation. Pipe fragments in zone deposits overshadow the fragments in the moat below by a ratio of 4.8:1.

Nails and nail fragments, however, cloud the theory of the moat being filled in rapidly and early in the settlement's life. Nails and nail fragments total 182 pieces in zones, while 179 were found in the moat. If ceramic and pipe fragments trend with the zones and not the moat, then why are nails so evenly distributed? Was there a structure close by that needed demolition in order for the moat to be dug, and those nails wound up as accidental discard in the moat fill? Zone 3 that lies directly on top of the moat suffered little to no 20th century plow damage. A total of 107 nails and nail fragments were found in Zone 3, while 179 were found directly below in Feature 106. Ceramics and pipes represent active use; nails represent a one-time use—construction—and then once they served their purpose in a structure they were either salvaged or discarded with the derelict building.

Concerning the idea of a palisade being responsible for the high number of nails inside the moat fill, this theory is less plausible as an answer. Slightly more whole nails (n=91) than fragments (n=88) were recovered in Feature 106. If we consider only the whole nails, then we have to accept the fact that over 90 nails were used to fasten clapboards to palisade posts, spaced several feet apart, and that those 90 nails were used within a less than 5' foot stretch of palisade wall. Even if the wall was 20' feet tall, this number of nails is still too high to be believable as a theory to explain their large number here. The most likely theory is that a building was once in this location and the demise of it fell during the moat's creation and infilling.

Lastly the Arms category, while small, is interesting in that the three lead shot recovered are all 60-calibur and show signs of impact. Do the larger sized shot represent militia-type activities on a defensive wall? Since the garrison would be located inside of the fort, and since few to no large sized lead shot were recovered the known structures, it seems unlikely.

Moat Corner

The corner of the moat is the smallest sample at 587 artifacts. Ceramics comprise 62.3% (n=368) of the entire Kitchen group, with only 50 pieces of olive green bottle glass and two table glass making up the rest of the artifacts. The Architecture group is 18% (n=106) and is only nails and nail fragments. The Personal group (2 medicine glass) comprises 0.3%, the Arms group (3 lead shot) is 0.5%, and the Tobacco group (n=39) is 6.6%. The Activities group is 12.2% of the Moat Corner artifacts and consists of 72 artifacts: 43 glass beads, three unidentifiable iron objects, 25 ballast/chert debitage, and one lead object.

Too small of a sample has been recovered from the moat itself in these two units (Feature 53); thus, the analysis and discussion preceding this one is not applicable. The Moat Corner does, however, provide ample evidence of Indian trade through the highest concentrations of Danner-like pottery. Bead density is similar to both Structures 1 and 2 as well as the North Moat samples. Excavations west of this location could find more artifacts related to Indian trade at St. Giles Kussoe.

South Moat

A total of 779 artifacts were found in the six, 2.5x5' foot units and the sample of Feature 99, the name of the moat in this part of the site. Of these artifacts 470 were found in Feature 99 while 309 were found in the thin deposit of Zone 2, and in two of the units Zone 3, over it. This is different from the North Moat sample, where the overlying zones contained roughly double the artifacts as the moat. Here, the south moat cut is a deeper and larger sample than that of the north portion, which likely contributes to the higher artifact count.

The Kitchen group is represented by 287 artifacts and comprises 36.8% of all artifacts in South Moat excavations. Ceramics entail 214 sherds, with Colonoware comprising 187 sherds or 87% of all ceramics found. Colonoware is 65% of the Kitchen group, and 24% of all artifacts in this assemblage. The Architecture group comprises 230 nails and nail fragments and is 29.5% of this assemblage. The Clothing group, which is made up of only five black glass buttons, is 0.6% of all artifacts, the Personal group (3 medicine glass) is 0.38% of all artifacts, and the Arms group consists of eight lead shot that indicate hunting only, which make up only 1% of the assemblage. Tobacco group artifacts total 83 pipe bowl and stem fragments, which comprises 10.6% of this assemblage. Lastly, the Activities group is the most diverse by way of artifact types and is made up of 163 artifacts that comprise 20.9% of the South Moat assemblage. These artifacts include one lead seal, 29 unidentifiable iron objects, 17 ballast/chert debitage, three lead objects, three burnishing stones that were mostly likely used to construct handmade pottery on-site, and 110 glass beads. These glass beads are high in count most likely due to the largest water screened soil sample ever collected at 38DR83a from one specific provenience: the 2.5x2.5' foot column that captured all six arbitrary levels of Feature 99—40 seed beads alone were collected from this column sample.

There were 66 nails and nail fragments recovered from Zones 2 and 3 from all six units in this locale. Feature 99 produced 157 of the same artifacts. Similar to the North Moat sample, there are a large amount of nails in the moat itself. Was there also a building down in this part of the settlement that was responsible for these nails being in both the moat and the ground after the moat was filled in? The current theory is that the moat was defensive, was open the entire time the settlement was active, there was a palisade supporting the moat, and the moat was filled in when the settlement was abandoned. Why, then, are there artifacts in Zone 2? Why are Zone 2, and especially Zone 3, even present at all? If the moat was the receptacle for site clean-up and abandonment, then why is there a cultural zone of deposition overlying it? Why does the stratigraphy show a clean separation between Zone 2/3 and Feature 99? Pipe fragments total 52 pieces in Zones 2 and 3 and 59 pieces in the moat. Like the North Moat, why are there so many pipe fragments in the soil layers *overlying* the moat *after* it was filled in? What were the inhabitants of this settlement doing after the moat was filled in—after their presumed defenses were down? The Westo War was an actuality; St. Giles Kussoe felt the full force of it through the complete end of Indian trade between Woodward and the Westo. If the moat kept them safe before the war, and presumably safe if it was still open after the war, then why was it filled in with enough time to create so much trash and soil *before* the scared inhabitants left for good?

Furthering this strange phenomenon are the ceramics and their counts inside and outside of the moat fill. There are 13 European sherds from Zones 2 and 3 and 11 from Feature 99. These 13 sherds were deposited after the moat was filled in. For the Colonowares there are 83 from Zones 2 and 3 and 104 from Feature 99. Although the moat produced more Colonoware than its overlying soils, the 83 sherds from the upper zones should be much less in count to believe the 'moat filled during abandonment' theory. These 96 combined ceramics, paired with the 52 pipe fragments, help to show that there was activity for some amount of time after the moat was filled in. I had thought that the downward slope from north to south—from Structure 1 to the South Moat—might have allowed for artifacts to move and migrate south, so that Zone 2 was a sheet of soil and artifacts that accumulated through the decades, and even centuries. However, the overlying, thicker Zones 2 and 3 in the North Moat—itself an area on equally high, if not higher, ground as Structure 1—also could have been subjected to the same kinds of erosional wash from plowing and past, unknown tree clearing, which would have made Zone 2 much thinner. This is not the case. Although some erosion was likely going on in the past, erosion from areas north did not create Zone 2 that overlies Feature 99. Post-1685 activities like plowing in the 20th century might have also displaced artifacts and broken them into smaller, more numerous, pieces.

Lastly, the date of the moat is in question due not to dateable artifacts but specific Native American pottery. The only identifiable types of handmade pottery, attributable specifically to a cultural group, are the Ashley and Danner-like ceramics. The Ashley pottery has been found and recognized as belonging to Native Americans during the last half of the 17th century throughout the Lowcountry (Nyman 2011). Danner-like pottery has recently been identified as belonging to Shawnee peoples who migrated from the upper Ohio/Illinois region to the Savannah River area near Augusta, Georgia (Marcoux 2015). No concrete, qualitative analyses have ever been conducted to evidence West African/West Central African pottery to Colonoware in Carolina before; only known, Native American pottery has been identified and researched. Therefore, these two pottery types help me to identify two specific kinds of people: Native Americans that I believe were at 38DR83a before St. Giles was settled, and Native Americans who engaged in trade from the Augusta area. The ways Ashley and Danner sherds sort out between all three sections of the moat provides a unique and possibly problematic interpretation for what we believe was occurring at 38DR83a, and especially what the moat had to do with site function and dates of occupation.

The North Moat sampling produced 33 Ashley and eight Danner-like sherds. Two Danner sherds were found in the moat while three were found in Zone 3 directly above. No Ashley sherds were found in the moat. At the Moat Corner, 64 Danner-like sherds were found in the zones and in the moat. The South Moat sample produced six Ashley sherds and 35 Danner-like sherds. Interestingly, Danner pottery was found in Feature 99 in Level 1 (n=9), Level 2 (n=12), Level 3 (n=1), Level 4 (n=5), and Level 6 (n=1), which totals 28 sherds for the sample of this feature. Zone 2 from all six units produced five Danner sherds and six Ashley sherds. No Ashley pottery was found in the moat. Lastly Feature 108, the intact sandy silt that rested below a dense intact wedge of clay fill, produced neither Ashley nor Danner pottery. Since we excavated a very small window into this soil, it is possible that neither pottery type would have been found: a larger sample of Feature 108 fill could have produced either or both of these pottery types.

With the Danner-like pottery being present in all three moat samples, did the Danner-like pottery come in with the Westo initially in 1675? Or, did it come in with the new Savannah River traders after the fallout of the Westo War sometime after 1681? In either case the moat was not open for very long: if the Westo brought the Danner pottery before 1680, they may have arrived as the moat was open, then vessels were used and broken and incorporated into the fill that then went back into the moat; if someone else brought the pottery after 1680, then the same scenario occurred, except the moat *was not open until after 1680*. If the moat was for defense, and it has Danner pottery in it from top to bottom, corresponding with rapid infilling of the moat, then how could it have been opened and closed after 1680? Does this settlement even date to the 1670s at all? If the Ashley sherds belong to the site *before* settlement, possibly associated with the Kussoe Indians, then why is it present in some parts of the moat but not all?

It is possible that the people who used the Ashley pottery only utilized this landform for specific reasons, which could mean that their refuse only occurs where they were conducting specific activities. North Moat is on higher ground while Moat Corner and South Moat are on lower edges of the sandy ridge that the structures once sat upon. The Danner-like pottery most certainly came in through trade with a foreign Native partner. It does not matter who brought the

Danner pottery: its presence in the fill of the moat does not change the fact that the moat was filled in rapidly and was not left open for a long period of time. No silting or slow infilling, as is seen in two defensive features at Charles Towne, is noted in the north or south cuts of the moat. The artifacts in the moat do not offer specifics of the function of the feature as the nails do not correspond with interpreted and archaeologically discovered palisades of the time period (pointed logs placed side-by-side and upright that required no nails). Geophysical survey shows that the moat does not continue to the north or east, as GPR has found no traces of anything remotely similar in either direction. What else could this feature be?

The Moat as Clay Quarry for Brick Making

The soil core of the bottom of the South Moat cut punched through a gray, highly plastic, solid clay. One core punched through a brick fragment; this fragment and the *in situ* clay associated with it were both sent to Zack Stroman at NC State University for scanning electron microscope (SEM) and Neutron activation analyses. This work is similar to the same techniques employed by Dr. George Calfas at the University of Illinois in 2011. Calfas was able to correlate redwares manufactured in Barbados to redwares found at the Lord Ashley site through relative amounts of elements that did not mirror ceramics known to be made in England. Calfas discovered a “thumbprint” signature for Barbadian redwares based on this study; however, more tests need to be conducted to solidify this thumbprint as our pilot study sample was too small to make statements beyond the simple correspondence between 38DR83a and Barbadian redwares.

Zack tested the brick and associated clay and found a strong correlation between the two based on the presence of specific elements. To process these samples, Stroman dried both samples completely and pulverized them in order to compress them into special pellets. These pellets provide a thoroughly mixed substance that the SEM could scan without bias. If the brick was unprocessed in this way, each targeted spot on the sample could contain radically different components of the parent substance (for instance, a sand grain that is not clay, or a piece of clay from deeper depths in the ground that contains more iron than a piece closer to the surface could provide wildly different readings for the brick sample; those pieces of clay may not have been mixed thoroughly enough in the 1670s, which can throw the elemental values off and skew interpretations). Two samples of the brick fragment and clay were prepared. Figures 29 and 30 display images of the brick and clay respectively. Samples 1 and 2 for the brick and for the clay

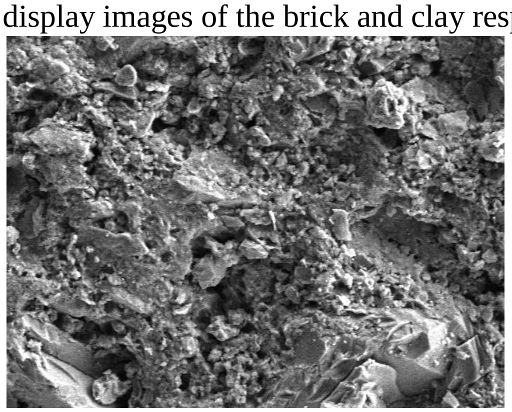


Figure 29. SEM analysis brick sample.

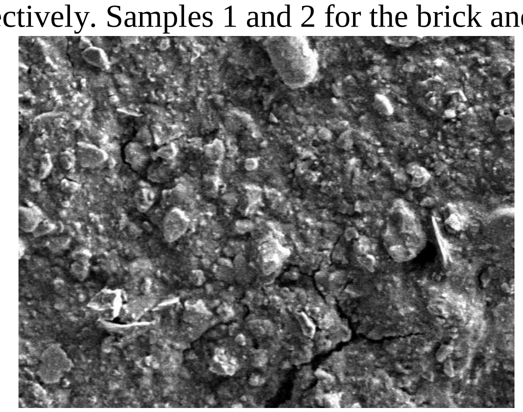


Figure 30. SEM analysis clay sample.

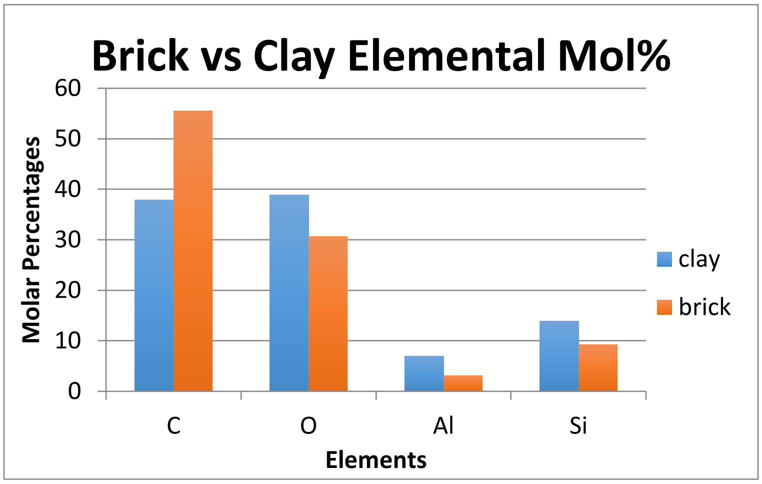


Table 7. SEM analysis results for Carbon, Oxygen, Aluminum, and Silicon.

were shot three times and the values were averaged. Table 7 to the left displays one of two charts of his analysis. The two elements to the left on this graph, Carbon and Oxygen, change due to the firing process of clay, as the Carbon in the unfired clay is quite lower in amount versus the brick that was fired. The difference in Oxygen comes from the firing process; Oxygen burns out of clay from heat (Stroman 2013, personal communication). The Aluminum and Silicon to the right are more closely related, as these elements are less likely to burn out or change due to firing.

The other graph, Table 8 to the left, shows even closer correspondence between the unfired clay and brick fragment. The molecular percentages on this chart show smaller differences than the previous chart, which is important for interpretations. Iron at the far left, Potassium (K), and Titanium (Ti) all differ by 0.1, which is too close to not be related (Stroman 2013, personal communication). Calcium (Ca) likely burns out easily during firing and is not a reliable element for this kind of study. Based on the correspondence between the heavy metals, Stroman and this author believe that the clay found in the deepest part of South Moat, and the brick fragment found within the clay, are a match and help to prove that brick was made locally on site.

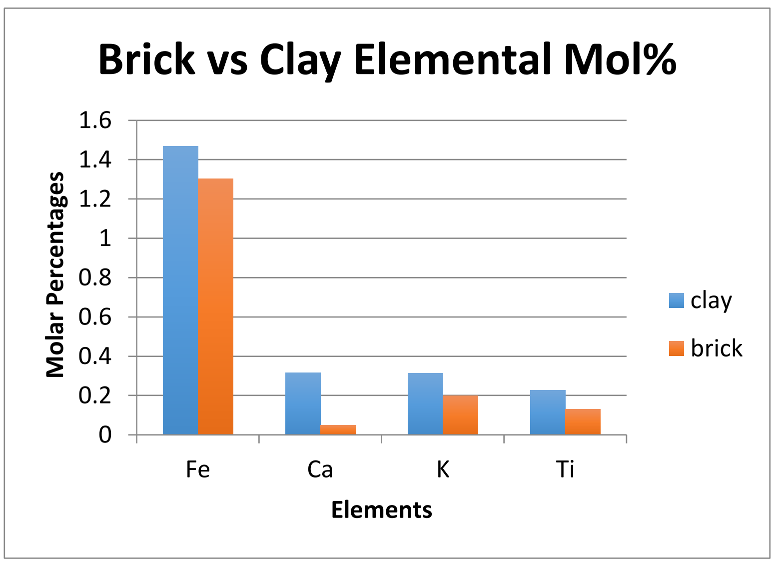


Table 8. SEM analysis results for Iron, Calcium, Potassium, and Titanium.

This analysis and discovery are pivotal to our understanding of the moat's function. If clay quarrying was a secondary function for the moat—the first being defense—then how long did clay remain present in this status before it was *put back into* the moat? Was it being stored in mass quantities within the settlement? If so, why have we found little to no clay within the zone deposits of the many units excavated? If this thick gray clay, found only at the bottom of the moat, was not stored "inside" the settlement behind the moat and defensive palisade wall, where was it kept? If it was kept out for future use, after bricks were made for the settlement at 38DR83a, what else was it to be used for? Bricks for other settlements within St. Giles in the future, beyond the 1670s? If it was kept in a building for dry, safe storage, for an intended future use, where was this structure? Since the clay is in the moat now, I can assume that it must not have been very far from the moat. If it was close, and kept outside, how far from the palisade wall and moat was it kept? Directly south of this part of the moat lies a mostly boggy field today. As mentioned earlier in Chapter 2, shovel tests 90' feet south of the moat reached the old, pre-20th century surface at depths between 1.7-2.2' feet below current surface. Modern debris in the fill proves a modern deposition; therefore, the settlement sat on a more prominent hill/ridge than we can perceive today. Roughly 70' feet south of these shovel tests is the large springhead that the owners of the property say used to be a literal pond as it always had water in it and was a location for pumping water to irrigate corn (Agha et al. 2012).

Based on the location of the moat and the sloping surface down towards a spring, the storage of clay would likely have been closer to the moat than the water to the south. If the moat was defensive, why would the settlers have placed this storage building so close to their defenses? If the enemy was attacking on foot and made it safely to this building, they could evade gunshots. In terms of defense, this building is entirely improbable and would not have existed in such a location so close to the main defenses.

This author does not believe the moat to have been defensive. The clay/brick correspondence helps to truth the clean, warped, never-used whole bricks found deep in the moat and the mass of bricks, found a few feet south of the moat cut, that were fused together through heat and not mortar as wasters from a brick clamp. The moat was likely a massive search for brick-quality clay and it was found: the clay and brick analysis shows correlation strong enough to say this safely. We have discovered brick foundations, and, within the architecture, bricks that have reverted back to natural clay due to poor firing. The artifacts within the rapidly filled in soils of the moat do not reveal specific site-use functions beyond what has already been discovered and interpreted. No additional Arms/Military related artifacts of significant numbers or qualities were found through the investigation of the moat. Several GPR surveys show an undulating and irregular basal depth for the moat, as well as no continuation north or east that would show and enclosed area the settlement sat within. No additional trench different from the moat that could support a palisade has been seen through GPR or excavations.

The Dorchester County USGS Soil Survey (Eppinette 1990) shows three strongly associated soils intersecting at the treeline that is between the moat and the southern shovel tests discussed above. Elloree loamy find sand is described as "frequently flooded" (Eppinette 1990: 21, 67) and follows a course through the land owner's property that matches the line between both springs—the one south of the settlement detailed by the land owner's stories, and the one in the woods to the west that was dug out with a backhoe to create a cow watering pond—and the creek the springs create that runs into the Ashley River. Eppinette describes this soil as "poorly drained" and occurs "along drainageways" (1990:21). He also mentions that the Yauhannah loamy fine sand that the settlement sits on is suited for building sites and row crops, but "wetness is a major management problem…drainage systems can lower the seasonal high water table and reduce the problems caused by wetness" (1990:36). The owners of the property have remedied these "problems" by filling in the area south of the moat with modern fill, likely generated from the massive road cut through the landform that 38DR83a sits on, and by digging a massive drain with a backhoe from the southern springhead to the second spring in the woods west of the settlement. The soil survey reveals that Elloree soils have a gray sandy clay loam from 23-51" inches below current surface that has a Munsell color (10YR5/1) (Eppinette 1990: 67), which is extremely close to the gray clay in the moat (10YR4/1). The moat actually borders the edge of the Elloree soils, suggesting that the moat may have also served as a large water catchment that protected the settlement. If thousands of animal skins were to be shipped on the 1st Earl of Shaftesbury's account, I imagine the effort to keep them dry and safe was of the utmost importance, and any modifications to the landscape would have been in order to secure the valuable goods.

Lastly, it can be argued that an embrasure or embankment was present on either side of the moat, and it was this bank that was pushed into the moat that shows the rapid infilling seen in the profiles of our excavations. However, the verification that the brick and clay within the moat itself shows evidence of brick making, and that it occurred most likely close to South Moat, complicates this interpretation. If the bank was on the south/west sides of the moat, the stored brick clay and its building would have been within a few feet of each other, which was highly unlikely. (However, for cannons on this embrasure to shoot at the Ashley River, the bank had to be on the south and west side of the moat.) This also placed the defensive wall on the non-settlement side of the moat, so this theory is not valid. If the embrasure was on the north/east side of the moat, the building storing the clay would have been in the line of fire and on the side of the enemy. In both cases, the association between the clay, brick and moat disprove the theory that there was an embankment on the moat organized into a purposeful cannon battery, regardless of the side or location. The following discussion details the pollen and ethnobotanical remains recovered from various proveniences at the site, as well as the moat. This current discussion will be brought back into consideration concerning the presence of specific plant types found in the moat fill.

Pollen Analysis

Dr. John G. Jones of Archaeological Consulting Services conducted the analysis of 11 soil samples for pollen presence. These samples were collected during the 2013 field school by Andrew Agha and Nicole Isenbarger. Agha and Isenbarger employed strict methods for the collection of the soil samples. All tools used to collect the soil were washed with fresh, sterile water seconds before the soil was removed. Almost all samples were pulled out of profiles of unit walls, 2.5x2.5' foot quad samples for water screening, or feature profiles. Each surface was freshly troweled clean with a washed tool seconds before a cleaned tool cut into that surface. Soil was pulled out rapidly and put into mylar bags. Roughly one measuring cup of soil was collected at Dr. Jones' advice. The extra steps to prepare the surface where the sample was to be taken, and to clean the tools so often, reduces the chances of pollen contamination from the air and environment. The longer the soil is exposed to air, the more likely it is that modern contaminating pollen can enter the sample. While it is not harmful to the historically created pollen, it does raise pollen counts and provides false information for soils that may have limited amounts of pollen. It also creates a lot of "background noise" for the pollen analyst to sort through.

Eight of the 11 samples contained pollen. The other three samples did not reach the desired amount of 200+ pollen grains, which is a standard for interpretative purposes. Forty-one different taxa were identified. Wind pollinated taxons produce enormous amounts of pollen, while insect-pollinated grains are low in number and are scarce, rare or even invisible in the archaeological record. These differences are extremely important in regards to the locations of certain pollen types in relation to certain contexts at 38DR83a.

Plant Types

Pollen from the Apiaceae family represent the possibility of carrots, parsley, caraway and fennel at the settlement. All of these are Old World economic members and may have been grown as part of a kitchen garden for the settlement. Cheno-Am and Amaranthaceae pollen types represent specific types for land management. Members of the Cheno-Am group tend to evidence farmland and cleared areas around settlements, or areas of human disturbance. The plants that produce these kinds of pollen produce mass amounts, the pollen is transported easily by wind, they are very durable and easily recognized even when degraded or deteriorated. They represent Old World domesticates such as beets and spinach. A large amount of pollen was identified from the Fabaceae family, and economic members from this group include several varieties of beans. Because so much was found, Jones interprets a possible economic use.

One of the most important pollen types identified is that of *Fagopyrum*, which is commonly known as buckwheat. Buckwheat is an Old World domesticate grown for its seeds, or groats, that are ground into flour. Buckwheat was grown in East Anglia and southeast counties in England during the seventeenth century (Thirsk 1984: 211, 270, 274-76). In England buckwheat was used as a cover crop and also as something chickens could eat. It also was cover for cattle to graze on, but did not become a food source for humans until the later $18^{th}/19^{th}$ centuries. Because it was at the Lord Ashley site in the 1670s/1680s, Jones suggests that this may be the earliest known occurrence of buckwheat in North America (personal communication, 2013). Much more verification into this theory is needed.

Liliaceae pollens are strictly insect-pollinated and are rarely found in archaeological sediments. At 38DR83a, Old World economic plants from the Lily family are represented, such as *Allium* (onion, garlic, and leek), Asparagus, tulip, Africa lily, hyacinth, and grape hyacinth. Local/Native economic members of this family are camas, wild onion, and yucca. Because they are so scarce, a few grains are enough to indicate economic activities.

The Poaceae and Cerealea families are wind pollinated. Old World grains such as wheat, barley, rye and oats are in the Cerealea family; however, these individual species are usually not identified below the larger family level. *Zea mays* was positively identified in two samples from the site. Because Shaftesbury told Percival to grow wheat, I can suggest that the Cerealea grains found could be from wheat grown on site, although the question of "where" the wheat was grown is up for debate. The current grass fields that are on higher ground towards Highway 61 may have been experimental wheat fields. Since this kind of pollen is abundant and travels far, or could travel back to the settlement with the laborers, it is a possibility that wheat fields sat near to the settlement. The other grains may have also been experimented with and grown nearby.

Other food items are worth mentioning. From the Solanaceae family, there is the possibility of tomato, chili peppers, potato, nightshade, eggplant, and tobacco. One pollen grain of *Vitis* (grapes) was found, and grape growing was well known at Charles Towne (South 2002). Percival's account book lists the credit of "vynes" in January 1677. The word "vynes" was used to represent all kinds of plants, but specifically in Carolina's colonial setting, the word was used to indicate foreign cultivars. Is it coincidence that "vynes" in this case could be grape vines? John Locke was researching grapes and wine making in France from 1675-1679 and it is highly possible that Shaftesbury was prospecting wine production wherever he could, even at his own plantation in America.

Fifteen different tree species were identified through pollen: Chestnut, Hickory, Hazelnut, Beech, Ash, Walnut, Sweet Gum, Tulip Poplar, Wax Myrtle, Black Gum, Pine, Oak, Willow, Bald Cypress, and Cherry/Plum. The *Prunus* family (Cherry/Plum) may be one of the most important and significant pollen types found at the site so far. It was identified in 2011 samples from N950 E855 where the Moat Corner is located. It was also identified in Feature 99 Levels 4 and 5, the transition from sandy loam to the heavy gray mottled clay in Feature 99 (1.9' feet bs), and N1010 E900 Zone 2 (Structure 2). These grains are uncommon in archaeological sediments since they are dispersed only by insects and do not travel far from their trees at all: the grains usually indicate the location of the trees. While some are native to the region, species of cherry, plum, peach, apricot and almond could have been introduced for economic reasons. Shaftesbury was known for breeding apples at his country home at St. Giles in Dorset, but he was very concerned with all things "fruit" as his garden index book lists dozens of plum, pear, fig, cherry, apricot, and other fruits he was collecting and actively growing during the years of Carolina's development (Fleming 2007). He was interested in the best fruits for canning, and went to great lengths to secure the best specimens, getting fruits from Holland and other places in Europe.

Feature/Structure interpretations

The Prunus pollen is very important to my interpretations of the moat. Since it was found in the lower levels of the moat, a few concerns arise. First, we know that these soils were thrown into the moat quickly, and the lack of silting shows that the moat was not open for long at all. Where, then, were these fruit trees growing? Were they lining the edge of a moat designed for defense? Were they growing on the cannon embrasure, or in between platforms for sentries to stand watch on the palisade wall? If these were experimental varieties, and all historical evidence points to them being such, then why risk rare and valuable trees on a defensive moat line? The pollen also seems to have been present before the moat was opened. This raises the possibility that the *Prunus* pollen are of local varieties of native species, like black cherry, Carolina laurel cherry, American plum, flatwood plum, or Chickasaw plum. Jones believes, though, that the significant numbers of this pollen suggests the deliberate cultivation of these kinds of trees, and economic cultivation should trend more strongly with the varieties from Shaftesbury's catalog, not native varieties. We do not even know if these native varieties grew in the upper Ashley River region. This raises the strange theory that this landform was not settled or built-out the way we currently know it through the archaeology we conducted. It is possible that one or more of the structures we have identified, or even those we have not found yet, were here in the 1670s to support experimental crops, and fruit trees were grown in an orchard on this landform. They went to pollen because we recovered it, but if they were either unsuccessful or did not meet the qualities desired for Shaftesbury's economic plans, they may not have been supported or cared for any more. It is possible that development of this locale intensified as the plantation moved forward: changes to St. Giles Kussoe after the Westo War may have instigated a surge of building and development at 38DR83a after 1680/1. The moat was dug and clay was found to create Structure 1 and anything else that required brick. When the moat was dug, *Prunus* pollen already on/in the ground was turned up and then redeposited into the trench. This theory, while elaborate, could provide more evidence for the settlement having a post-1680/1 creation date or evidence an improvement phase for a presence that was already there that served a different, earlier plantation function and purpose.

This pollen was also found at Structure 2, at the transition from the base of Zone 2 to subsoil. We collected the soil from the north profile, purposefully outside of that building. Maybe fruit trees dotted the settlement concurrent with its lifespan? More soil samples need to be collected from areas inside, but especially outside, of the settlement in order to recreate the landscape of the late 17th century.

Besides fruit tree pollen, the lone pollen grain of *Vitis* (grapes) and a grain of pollen from maize came from Feature 99 Level 4. Jones says that the pollen from Level 5 reflects more of a forested environment due to the tree pollen found in it. Likewise, sedge pollen, a plant that favors wetland environments, was identified in Level 5. Jones interprets this as meaning that the moat was open and contained water for a period of time long enough for sedge to grow in the base of the moat. Level 5, however, is not the base of the moat and is actually roughly 2' feet above the base. Also, there was a "wetland" directly south of the moat historically, and the sedge may have been abundant prior to the digging of the moat. Since the fill entered the moat so quickly upon backfilling, is it possible that all of the non-economic plant pollen found its way into the moat because it was present on the surface before the moat was dug? The grape, corn, and fruit tree pollen all come from Levels 4 and 5 as well: do these pollen varieties support an economic use of this landform before the moat was dug, or before brick was needed? Do these pollen types further complicate the date we believe this settlement was founded?

Feature 106, the North Moat sample, produced pollen counts too low for proper interpretation. However, the only occurrences of buckwheat, sumac/poison ivy, cattail, and alder were found here. The poor preservation could be because this part of the moat is very shallow, thus too far above the water table for good pollen preservation.

Feature 108, the dark intact silt below the clay lens south of Feature 99, contained only 75 grains of pollen and was not interpreted. Technically speaking, pollen did not preserve in this soil. Since it is the most intact, undisturbed soil lens at 38DR83a, this area should be explored more in the future and more samples should be collected to further identify pollen. The answers for these questions concerning the moat and date of the settlement could lie within these soils.

Structure 1 had one pollen sample, that of Feature 61. This feature provides evidence for either the fire that destroyed the building here, or fireplace clean-outs. Some Cheno-Am pollen, a maize pollen grain, Liliaceae and Solanaceae families represent cultivated plants, or, native vegetation prior to settlement. Being so close to this building, it is possible that a kitchen garden or something similar was nearby that provided readily available food.

Paleoethnobotanical analysis

Soil samples were collected in 2011 and 2013 for flotation and Paleoethnobotanical (p-bot) analyses. Funding was finally secured during the 2013 field season to process seven samples for preserved botanical remains. Dr. Kandace Hollenbach at the University of Tennessee's Archaeological Research Laboratory (ARL) oversaw the analysis conducted by graduate student Jessie L. Johanson. Their analysis was completed in August 2014.

Five features and two intact zone deposits were analyzed. Features include Feature 10, the pit excavated in 2011 at Potential Structure 3 in the woods next to the pasture; Feature 53, the top of the moat corner discovered inadvertently in 2011, Feature 46 Level 2, the interpreted southeast corner of the cellar under Structure 2 that was excavated in 2013; Feature 61, the burned soil and charcoal/ash deposit near the southeast corner of Structure 1, also excavated in 2013; and, a combined sample from Levels 5 and 6 of Feature 99, the South Moat excavation in 2013. The two zone deposits sampled contain no evidence of plowing or other modern disturbances. These samples come from N1055 E855 Zone 3 that sits on top of Feature 106, the moat as defined at North Moat, and N992.5 E915 Zone 2 that overlies Feature 46. In all cases, 10 liters of soil were collected unless otherwise noted (refer to Appendix A for more details concerning the methods of soil collection, processing, botanical identification and analyses/interpretations).

From these seven samples, 10 unique taxa were identified. Food remains are scarce. The most exciting information gained from these identified taxa is that they align almost perfectly with the pollen analysis and results. The direct correlation between the pollen and p-bot analyses, then, shows evidence for the active cultivation of these identified plants and foods at 38DR83a. It also helps to show that the hard remains found in the p-bot analysis likely come from the plants that were grown on site, whereas if they were not grown on site but brought in by hand, the pollen results may have not correlated so well. Therefore, the p-bot remains identified provide good evidence of what was grown on site in the 17th century.

Nuts

Hickory, Thin Hickory, and Walnut were identified. A total of 28 fragments were identified, with 24 being hickory. Pollen analyses also identified both hickory and Black Walnut. We know that Shaftesbury's orders to Percival were to fell trees for industrial and trade purposes; these nut trees, however, would most likely have not been cut down due to their food potential. Walnut may have been used to create furniture or other household needs, but we have no evidence of such activities thus far. Concerning the pre and post-colonial occupation at 38DR83a, these nut trees might have been present only during the Kussoe presence before Shaftesbury "bought" all Kussoe land, including the 12,000 acre St. Giles Plantation (Agha et al. 2012). If so, it provides economic and foodways information for the pre-European and African residents and improvers of this site.

Fruits

Three grape seed fragments and one sumac seed were identified. Both sumac and grape were identified through pollen (see Appendix B for the pollen analysis report). Again, both of these fruits could have been native and present before colonizers occupied this land, and would align with the nut trees and Kussoe foodways. Shaftesbury's deep interest in all things fruit and fruit preserves, and wine and wine making, suggest that the grape evidence from both pollen and p-bot analyses point to an economic, colonial origin. Percival's account book lists "vynes" in January 1677 and this historical mention paired with two unique botanical analyses helps to support the theory that the colonists at the settlement were growing grapes. Whether the grapes were grown to supplement diet, or for prospects of making wine, is unknown; although, both scenarios are highly plausible. Lastly, no fruit tree evidence was found in the p-bot analysis. It is possible that the trees lived long enough to mature to flower, which would have released the pollen that was found by Jones, but factors may have prevented the flowers from propagating into fruit that would contain seeds.

Crops

The pollen analysis shows more evidence of economic crops than the p-bot study. However, maize was identified through four definitive and two possible corn cupule fragments. These were recovered from the moat (Features 53 and 99) and the cellar (Feature 46). Pollen for maize was also recovered in Features 53, 99, and 106 (all three moat locations), Feature 10 at Potential Structure 3, and outside the footprints of Structures 1 and 2. Since corn is found so readily in the deepest features on site, does this mean that modern activities have disturbed and ruined the preservation for corn in upper zones? Does the recovery of corn through both micro and macro remains help us figure out if the corn was grown before or after colonial intervention?

The cupules, or the part of an ear of corn that holds the kernels to the cob, denote corn refuse. They are evidence of actual ears of corn. Therefore, they can be evidence of colonial corn growing. Shaftesbury instructed Percival to bring "Indian corn" with him to Carolina to eat through the winter while they waited on their crops to mature (I'm assuming for a spring harvest of winter crops). Did Percival and his servants plant the Indian corn? They would have brought dried kernels and not whole cobs. In contrast, do the cupules represent maize grown by the Kussoe Indians who controlled the land before Percival landed there? Since pollen was found in features and zone deposits from the entire site, including areas directly next to Structures 1 and 2, does the pollen represent an "old field" that was maintained by the Kussoe and then settled upon by Percival? The cupules, then, could have been refuse from the Kussoe that was already an archaeological deposit prior to the digging of all of the large features by European orders at the settlement. Just because we have records showing that maize was brought to the New World from England does not mean it actually was loaded on the ship: Percival's purchases as he outfitted the Dogger do not list corn/maize, and we have no proof he brought it.

It is easy, and a fallacy, to attribute the corn to Native Americans who may have been present during the European occupation of this landform. This equates a food source with a culture, and treads a dangerous path laid down by bias. As the botanical evidence stands thus far, it is most likely that the maize is evidencing either pre-settlement colonial corn growing at the site or a Kussoe "old field." Ashley ceramics are also scattered across the site in uniform ways. At Structure 1 there are 24 total sherds, with 17 others occurring in the four units south (excavated in 2011). Structure 2 produced 38 total Ashley sherds, including one unit to the building's southeast (N985 E925). From the moat samples, North Moat produced 33 sherds, the Moat Corner produced none, and South Moat produced six. The three units by the road dug in 2011 and 2013 produced a total of 16 Ashley sherds. The three units in the woods from 2011 produced 40 of these ceramics, and the two unit block in the pasture next to the woods produced nine. The somewhat even scatter of Ashley ceramics and lack of concentrations point not to a mixed colonial use and context during the St. Giles Kussoe period, but fall more in line with the appearance of an "old field" seasonally, thus lightly, occupied while corn grew. Or, the ceramics mark Kussoe Indian presence without contemporary corn crops, and the corn pollen and p-bot remains hint at c.1675-1680 colonial corn crops.

Maize pollen does travel by wind; however, the landform 38DR83a sits on drops into wetlands/boggy soils to the north, west and south quite rapidly. To the east of the settlement is the quarried road cut and beyond it modern fields and pastures. It is possible that maize was grown in these eastern areas and the wind carried it over to the settlement from afar. Current maize pollen locations seem as if the maize was grown within the settlement, between buildings and directly next to activity areas. This was most likely not the case. How did the laborers work with corn in their way? One idea is that this site was first a colonial farm field before the buildings were built, and corn was a crop grown on the high ground. After time passed the land was converted to the settlement; corn pollen could then be all over and in the ground before construction. Another interesting interpretation is that this landform was a Kussoe "old field" and when paired with the even distribution of Ashley series ceramics, this theory is well grounded. Lastly, maize would have probably been at the bottom of the experimental crop list designed by Shaftesbury. He did not tell Percival to grow it, but colonists' reports from 1671-1680 report it was grown frequently. Maize was readily available in Carolina from Native Americans and this author found no records detailing its shipment abroad. Barbados would have benefitted from corn; however, there is absolutely no evidence at all that St. Giles Kussoe was growing food or raising cattle for the Caribbean. All of Shaftesbury's correspondence deals primarily between Carolina/England transactions. Barbados was not listed as a destination for anything produced at this plantation.

The above discussion provides a safe warning for attribution of the watermelon seed that was identified in Feature 10. Watermelon is not always found as the seeds are soft and do not preserve well, especially from early Carolina contexts such as those at 38DR83a. Watermelon was originally cultivated along with many melon varieties in Africa (Blake 1981). It is among the crops believed to have been brought over with enslaved Africans specifically from West Africa (Carney and Rosomoff 2009). While watermelon has been found in 17th century contexts associated with Native Americans along the Mississippi and the northeastern United States (Blake 1981: 194-195), it is not present in similar contexts in South Carolina. It is an "understood" that watermelon, cowpeas (black eyed peas), and peaches were all grown by Natives thanks to Spanish interactions; however, watermelon has not been found alongside cowpeas or peaches on late Mississippian era sites in Carolina.

Therefore, it is safest to attribute the watermelon seed to the 15 enslaved Africans that we know were present within St. Giles Kussoe. Saying that corn/maize may or may not have been attributed to Native Americans is valid considering Shaftesbury knew of corn supplies in England that Percival could collect. But the watermelon? Who would have been most responsible for that? In this case, the enslaved Africans. Why jump to this conclusion so easily? Because in the 17th century, it was most common for enslaved Africans to grow and eat foods most familiar to them. Shaftesbury's own Barbadian plantation in the late 1640s listed several West African crops, such as yams, plantains, and cassava (although originally a South American root crop grown by Native Americans, West Africans had appropriated it by the 1500s and it is still a staple in some African countries today). These were not economic crops: they were subsistence crops grown specifically for laborers' consumption. We found no evidence of other

West African crops. Lastly, the watermelon was found in context with Colonowares that are most commonly attributed to the large number of 18^{th}-19^{th} century slave villages that have been excavated in South Carolina, where those villages housed primarily, if not most of the time exclusively, enslaved Africans and not Native Americans. Feature 10 sat near Potential Structure 2, which is currently being interpreted as a slave cabin that housed West Africans on site.

Does one watermelon seed evidence an economic production of this crop? No. It can provide essential foodways information and evoke discussion concerning the retention of West African foodways in early Carolina. This seed provides critical evidence for some of the earliest known West African foods to have been found archaeologically in South Carolina. More fieldwork at 38DR83a should focus on this research topic thoroughly in the future, as it is highly unique and important to our better understanding of the origins of economic agriculture in the state's history.

Lipid Results

Lastly, the results of the lipid analysis of 11 Colonoware sherds and their complimentary in-situ soils provide an interesting picture of the ways pottery was used on site, and the food types that vessels contained. Dr. Elenora Reber of the University of North Carolina-Wilmington Anthropology department processed the soils and a 4-gram pulverized portion of each sherd for amino acid extraction. Appendix C details the exact methods and processes involved in taking the ceramic through the process to arrive at the kinds of foods that were once present in those vessels. The soil was sent as a control, so that natural processes that could influence the sherd can be negated. For instance, if a rat dug a hole and suddenly died while resting against a sherd, we might see "rat" or "meat" in the sherd, even though the vessel was originally used only for fish and plants. The soil, however, would reveal the "meat" content and would tell Dr. Reber that meat was inherent in the soil and leeched into the sherd after deposition. We also washed our tools with fresh water before removing sherds from the ground, and the soil was usually attached to the sherd. Sherd and soil were placed in acid free paper envelopes and pencil was used to mark the paper. The samples were then in open air to dry thoroughly. No touching of the soil or sherds occurred. Dr. Reber told Nicole Isenbarger and myself—we were the ones who collected nine of the 11 samples—that this series of ceramics was one of the cleanest and least tampered with collections she has worked with in recent years. Human contamination is the biggest problem when dealing with the collection of clean lipid samples from the field.

Five of the 11 sherds analyzed are Danner-like ceramics. Based on the chance collection of rims in the field (we make no attempt to identify what the ceramic is when it is first discovered in situ, nor are we aware that sherds might belong to the same vessel) we believe that each of these five sherds represent five unique vessels. Each of the Danner vessels exhibits slightly different readings of the lipids present. One has plant or fish with some meat present small amount of residue showing low or single time use; one is a mix of plant/fish and meat; one shows primarily meat but contains a mix of plant and fish in smaller quantity; one vessel is primarily meat with some plant; and surprisingly, one vessel shows no lipids at all. There are a few ways to read these results in terms of the people who came to the site and why they were there.

Since we believe the Danner pottery is related to the people after the Westo, then it is most possible that these vessels represent meals prepared during the trip to the site. We have to imagine a sort of "caravan" of Native Americans who travelled around 100 miles to reach the settlement. On their journey, they must have packed pots to cook and eat food along the way. The differences in plant, fish, and meat, and especially the quantities represented in the sherds and the dominant food types over others, may demonstrate the varied environments they traversed. Sometimes they may have had the chance to eat aquatic species, and other times they might have had to rely on upland animals and vegetation for food. They may have packed dry vegetables too.

The other scenario is that these vessels were also used at 38DR83a when the caravan arrived. They may have camped on site and ate food from their own ceramics. Some of these vessels may have broken accidentally and were left for us to find. Or, they left their vessels for the colonists to use. There are many more non-Danner-like vessels on site and there was likely no urgency or need for foreign pottery to supplement a lack of locally made wares.

The other ceramics contain evidence of primarily meat and some plants (n=3), primarily fish or shellfish with some plants (n=1), primarily meat or a mixture of plant/fish and meat (n=1), and a non-interpretable reading that points to no food use at all. Although the exact kind of meat, like chicken or beef, and plants, like tomatoes or beans, cannot safely be identified, these raw differences between meat, plant and fish resources is very exciting because it shows different uses, and reliance, on certain kinds of food stuffs mixing together. Some of the vessels that have mostly meat with some plant do not have fish/shellfish. Was this because of the dominating nature of fish oils in regards to flavoring food? Would cooking fish/shellfish in a vessel permanently alter the taste of non-marine food prepared in that same vessel? If this was the case, this means that some of these Colonowares that are not Danner vessels were selectively used for specific meals with specific, and reliable, tastes and flavors. This differentiation could represent vessels used to prepare meals, cooked by enslaved Africans, for white people on site who desired, or more likely demanded, certain foods, meals and tastes. Or, it could all be related to chance alone. Also interesting is the vessel that appears to have not contained food at all. Was it used just for water, or other non-food purposes? Here, the non-food use allows us to think of the myriad uses of handmade ceramics in West Africa that do not concern the cooking and eating of wet-based foods. Some vessels may have been used to simply store important things that were not used for food but maybe for medicine or the preparation of non-food related, mineral-based concoctions. Another use is personal hygiene and cleansing. These non-food uses of Colonowares in South Carolina are rarely, if ever, evoked in interpretations of vessels found in context with known enslaved African habitations. Further lipid studies at this site and others may unlock functional aspects of Colonoware that have never been figured out, which could further the identification of African versus Indian-influenced ceramics.

A similar study was conducted by Dr. Reber on Colonowares from Dean Hall Plantation in Berkeley County, South Carolina in 2008 (Agha et al. 2012). There, Dr. Reber's analysis revealed that fish/shellfish lipids occurred only in Colonowares that were decorated with incising, rouletting, or punctates. Unfortunately no marked Colonowares similar to Dean Hall have been recovered at 38DR83 a; however, if some are identified in the future, this theory may be tested again through further lipid analyses.

Lastly, this analysis helps to show that the Colonowares were utilized to cook meals in, while some were not. They were all utilized for some needs; otherwise the creators of them would not have gone through the effort to produce these ceramics. Who allowed the potters the chance to make pottery? Was a manager present at 38DR83a everyday labor and living was conducted there? Would management have even prevented the creation of pottery? If pottery was used in the white peoples' hearth to make their food, and it was Colonoware, would they have rejected the food? We tend to think that Colonowares in the presence of white people would have been an alien, unknown, and strange thing. However, white people certainly knew that West Africans made their own pottery since they had been in close contact with the African coastline for over 200 years before the settlement of Charles Towne in Carolina. Why would we ever think that major negotiations and even coercion was required for simple ceramics to be made at plantations, regardless of the time period during colonialism? The ubiquity of Colonoware in Carolina, obviously starting at the inception of the colony as evidenced by not just the Lord Ashley site but the Miller Site at Charles Towne Landing, has to equate the acceptance and possibly even encouragement of its making by the white elites that owned the African potters.

In conclusion, the issue of "who made Colonoware" comes down to human agency. Did enslaved Indians have more agency, hence 'freedom,' to make Colonoware over enslaved Africans? When talking about the ethnicity of the "who" that made Colonoware in Carolina, entitlement and privilege are the entities that are truly being evoked. We tend to think that all Contact-period Native Americans naturally made pottery (Steen 2011). This idea is used to counter that it was Native Americans that were "natural potters" over enslaved Africans, due to southeastern archaeologists' ignorance of African pottery and its production in Africa. This is an issue of agency. Saying that Colonoware was made by Native Americans instead of Africans assigns the natives with a privilege that the slaves did not have. We cannot give privilege to anyone that was not white during the colonial development of Carolina: all non-white people were subjected to domination by Europeans, and all were considered subjects of them. There were no "privileged" people in colonial Carolina except for the white creators of the colony, and even they were held underneath the Lords Proprietors' ultimate power. As anthropologists, we must tread lightly when attributing agency to these subjected peoples. All we can do is know that Native Americans and Africans existed in varying levels and degrees of contact, or, had no contact at all, and that they all had the potential to make pottery because we find it on more sites than not. It should be our first duty to explore function through form to learn why it was made in the first place, and from this, we can better explore the ethnicity debate more clearly.

Conclusions

The Lord Ashley site proves to be one of the most unique archaeological resources ever discovered in South Carolina. If anything the confluence of the historical and archaeological records alone are evidence that neither can be taken at face-value. No site that I know of has been so wrapped up in lore and legend as St. Giles Kussoe. Peter Wood's major work, *Black Majority* (1974), which educated us all about the trials, tribulations and resolutions of enslaved Africans during their first seventy years in Carolina, listed St. Giles Kussoe as a settlement that Shaftesbury "envisioned (but never established)" (29, n.48). While Wood had plenty of references to the successful establishment of St. Giles Kussoe, most from the Shaftesbury Papers that he was citing directly while writing *Black Majority*, Wood apparently felt that the plantation was not a reality. Did his idea for this come from the fact that Locke Island was not settled, and since it was not, then Shaftesbury's plantation did not form anywhere else? Locke Island itself is in ways a mythical sounding place: an island on Carolina's coast named for the famous Enlightenment philosopher whose ideas literally changed the world. Wood's mention that the plantation did not get settled is a great example how the historical information, while in high amount, can lead to confusion about St. Giles Kussoe, even when written about by one of South Carolina's foremost historians.

Likewise, the archaeological record provides a major conundrum involving perceived functions of buildings, features and artifact concentrations. This author looked at all of the buildings discovered and attempted to fit Andrew Percival and Henry Woodward within them, speculating that some of the artifacts we recovered were held and worn by these elites. In reality we do not even know if either of these two illustrious Englishmen ever spent serious time at the Lord Ashley site. The silver items discovered at Structure 1 could be pinned on Percival; however, it is also possible that the enslaved Africans that were most likely working and living at this settlement salvaged the silver objects from other contexts for unknown uses. The bits of fine ceramics might have also been collected from the ground for other uses and functions by the enslaved and not represent actual dining practices at all. "Out-of-place" ceramics in the past used to be called "hand-me-downs" that were given to enslaved Africans by their owners. However, recent work has challenged this long held notion by showing that slaves had buying power and agency in their ceramic choices, uses and collections (Agha et al. 2012). Because we know that Percival and Woodward were living and working within St. Giles Kussoe, we leapt at the idea that the finest of fine artifacts recovered must have belonged to these men—a leap that should have been checked before the jump.

We immediately referred to the glass beads as evidence of Indian trade, yet West Africans had a longer history of their use than the Natives in Carolina, even predating the Spanish marches through the southeast. We also immediately believed that the giant ditch found first inadvertently in 2011, and then tested vigorously in 2013 with aid from geophysical survey, was the moat described by two runaway indentures in 1679. The excitement of the knowledge that we were working at a settlement within Shaftesbury's 12,000 acres helped us to solidify the "fact" of the historical records' mention of the moat without a critical read of the history: a site inside of the plantation boundaries that has a moat has to be the moat described in 1679. Jumping to conclusions like this is not the normal theoretical or methodological process inherent to historical archaeology. Historical records are meant to be scrutinized and not seen as the truth—otherwise, there is no need to excavate if the texts confirm the past. We know that there were almost 600 head of cattle within St. Giles Kussoe from the text but quantities of cow bones reflective of this herd size have not been found archaeologically. Is this the result of soil conditions that do not promote bone preservation below ground, or because the Lord Ashley site was a particular settlement that did not process/slaughter cattle? Just because we did not find a lot of faunal evidence of this cattle herd at the site does not disprove the existence of the herd. What if there were six other settlements scattered throughout the 12,000 acre plantation landscape and a moat was needed at each of them? If there was no moat present at the Lord Ashley site, would we have dispelled the idea that this settlement was associated with St. Giles Kussoe? I can easily say that the historical record is false because we find almost little evidence of cattle archaeologically, and also easily say that the historical record is true because we found a moat that is referenced in the texts. Historical archaeology should never be the “hand maiden to history” as Ivor Noel Hume expected it to be, and finding a moat and saying it was “the” moat described in 1679 is not how the science of archaeology is supposed to work.

After almost 50 years of historical archaeology in South Carolina, we have looked at sites where the planter/owner of the settlement was unknown until artifacts helped to provide dates that pointed that person out and identified them. The Lord Ashley site could be a non-descript seventeenth century settlement that we might have never been able to ascribe a name to; yet, the available historical records allowed us to quickly say that 38DR83a really was associated with St. Giles Kussoe, just as Stanley South and Mo Hartley were able to do in the early 1980s. With enough dateable material, and some specific artifacts, attributing a site to a past name is an important and helpful task. But attributing a feature or artifact set to a specific function or, worse, a specific ethnicity, is not what historical archaeology is supposed to be all about. Historical archaeology finds the nuances of daily life that were never written down. If you find specific buttons that could only belong to a certain kind of coat, and that coat was listed in an inventory of the place you are working at, then our discipline allows you to ask the important question of ‘what other kinds of clothing am I finding, or not finding, in contrast to this coat?’ When a discovery is made in the field and it links to historic texts it is not the end of our work and research. Instead, everything else present is scrutinized and thought about with more intensity. If not, then how are we supposed to find the residue of daily life, especially of people whose lives were not recorded on paper if all we do is corroborate historic texts with our findings? As I wrote in Chapter 2, the archaeology of the moat shows no clear-cut function or purpose for the feature and I am left with several options for its origin and use. We can only interpret and suggest—never provide a fact or a truth in archaeology—regardless of how many historical texts we have at our disposal.

Now that two buildings have been outlined, with a third still tenuous, the site function can be more properly addressed. As this report demonstrates, the idea that the Lord Ashley site was the only habitation and place of plantation labor and activity should be rejected, with multiple settlements dotting the 12,000-acre landscape a more likely past reality. By taking a multiple-settlement approach to the study of St. Giles Kussoe, the Lord Ashley site becomes a place where site function can be better addressed. One, a few, or all plantation activities might have occurred at the site in the past, or site use changed once or multiple times during the course of the almost 10-year tenure of the property. Forcing everything known into this small settlement makes for an overly robust interpretative exercise in site function. Both buildings contain nice tablewares and almost even numbers of everything else found. Was one of these structures a manager's residence? This author cannot currently make this determination. Fine Venetian glass was found only at Structure 2—a Cratchet house—and not at Structure 1—a house with brick foundations. Likewise, silver implements for clothing were found at Structure 1 and not at Structure 2. Is the Lord Ashley site, then, the site that will crush all previous assumptions of what a "frontier site" is supposed to look like? Does this site have the ability to force us to question what permanent and impermanent architecture really meant to the colonists in the 1670s and 1680s? Did permanent architecture serve purely functional roles and needs? Can we look at architecture as something that denotes past social affluence and positioning? Should we look at brick architecture as a marker for a white person—elite, manager, planter, etc.—on frontier sites, or as something related to the needs of the building and what its function was supposed to be? These questions cannot be answered at the Lord Ashley site, but instead provide a basis of scrutiny for all other seventeenth century sites and their architecture.

Research Questions Reassessed

In 2011 there were four research themes that guided our work at the site: Culture Contact, Defense, Architecture, and Trade and Commerce. Based on findings in 2011, Agriculture was added as a theme to be addressed in 2013. Now that the 2013 field season has provided us with more data, these five question sets need reassessment.

Culture Contact

As stated in the Introduction, historic texts do not say that Native Americans were enslaved within St. Giles Kussoe. Linking Henry Woodward's strongly rumored[1] Indian slave trading to his operations at St. Giles Kussoe is circumstantial. Documents do provide ample evidence of enslaved Africans at this plantation: a debit of £308 for "negroes" in January 1677/8 and an accounting of 15 Africans present at St. Giles Kussoe in August 1681. Marcoux's research into the Danner-like pottery identified at the Lord Ashley site has shown strong links between the same kind of pottery found at seventeenth century sites near modern Augusta, Georgia. Once the Westo War ended by 1681, new Native Americans moved into the Westo's home area described by Woodward in 1675: the Danner-like pottery may be associated with the Indians who traded with Percival after the Westo were weakened.

It is unknown if the Westo ever interacted with the Lord Ashley site. We do not have the ability to date artifacts within 5-year time periods, or less, for this part of the seventeenth century. 38DR83a may have been settled in the spring of 1675, or as a result of the end of Westo trade in 1681. It may have even been built after the First Earl died in 1683. The Indians that moved into the area of the Savannah River after the Westo's fall from power do appear to have interacted/traded with those at the Lord Ashley site due to the presence of the Danner-like

[1] This author investigated many 17th century primary sources and all pertinent secondary sources for clear, tangible evidence of Woodward's Indian slave trading and found no accounting/economic information or transactions from his time in Carolina. Historians assert he was an Indian slave trader; however, no tangible evidence has ever been found or cited.

pottery. The glass beads may also be aligned with said trade. Contact between the trading Indians and their Anglo agents and partners likely occurred because of the trading of economic goods. Trading Indians may have spent small or large periods of time at the settlement while they unloaded their skins; artifacts found might correlate with their presence. Contact between the Indians and the enslaved Africans may not have occurred because there was nothing to gain or lose from such interactions. Were there even indentured servants left at St. Giles in 1681? When did their tenure end? Culture Contact is still and always will be a viable avenue of inquiry, but until the material culture is able to provide more information about these interactions, especially the Colonowares present in great quantities on site, the levels of face-to-face relationships will be elusive.

Defense

The majority of the lead shot found at the site was used for hunting. The lead sprue waste that has been found is evidence of making hunting-sized shot and not 60-calibur balls designed for killing people. The moat's function and purpose is a mystery but may have had more to do with water control and clay quarrying than being a defensive position and embrasure on which cannons were mounted. There is the possibility that a blockhouse was erected at the settlement to provide a muster point and defense against any attack. The Spanish spy Camunas infiltrated Charles Towne in 1671 and described the blockhouse he saw there at the town's fort (South 2002). These buildings were generally 10x10' foot foundations that supported a structure over 10 feet in the air that was almost double the size of the base. Once people were inside and upstairs, the ladder could be pulled up and a trap door closed, securing everyone safely in the large loft room. Small windows on the second story provided portals for gunfire to hit attackers. Trap doors under the eave of the second story could also allow those inside the blockhouse to shoot at people trying to approach the bottom floor. This building may not have had a foundation that penetrated the ground, as Noel Hume described stacked logs that sat on the ground as being the foundation style known from Virginia examples in the seventeenth century (1997). If there was more than one settlement within St. Giles Kussoe's 12,000 acres then was there a blockhouse at each one? It is possible that through further testing of the site such a structure could be found.

In the previous report (Agha et al. 2012) much liberty was given in advancing Shaftesbury as the mind behind the military and defenses of the colony. After more research and consulting with seventeenth century historians and experts since the time of that publication, Shaftesbury was almost certainly not the brain behind the defenses. It is true he was in command of many troops at various stages of his past in England, and that his experimental crop plantation next to Charles Towne contained the "star fort" where governor Joseph West once lived. The small ship the Edisto was outfitted with four cannons just as many other doggers were once Dutch vessels were appropriated for trading purposes by the English. We also know that either those four guns or others were present at St. Giles Kussoe in August 1681 based on Thomas Stringer's account. However we do not know where in the 12,000 acres the cannons or fort were located. We assume that a manor suitable for Shaftesbury was built at St. Giles Kussoe in case the Earl wanted to flee England at a moment's notice to exile in Carolina. Nothing in the historical records state that such a structure was ever a reality or even an idea. I assume that if such a manor was built, it should be safe within the fort. I do not believe that the brick cellar that was destroyed during the construction of the road that traverses the landform the site is on was of the scale of a manor house, or was substantial. It may have been 10x10' feet or slightly bigger. South and Hartley did not mention lots of bricks or rubble during their original identification of 38DR83a, and consistent inspection of the steep walls of the road cut reveal no artifacts since 2009. Two small cannonballs have been found on site; however, their presence does not confirm that cannons were present at the settlement in the past. Much more work needs to be done on the moat, preferably the soils south of the feature that were encountered at the very end of the 2013 season (Feature 108), and at the corner. If the corner is shaped like a bastion it may evidence a defensive purpose for the ditch. Investigations into the differing depths of the moat should also be a priority so that the GPR readings can be verified.

Architecture

Although there are no other known examples, Structure 2 appears to be a Cratchet style house based on descriptions of archaeological examples from Virginia (Carson et al. 1981). This author witnessed the construction of a Cratchet at Charles Towne Landing State Historic Site in 2015 and the posthole locations, depths, and production of a shallow scratched-out trench for the puncheons placed between the posts mirrors the archaeological features found in 2011 and 2013 at the Lord Ashley site. Several “wall trenches” have been found but when excavated the things that look like posts have no depth at all and we decide that they were not posts. I now believe that they indeed are postholes they just defy our standard expectations based on decades of field examples from numerous sites. The next time investigations at Structure 2 are attempted knowledge of Cratchet construction techniques and the subsequent features that they produce needs to be kept in mind so that the wall trenches and posts that have been found, and will be found at this building, can be studied properly. Again, the Lord Ashley site has been looked at as a common frontier site in Carolina with expectations based on sites seen since the 1970s—this mentality must change since no one in Carolina during the 1670s had any idea what a settlement should look like or what it should be comprised of.

Also, Structure 1 might be larger than currently known. Based on archaeology up to this point it is a 15x15’ foot foundation. However, ambiguity in the features at its southeast corner, and other features in units to the south, may point to a larger building. Was Structure 1 one of the lodges Shaftesbury instructed Percival to build for him and the servants? Or, was it a later building after viable brick clay was discovered? Both Structures 1 and 2 are deserving of more work; however, a comprehensive plan needs to be in place before any more excavation does occur, as almost 50% of each building has already been exposed and thus removed. Some of each of these buildings needs to be preserved forever. Lastly, the cellar at Structure 2 has only seen excavation of its southeast corner. A cut through the entire feature should be performed in order to learn of its function in relation to its building.

Trade and Commerce

This theme relates almost solely to Indian trade based on material culture present at the site. There are payments to people in Percival’s account book up to 1680, as well as a sale of cattle and shipments of skins abroad. Can evidence of these sales and skins be found in the archaeological record? So far only glass beads have been found that suggest Indian trade occurred at this site. In 2011 a slate fragment that appears to have tally marks on it was found at Structure 1. Was this used for accounting for trade, or were the counts for things not related at all? Shaftesbury’s primary goal was for Carolina settlers to be planters and nothing else. Only he and his colleague Lords Proprietor Sir Peter Colleton were involved in wide scale Indian trade beginning after 1677, and even then returns in the account books show almost no profits were made (Fagg 1970). Indian trade is in important component of our overall understanding of this site and its impact and influence on all seventeenth century history and archaeology in Carolina. But in the grand scheme of St. Giles Kussoe it may have only been something for Shaftesbury to dabble in as a way to placate the Native Americans and attach them to the mercantile economic system he was a large part of. Finally it is well worth looking at similar trade negotiations and expenditures/profits in West Africa. There the English were not just trading slaves. They were interested in many more goods than human chattel in the seventeenth century, and a lot of the same kinds of things that were given to the Natives in Carolina were given to the chiefs that ran the slave trade in West Africa. Using West African trade as a comparative example may catapult current research into Indian trade in Carolina and other parts of the southeast. We have only been thinking of English trade with Native Americans as something that was new and unique to the English, but it was based in a system that was quite old: colonizers trading with indigenous people.

Agriculture/Husbandry

Since Shaftesbury's goals for Carolina were husbandry in first agriculture and later cattle, this research topic has the most far reaching influence and effect on seventeenth century studies in the colony. Fifty years after St. Giles Kussoe was gone rice was already the primary and most profitable cash crop for Carolina, and rice was also the staple that made the colony so influential among all 13 colonies in the eighteenth century. Because of this fact, agriculture should be the primary focus of research at St. Giles Kussoe. The historic records show numerous examples of Shaftesbury trying to plant in many colonies: Barbados, Bermuda, the Bahamas, and Carolina. He talked with people in Jamaica about what they grew and sent letter after letter to Carolina about planting efforts. Besides plants he wanted cattle to be a major staple as well, but did not believe that the failing "planters" in early Carolina were capable of being graziers (Colonial Entry Book, Vol. 20, pp. 93-95). He wanted 300 to 400 head of cattle on St. Giles Kussoe grounds as soon as Percival was able to get them. This shows that agriculture was not the only avenue of experimentation Shaftesbury was interested in for his Carolina plantation. The standard acreage required for a dairy cow is between two to five acres, but based on current husbandry in the southeast, less than five acres appears to be achievable for a cow/calf pair that grazes (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1097070.pdf). When looking at Shaftesbury's 600 head herd, each individual would have had 20 acres a piece if the entire 12,000 acres was pasture. Even if we split this in half and say that 6,000 acres was uplands and foraging grounds for cattle, each cow would have had 10 acres to itself. This would leave room for crops and orchards. When pairing this information with the bull to heifer ratio, which more than fits the needs for a breeding operation (Agha et al. 2012), then both land and bulls were in excess at St. Giles Kussoe. Shaftesbury died possibly before he had a chance to capitalize on the plantation's husbandry. No crops were listed as profitable based on their absence in the known account books; the only plant-based exports were barrels. The newly expanded botanical profile for the site shows a diversity that is robust for this time period and hints at experimentation. More studies of the paleoethnobotanical record is warranted.

Final Thoughts

When thinking of the settlement we excavate at St. Giles Kussoe, we should not look at it like something we have seen in excavations before. The architecture and other elements of the site may look similar to known examples of the last 40+ years of studies in the field. But the people who built the plantation had never attempted anything similar in Carolina before, since all but Woodward were seeing the colony for the very first time. We also cannot look at the material culture with expectations defined by the standardization of the idea “pioneering.” We cannot assume that the people at the settlement were “roughing it” or “struggling” to maintain life every day. Some of them may have found it easy while others extremely challenging. Some crops may have been successful with no effort while others may have failed for years. This site should instead be looked at with completely fresh eyes, as if we have never seen a seventeenth century settlement before. Ideas and set plans may have crossed the Atlantic intact but implementation of those plans might have failed within hours of their attempt. The people in control of the labor, and the laborers, were all hoping for the best and tried to make things work every day. Things must have worked; otherwise Shaftesbury would not have spent money on the plantation for almost nine years. Frontier sites archaeology has more to gain from this site than the site has to gain from known frontier patterns and site examples. Likewise, plantation archaeology has more to gain from St. Giles Kussoe and its settlements. Future work will force us to revise our current understanding of not only seventeenth century settlements but the way plantations evolved as the eighteenth century stormed forward to the dawn of America’s freedom.

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Appendix A: Paleoethnobotanical Report.

PLANT REMAINS FROM 38DR83A, THE LORD ASHLEY SITE, ST. GILES KUSSOE PLANTATION, DORCHESTER COUNTY, SOUTH CAROLINA

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INTRODUCTION

Site 38DR83a is located along the south bank of the Ashley River, approximately 30 miles northwest of present-day Charleston, in Dorchester County, South Carolina. The site lies on a low-lying grassy ridge (approximately 10 ft above sea level), just above a wide swamp that separates it and the Ashley River approximately 600 meters to the north. The site is the location of the colonial-era plantation of Lord Anthony Ashley Cooper, a prominent statesman of frontier South Carolina. The fortified plantation, active between 1675-1685, also served as a trading post with the Kussoe Indians.

The Ashley Plantation is located in the Sea Islands/Coastal Marsh region of South Carolina, which is characterized by the richness of its natural resources, including fertile soils, a moderate climate, and an abundance of aquatic resources. These attributes, along with the transportation capabilities provided by the nearby waterway, were likely reasons for the selection of the location for the site of the Ashley Plantation, as well as for the Kussoe Indian settlement that preceded it. The vegetation of the Sea Islands/Coastal Marsh region is characterized by marshes with cordgrass, saltgrass, and rushes; swamp forests of tupelo, red maple, sweetgum, and bald cypress; maritime evergreen forests of live oak, red cedar, slash pine, and cabbage palmetto; and dunes stabilized by sea oats, bitter panic grass, cordgrass, and beach grass (Griffith et al. 2002).

Following Brockington and Associates' successful effort to further clarify the boundaries of the historical St. Giles Kussoe plantation in 2009 (Agha and Phillips 2010), a joint effort was undertaken by the Charleston Museum and the College of Charleston in 2011 to achieve a better understanding of the 12,000-acre plantation's composition. Since then, Andrew Agha has directed several field schools at the site, uncovering evidence of the daily activities of its inhabitants, the degree of culture contact at the site, its role as a defensive post, the architectural makeup of the site, and the magnitude of its trade and commercial activities (Agha 2012; Andrew Agha, personal communication 2014).

The St. Giles Kussoe plantation is an important site in American history. In addition to serving as the cornerstone of Lord Ashley's economic enterprise in colonial America, this *place* is where his idea of a plantation was materialized. Lord Ashley's plantation was designed primarily as an economic venture that depended on the success of his exploits in experimental agriculture and trade (Agha 2012). As no records exist to detail the exact nature of his agricultural pursuits, the plant remains from this site are one avenue to evaluate his trials and successes in tropical agriculture in South Carolina. The Ashley plantation was an experimental social venture as well. The result of his economic undertaking was the forced cultural contact between both free and indentured EuroAmericans, enslaved Africans, and Native American peoples. As such, the plant remains from this site have the potential to emphasize the ways in which the diverse groups of people at the plantation engaged with one another to create new forms of foodway traditions, as well as to how they used plants to maintain their own nutritional, social, and emotional well-being (see Mrozowski et al. 2008).

This report details the analysis of plant remains recovered from seven floatation samples collected from five features and one distinct zone from a test unit at the site (Table 1). All of the floatation samples derive from the approximate single decade occupation of the St. Giles Kussoe plantation that spans roughly from the plantation's inception in 1675 to

Table 1. Floatation Samples Analyzed from 38DR83a (all weights are given in grams).

FS#	Unit	Fea.	Zone	Level	Sample Weight	Contaminant Weight	Residue Weight	Shell Weight	Bone Count	Bone Weight	Ceramic Count	Ceramic Weight	Plant Weight	Wood Weight
1		10	E ½		129.98	7.35	99.62		64	0.94			21.16	20.42
88		53			141.26	21.60	118.06		6	0.02			1.08	1.02
162	N1055 E855		3		109.14	9.41	91.08		1	0.00			7.33	6.90
183	N990 E970	61		2	104.32	16.03	85.03	0.08	82	0.78	3	0.00	1.90	1.52
200	N992.5 E915	46	2		94.02	11.51	75.00		4	0.00			7.43	7.14
214		46		2	146.69	17.63	116.85		34	0.26			11.95	10.75
240a	N910 E940	99		5,6	153.14	20.90	124.65		34	0.28			7.25	6.64

its termination in 1685. All of the floatation samples were recovered during the summer of 2013's Archaeological Field School excavation. The analysis of preserved plant remains is one avenue of research into a group's foodways – the procurement, production, preparation, consumption, display, storage, and discard of food. These practices vary by economic, social, and political situation, and thus provide information about the cultural traditions of a group (Johannessen 1993).

The samples collected from 38DR83a derive from distinct areas of the site, and thus have the potential to help define where sets of activities were conducted at the site and who was potentially performing these activities. Three of the floatation samples are associated with the defensive moat (Feature 99, Feature 53, and Zone 3 of Test Unit N1055 E885). One floatation sample is associated with a likely domestic structure (Feature 61). Two floatation samples derive from above and within a cellar (Feature 46). The final floatation sample is from Feature 10, a unique pit feature whose function is unknown. Located outside of the defensive structures of the plantation, this feature's location and contents generate intriguing questions concerning its manufacture and use.

METHODOLOGY

The floatation samples were processed by Andrew Agha using a Flote-tech machine fitted with a 1-mm mesh to capture the heavy fraction. Sheer material was used to catch the light fraction (Andrew Agha, personal communication 2014). Both the light and heavy fractions were sent to the Archaeological Research Laboratory (ARL) at the University of Tennessee-Knoxville for analysis.

The samples were analyzed using standard paleoethnobotanical procedures (Pearsall 2000). Once weighed, both the light and heavy fractions were sifted in nested geological sieves. Carbonized plant remains were sorted out of the materials greater than 2.00 mm in size and were identified to the lowest possible taxonomic level. Materials less than 2.00 mm in size were scanned for seeds. In addition, the samples were scanned for acorn remains, which if found, were pulled from the 1.40-mm sieve in order to mitigate biases against its preservation. All materials were then counted and weighed. Identifications were made with reference to Martin and Barkley's (1961) *Seed Identification Manual* and the PLANTS database (U.S. Department of Agriculture – Natural Resources Conservation Service 2014), as well as modern comparative specimens housed at the ARL.

In general, uncarbonized plant remains are relatively rare from archaeological sites, even from relatively recent historic contexts (Reitz and Scarry 1985:10). Uncarbonized plant materials are assumed to be modern contaminants that reflect the present-day local habitat. As such, the plant remains discussed here are carbonized unless otherwise noted.

RESULTS

In addition to 54.39 g of carbonized wood, ten plant taxa were recovered from the seven floatation samples, which yielded a total of 58.10 g of plant remains (Table 2). Food taxa, including nuts, fruits, and crops, were recovered in relatively low numbers. Several miscellaneous taxa, such as pine cone and limited weedy seeds, were also found in the samples. The taxa recovered give an impression of the landscape of the St. Giles Kussoe plantation, as well as a limited picture of the plant taxa (local and exotic) that inhabitants at the plantation were using.

Table 2. Plant Taxa Recovered from 38DR83a.

Category: Common Name	Taxonomic Name	Seasonality	Count	Weight (g)
Nuts:	*Carya* sp.			
Hickory		fall	24	0.11
Thin hickory	*Carya* sp.	fall	1	0.00
Walnut family **Fruits:**	Juglandaceae	fall	3	0.00
Grape	*Vitis* sp.	summer	3	0.00
Sumac	*Rhus* sp.	fall	1	0.02
Crops:				
Corn cupule	*Zea mays*	late summer/fall	4	0.00
Corn cupule cf.	*Zea mays* cf.	late summer/fall	2	0.02
Watermelon	*Citrullus vulgaris*	summer	1	0.01
Miscellaneous:				
Bark			37	0.46
Bark, part carbonized			122	0.72
Black gum	*Nyssa sylvatica*		2	0.07
Bud			33	0.07
Bur			2	0.00
Gall			2	0.00
Knotweed	*Polygonum* sp.		6	0.00
Pine cone	*Pinus* sp.		21	0.08
Pine cone cf.	*Pinus* sp. cf.		1	0.00
Pine seed	*Pinus* sp.		1	0.02
Pitch			151	1.04
Receptacle			2	0.00
Stem			1	0.00
Unidentifiable			169	1.09
Unidentifiable seed			19	0.00

NUTS

Nuts are relatively scarce in the site assemblage. A total of 28 nut fragments were identified from the floatation samples, of which 24 were hickory. One fragment of thin hickory and one fragment belonging to the walnut family were recovered. A variety of mast resources including hickory nuts mature in the fall (Radford et al. 1964). These resources would have been collected during this season but may have been stored for later use. Rather than felling these trees to make space for fields, hickory and black walnut trees were protected, if not encouraged, by people working on southern farms. Their nuts provided some variety to the autumn and winter diet (Hilliard 1972:89).

FRUITS

Similar to nuts, fruit taxa were recovered in relatively low numbers. These include three grape seed fragments and one sumac seed. While the grape may be a wild variety, these fragments hint at Lord Ashley's interest in the agricultural production of grapes for vineyards (Agha 2012:106). However, grapes and likely other berries would have also added flavor and variety to the site occupants' diets, as well as important vitamins and minerals such as vitamin C. These kinds of nutritional supplementations, grown in either garden plots or gathered, would have been very important additions to slaves' diets; these additions would have given them a way to improve a potentially poor diet that was a common condition of slavery (Carney and Rosomoff 2009:64). Fruits can be used in a variety of recipes. For example, blackberries and raspberries can be eaten fresh, or used to make pies, jellies, and jams, and drinks including cordials and wines. The young shoots can be eaten as greens, while the leaves can be used to make tea (Angier 1974:182; Fernald 1943:236; Medsger 1972:23; Peterson 1977:184). The enslaved Africans at the St. Giles Kussoe plantation (particularly enslaved women) would have likely added many of these local fruits into a suite of new cooking traditions to meet their taste preferences and dietary needs. Grape vines prefer wooded or edge situations, while sumac is a temperate to subtropical shrub that prefers forest undergrowth habitat or disturbed settings (Radford et al. 1964; Scarry 2003:68). Other fruiting shrubs, such as blackberries and raspberries, primarily prefer open and disturbed settings such as fence rows and abandoned fields (Radford et al. 1964). These various shrubs and grape vines likely would have been encouraged by the occupants of the site. Although grape and sumac were the only two wild fruit taxa were recovered from the floatation samples, it is likely that a variety of fruit trees were planted at St. Giles Kussoe due to Lord Ashley's previous endeavors in the planting of orchards and experimental fruit trees, including apples and plums at previous estates (Agha 2012:106). The absence of these fruits in the samples is perhaps a result of the relatively short occupation of the plantation, or a product of the types of features sampled and the limited sample size.

CROPS

The only crop taxa represented in the samples are corn and watermelon. The low recovery of crops is likely a product of the types of features analyzed and the relatively small sample size. Lord Ashley conveyed his interest in agricultural crops at St. Giles Kussoe in a letter outlining the variety of crops he wished to have grown immediately for early provisions, including English grains, Irish potatoes, Indian corn, and tropical cultivars (Agha 2012:20). Although his active involvement in trading with Native Americans funded the plantation and offset his debts (Agha

2012:31), he undoubtedly had a variety of cash crops and experimental cultivars at the St. Giles Kussoe plantation.

Four definitive and two possible corn cupules were recovered from both the cellar and the moat (Features 53, 99, and 46). The corn remains reflect the importance of corn to historic Southern households. Southerners relied heavily on corn for the majority of their grain needs (Hilliard 1972). Indeed, the everyday bread in most households, of both EuroAmericans and slaves, was cornbread; wheat flour was used only occasionally (Hilliard 1972:48, 50). Corn may have been a familiar economic crop and cooking ingredient for all of the groups present at the plantation: the EuroAmerican planters, the Native American traders or slaves, and the enslaved Africans. Its introduction into western Africa by the early sixteenth century meant that many first generation slaves in America had some familiarity with the plant (Carney and Rosomoff 2009:55).

No records of crop yields exist for St. Giles Kussoe; however, agriculture and plant husbandry were a noted priority for Lord Ashley (Agha 2012:106), as his personal prosperity depended on their success. It is worth mentioning that no rice was found in the samples. Rice is well suited to the inland and tidal swamps and floodplains along coastal South Carolina. Extensive slave labor was used to clear fields, carve drainage ditches, and build embankments and floodgates, as well as maintain this infrastructure, through which the tides would flood and drain the fields (Carney 2009; Fields-Black 2008:179; Proctor 2004). For each fieldworker, approximately five acres of swampland was converted into rice fields, and up to ten acres of higher land was cleared for provisions (Edelson 2009:117). Additional slave labor was required to sow the rice in March or April, weed the fields, and harvest the ripened grains in August or September (Hilliard 1972; Proctor 2004). These practices would not have been novel to many slaves from West Africa, where indigenous farmers adapted rice agriculture to upland, inland swamp, and tidal settings (Carney 2009:85). Indeed, African slaves introduced agricultural technologies to plantations along the South Carolina and Georgia coasts that created and improved rice fields in the region (Carney 2009).

Within the coastal area of South Carolina and Georgia, rice was an important cash crop. Low-grade rice was issued to slaves as rations, but higher quality grains were sold. Both Euro-Americans and slaves in the rice-growing areas ate considerable quantities of rice, even largely replacing corn as a mealtime staple on some plantations (Hilliard 1972:169).

Perhaps most intriguing of the plant identifications from the St. Giles Kussoe plantation floatation samples is the recovery of one watermelon seed. Identified from the Feature 10 plant assemblage, the recovery of this seed along with the associated suite of notable artifacts from this pit feature hint at its possible slave origins. Originating in the dry African savanna, this cucurbit crop was used for both its edible seeds and fruit (Carney and Rosomoff 2009:22). Watermelon was quickly adopted into plantation economies. For example, it was noted that in Barbados, watermelon along with a suite of other African crops were being cultivated successfully only twenty years into the farming system of one early plantation (Carney and Rosomoff 2009:106). Enslaved Africans and their Euro-American counterparts often depended on the enslaved Africans' critical knowledge of tropical cultivars, as well as their farming expertise.

MISCELLANEOUS TAXA

The miscellaneous plant remains recovered from the site provide a general indication of the local habitat. The presence of pine cone scales and pine seeds is not surprising given the predominance of pines in Coastal Plain forests. The black gum seed is also suggestive of local tree species. This tart, fleshy fruit was also gathered and consumed by Native Americans (Scarry 2003:55), so it is possible that this taxon was utilized as food.

Two weedy seed taxa were recovered from the floatation samples. Six knotweed seeds were recovered from Feature 99, which is comprised of moat fill. Two fragments of bur (likely cocklebur, *Xanthium* sp.) were found in the sample from Test Unit N1055 E885, also representing moat fill. Both weedy seeds likely represent the disturbed habitat of the plantation grounds and probably found their way into the moat fill by natural agents (i.e. wind or water).

COMPARISON BY CONTEXT

The number of sampled contexts is relatively small, but there are some interesting differences between the features that hint at both the range of activities conducted at multiple areas across the site, as well as the people who may have performed these activities. Several floatation samples derive from both above and within the moat fill (Features 99, 53, and Zone 3 of Test Unit N1055 E885). All three contexts contain plant taxa that almost certainly represent the general activities conducted at the site and the local environment. Feature 99 was the most diverse of the three samples with six identifiable plant taxa, including hickory, sumac, black gum, grape, and corn. The plants suggest that the inhabitants were utilizing some local trees and shrubs such as hickory, sumac, and black gum for nuts or fleshy fruits. As noted above, the presence of burs and knotweed indicate, not surprisingly, that the plantation grounds were disturbed by anthropogenic impacts. These impacts would have included tree clearance by burning and felling to create open habitats. The recovery of a felling axe on site further provides evidence that tree clearing was a laborious and consistent activity performed on the plantation grounds (Agha 2012:87). One definitive and one possible corn cupule found in the moat fill likely reflect the agricultural production of corn at the plantation.

Features 46 and 61 represent the domestic activities conducted at the site. Feature 61 is located just adjacent to a domestic structure and was speculated to be the remains of fireplace cleanings. As all cooking was done in the interiors of dwellings at this time (Andrew Agha, personal communication 2012), the plant remains in this feature potentially represent the remains of meals. However, plant recovery from this feature is minimal. Only 1.90 g of plant remains were recovered, of which 1.52 g is wood. The only economic plant remains recovered were four fragments of hickory nutshell. The relatively limited amount of wood and other plant taxa may suggest that much of the plant material burned in the fireplace combusted completely or turned to ash, or perhaps that this feature is instead related to the burning of the building upon its destruction.

Feature 46 is also related to a domestic structure. Two floatation samples were recovered from this feature; FS #214 represents a sealed context, while FS #200 may be mixed with the upper soil matrix. Believed to be the remains of a cellar, FS #214 contained one of the more dense (plant weight of 11.95 g) and diverse plant assemblages recovered from the site. Directly related to its function as a storage facility, several wild and crop taxa were recovered including one fragment of thin hickory, one grape fragment, and three corn cupules (see Appendix).
FS #200 did not have the same amount of diversity as that found in the sealed cellar context. Eight fragments of nutshell were recovered, including five hickory nutshells and three only

identifiable to the walnut family that may be either hickory or black walnut. The remainder of the plant taxa were representative of the local environment and include buds, bark, and pine cone.

Taken in concert with the artifacts recovered and its location outside of the defensive palisade and moat, the plant remains from Feature 10 are perhaps the most intriguing. The column sample from the east portion of Feature 10 had the greatest density of plant material (21.16 g) of all of the floatation samples. Although the majority of the plant material is wood (20.42 g), along with a suite of plant taxa that represent the local environment (e.g. bark, buds, a pine seed, and pine cone), one watermelon seed was recovered. Although this one seed representative of an African cultivar does not conclusively identify the pit feature as the product of the enslaved Africans living at St. Giles Kussoe plantation, it does strengthen the possibility. An unusual assemblage of artifacts and faunal material was recovered from this feature: a Lesesne lustered Colonoware bowl with a bone-handled knife, a quartz polished stone, historic aboriginal ceramics, Colonoware pipe fragments, the only straight pin found at the site, and a talcum rock, along with unusual faunal remains such as cow skull fragments, domestic cat bones, and limpkin remains (Agha 2012:91). The combination of cat bones, a very rare bird, and unusual assortment of artifacts along with the presence of watermelon may suggest ritual activity associated with enslaved Africans. However, the location of the feature outside of the plantation's defensive structures is puzzling. It is unlikely that slave quarters were located on the exterior of the property. As such, this may be an example of an act of resistance by an enslaved individual. Alternatively, the pit feature could potentially have free or enslaved Native American origins. The plantation was a hub of trade and it was noted that, although they were present in the vicinity, it is unclear if Native Americans ever saw the inside of the fort (Agha 2012:102). This may explain the exterior location of the pit.

Regardless of its maker, the presence of watermelon seed in the pit feature solidifies that in the very early years of their enslavement the Africans at St. Giles Kussoe plantation were actively engaged in the planting and care of West African crops. Moreover, the presence of watermelon indicates that in one of the earliest plantations in South Carolina, plants and foodways were quickly being maintained, newly incorporated, and adapted to a new set of social and environmental conditions.

COMPARISON WITH THE POLLEN RECORD

The pollen analysis conducted at 38DR83a provides a unique opportunity to compare the pollen record with the macrobotanical assemblage. Due to the preservation limitations of pollen at archaeological sites in the southeastern U.S., opportunities to juxtapose these complementary datasets are rare. While the pollen assemblage is not identical to the macrobotanical remains recovered, there are some similarities that provide further evidence for plant use and environmental conditions at the site. Due to the large differences in how the two datasets are produced, used, and introduced into the archaeological record, we employ a comparative strategy here that highlights interesting similarities and differences in the dataset rather than focusing on strict presence/absence counts.

Both the pollen and macrobotanical samples found evidence of some crops. Corn was found in both datasets, suggesting its early and important use at the plantation. While possible bean (Fabaceae) and buckwheat *(Fagopyrum esculentum)* were found in the pollen samples, they are not present in the macrobotanical assemblage. This is not surprising as their chances of recovery are low in macrobotanical assemblages at archaeological sites. Neither have durable, inedible byproducts similar to corncobs that lend themselves to preservation.

The fossil pollen analysis identified a wider range of tree species than that found in the macrobotanical record. In addition to those present in both assemblages (hickory, pine, and black gum), acorn (*Quercus* sp.), chestnut (*Castanea dentata*), and black walnut (*Juglans nigra*) were present in the fossil pollen. Although not present in the macrobotanicals, the plantation's inhabitants were likely using these additional mast resources economically. They may have collected black walnuts from local trees. Chestnuts are not native to the Coastal Plain, and therefore would have been introduced through silviculture. While acorns are edible and certainly would have been used by indigenous Native American groups, Europeans considered these nuts to be pig fodder. Enslaved Africans seem to have considered acorns to be famine food, bothering with the process of removing tannins to make them edible only when the necessity arose.

The occurrence of weedy species is high in the pollen record, which further indicates, along with the knotweed, that the habitat was a disturbed setting. Grape was found in both the fossil pollen and macrobotanical assemblages, which suggests that it was either gathered or potentially grown on the grounds of the site.

DISCUSSION AND CONCLUSIONS

The plant remains recovered from 38DR83a suggest that the occupants of the St. Giles Kussoe plantation used some wild plant resources, such as nuts and wild berries, in addition to cultivated plant foods like corn and watermelon. It is likely that the wild taxa grew in the vicinity of the site, and were encouraged by the site's occupants. These resources would have been important dietary supplements for the EuroAmericans, indentured servants, enslaved Africans, and Native Americans at this frontier location. While the enslaved at the site received some food provisions, they were also likely allowed, if not encouraged to engage in self provisioning through gardening and gathering.

The range of plant taxa recovered from 38DR83a is similar to that from other historic sites located in the region. These include 38CH2017, a historic site in nearby Charleston County with occupations spanning the close of the seventeenth century through the beginning of the twentieth century (Hollenbach 2008a); four plantation sites dating to the late eighteenth and/or early nineteenth centuries on Daniel Island in Berkeley County (Lesesne and Fairbank plantations [38BK202; Gardner 1986], 38BK1628 [Hollenbach 2006], and 38BK1629 [Hollenbach 2009a]); site 38BK2132, a late eighteenth/early nineteenth century slave village (Hollenbach 2009b); site 38BK1627, which claims a late seventeenth century and eighteenth century occupation (Hollenbach 2008b); and 38BU1957 and the Combahee Ferry site (38BU1216), which both have late eighteenth/early nineteenth century occupations (Hollenbach 2007, 2009c).

The single late seventeenth century feature analyzed from 38BK1627 contained bedstraw, hickory, and an unidentifiable fruit (Hollenbach 2008b), but the late eighteenth and early nineteenth century contexts at the various sites provide a larger comparative base. These include 67 samples from 38BK202 (Gardner 1986), 11 samples from 38BK1628 (Hollenbach 2006), five from 38BK1629 (Hollenbach 2009a), one from 38BK1627 (Hollenbach 2008b), 27 from 38BK2132 (Hollenbach 2009b), two from 38BU1957 (Hollenbach 2009c), 12 from Combahee Ferry (Hollenbach 2007), and four from 38CH2017 (Hollenbach 2008a). Hickory nutshell was present at all sites, and acorn from all but 38BK2132, although both nuts were often found in low numbers. Gardner (1986) also identified uncarbonized peanut (*Arachis hypogaea*) and pecan (*Carya illinoensis*) shells from a waterlogged deposit in a well at 38BK202. Black walnut shell (*Juglans nigra*) was also recovered from 38BK1627, 38CH2017, and the Combahee Ferry site. Wild fruits recovered from the sites include blackberry/raspberry (*Rubus* sp.), black gum, blueberry (*Vaccinium* sp.), elderberry (*Sambucus* sp.), grape, hackberry (*Celtis* sp.), mulberry (*Morus* sp.), persimmon (*Diospyros virginiana*), plum/cherry (*Prunus* sp.), sumac (*Rhus* sp.) and maypop (*Passiflora incarnata*), along with Old World fruits such as peach (*Prunus persica*) and watermelon. Beans (*Phaseolus vulgaris*), corn, rice (*Oryza* sp.), possible oat (*Avena sativa*), possible pea (*Pisum sativum)* and possible cotton seeds (*Gossypium* sp.) represent crop taxa recovered from the sites (Gardner 1986; Hollenbach 2006, 2007, 2008a, 2008b, 2009a, 2009b, 2009c).

In addition to food plants, a wide range of weedy species were recovered from these sites. These include knotweed, amaranth (*Amaranthus* sp.), bedstraw (*Galium* sp.), chenopod (*Chenopodium* sp.), cocklebur (*Xanthium strumarium*), dock (*Rumex* sp.), goosegrass (*Eleusine indica*), other grasses (Poaceae), Mallow family (Malvaceae), pokeweed (*Phytolacca americana*), purslane (*Portulaca* sp.), ragweed (*Ambrosia* sp.), sedge (*Cyperus* sp.), smartweed (*Polygonum* sp.), sunflower (*Helianthus* sp.), weedy legumes (Fabaceae), yellow star-grass (*Hypoxis hirsuta*), and possible morning-glory (*Ipomoea/Convolvulus* cf.). Gardner (1986:F-4) also speculates that the presence of these taxa is related to their weedy nature rather than direct use, but notes that some have edible leaves and seeds, while others have medicinal properties. For example, the leaves of bedstraw may be eaten as greens, but perhaps more importantly, the roasted seeds can be used as substitute for coffee (Peterson 1977:50).

In addition, seeds from trees used as ornamentals have been recovered at the various sites, including chinaberry (*Melia azedarach*), dogwood (*Cornus* sp.), magnolia (*Magnolia grandiflora*), and wax myrtle (*Myrica* sp.). It is worth noting that the nutlets of wax myrtles (also called bayberries) were used to make candles, and their leaves as seasoning (Peterson 1977:206). Also of note, chinaberry seeds have been used as rosary beads and the roots, leaves and berries have medicinal uses (Gardner 1986:F-4; Radford et al. 1964).

Food remains were recovered in relatively low numbers from the various sites, although significant quantities of carbonized wood were recovered from the samples. This suggests that the low numbers of plant food remains is not related to preservation, but instead to the preparation and disposal of plant foods. By the time they reach historic kitchens, grains such as wheat are likely to have already been ground into flour. Aside from areas of threshing, winnowing, and grinding, recognizable grains or plant structures are unlikely to be recovered archaeologically. Similarly, preserved (canned) fruits and vegetables leave relatively few recognizable traces (Crites 2000:207, 213), particularly when compared to their dried counterparts. Limited recovery of food remains from historic sites is therefore relatively common (Crites 2000).

Not only are food items processed beyond recognition, they are also less frequently introduced to fire and therefore are less likely to be carbonized and recovered from historic sites. This is especially true after the Civil War, as cooking stoves replaced fireplaces as the main locus of food preparation in southern homes (Taylor 1982).

Also of relevance are historic disposal patterns. If scraps, grains, and silage are fed to livestock rather than burned and/or deposited in trash pits, they are less likely to be preserved and recovered (Crites 2000:213). Outside of specialized contexts, such as privies, wells, and cisterns with waterlogged deposits, food remains are simply scarcer at historic sites.

In sum, the foodstuffs from 38DR83a are similar to other historic sites in the region, indicating reliance on corn and supplementation with fruits, both cultivated (watermelon) and wild (grape), and nuts. The small sample size precludes quantitative comparison. In addition, while the plant taxa recovered suggest possible group associations (i.e. Native American, African, or EuroAmerican), due to the limited nature of the dataset, it is not possible to make definitive associations. However, the plant remains do begin to provide us with an idea of what early plantation life may have been like; how people were adjusting to this new situation, maintaining, resisting, and incorporating new foods and ideas into their daily existence.

The plant remains from the St. Giles Kussoe plantation have the potential to begin to address the hidden details of early plantation life at this location. The plantation was an enterprise that was dependent on the successful execution of Lord Ashley's vision, as well as the labor and perseverance of diverse groups of people. Although there is little evidence to indicate how successful Lord Ashley's experimental agricultural crops were (other than the possibility of domesticated grape), additional analysis of future samples may help explain his agricultural strategies. In addition, future analysis of the plant remains from various contexts should help clarify how and where people used portions of the site for various activities. Perhaps more importantly, the plant remains may be able to provide us with clues about how individuals adjusted and managed to endure new and difficult situations.

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APPENDIX A: Tables

Table 9. Plant Taxa Recovered from 38DR83a by Context

Bag	Feature	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
1	10	21.16	20.42	Bark	23	0.31
				Bud	3	0.00
				Gall	2	0.00
				Pine cone	1	0.00
				Pine seed	1	0.02
				Pitch	36	0.25
				Receptacle	1	0.00
				Unidentifiable	28	0.15
				Unidentifiable seed	4	0.00
				Watermelon	1	0.01
88	53	1.08	1.02	Bud	2	0.00
				Corn cupule cf.	2	0.02
				Hickory	4	0.01
				Pitch	2	0.00
				Unidentifiable	6	0.03
				Unidentifiable seed	2	0.00
162		7.33	6.90	Bark	6	0.08
				Bur	2	0.00
				Hickory	5	0.03
				Pine cone	16	0.08
				Pitch	14	0.05
				Unidentifiable	27	0.19
				Unidentifiable seed	2	0.00
183	61 Level 2	1.90	1.52	Bark	1	0.04
				Bud	2	0.00
				Hickory	4	0.03
				Pitch	15	0.08
				Unidentifiable	28	0.23
				Unidentifiable seed	2	0.00
200	46	7.43	7.14	Bark	7	0.03
				Bud	10	0.03
				Hickory	5	0.00
				Pine cone	1	0.00
				Pitch	25	0.09
				Unidentifiable	24	0.14
				Walnut family	3	0.00
214	46	11.95	10.75	Bark, partially carbonized	122	0.72
				Bud	9	0.02
				Corn cupule	3	0.00
				Grape	1	0.00
				Pine cone	1	0.00
				Pine cone cf.	1	0.00
				Pitch	27	0.21
				Receptacle	1	0.00
				Thin hickory	1	0.00
				Unidentifiable	40	0.25

Table 9 (continued). Plant Taxa Recovered from 38DR83a by Context.

Bag	Feature	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
				Unidentifiable seed	2	0.00
240a	99 Levels 5, 6	7.25	6.64	Black gum	2	0.07
				Bud	7	0.02
				Corn cupule	1	0.00
				Grape	2	0.00
				Hickory	6	0.04
				Knotweed	6	0.00
				Pine cone	2	0.00
				Pitch	32	0.36
				Stem	1	0.00
				Sumac	1	0.02
				Unidentifiable	16	0.10
				Unidentifiable seed	7	0.00

Appendix B: Pollen Analysis Report.

Site 38DR83a, Lord Ashley Settlement, South Carolina:
Results of 2013 Pollen Analysis

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Eleven sediments samples from 38DR83a, the 17th Century settlement of Lord Ashley in South Carolina were examined for fossil pollen content. This site represents some of the earliest European settlement in the Carolinas, and it was anticipated that a detailed analysis of fossil pollen from the site might provide insights into past environmental conditions as well as human/plant interactions during this crucial time period. Five samples were examined in 2013, revealing that, although pollen was imperfectly preserved, data could be obtained that would provide important baseline data from this region. Samples for the 2013 study were selected based on strategic proveniences (See Table 10), with efforts focusing on the "moat" area, and features exposed during recent excavations.

Table 10. Pollen Sample Proveniences from the 2013 Analysis of the Lord Ashley Settlement Excavations.

FS #	Provenience
134A	
144	
162	
188	
210	
214	
215	
218	
242	
1.9	
2.4	

Methodology

Based on previous experience with sediments from the southeastern United States, a conservative extraction technique was employed for the extraction of pollen grains from this site as the grains are often present in poor or fragile condition. The silty and sandy sediments from this area allow for rapid water movement through the sediments causing oxidation through fungal and bacterial action resulting in the differential destruction of fragile pollen grains. To maximize pollen recovery, particularly of poorly preserved fragile types, we selected a gentle technique that does not completely remove all unwanted organics, and causes minimal damage to the more fragile pollen types.

The Palynology Laboratories at the Institute for Integrative Research in Materials, Environments and Society (IIRMES) at California State University in Long Beach, California processed the pollen samples, using a conservative extraction technique. First, 5ml subsamples were collected and a known number of tracer spores (*Lycopodium*) were added to each sample allowing for the calculation of pollen concentrations in the sediment samples. Concentration values are useful to the analyst as they allow for the calculation of the number of ancient grains per unit volume. In well-dated sequences, the values can allow for the calculation of sedimentation rates and document differential preservation. As the tracer spores were added at the beginning of treatment, these spores were subjected to the same treatment as the fossil grains, thus in the event that no pollen is noted in the sample, the occurrence of tracer spores documents that pollen was not inadvertently lost or destroyed during processing. Carbonates were removed from the samples by soaking the sample in 10 percent hydrochloric acid. The samples were screened and swirled, effectively removing larger and heavier materials. Next, the samples were immersed in 50 percent hydrofluoric acid for 12 or more hours to remove unwanted silicates. After the samples were neutralized, they were washed in 2 percent potassium hydroxide to remove humates, followed by an acetolysis treatment (Erdtman 1960) in a solution of nine parts acetic anhydride to one part sulfuric acid to remove unwanted organic materials. After this step, the samples were rinsed repeatedly in water to remove water-soluble humates and they were further cleaned by a heavy density separation using sodium polytungstate (Sp. G. 2.00). The lighter organic materials, mostly pollen and charcoal, were collected, dehydrated in absolute ethanol, and curated in vials with glycerine.

Pollen extracts were mounted in glycerol and stained with safranin (as warranted) to aid in identification. A Nikon E200 compound microscope was used to view the slides at 400× magnification to obtain 200+ grain counts. Pollen grain abundances and taxa (or types) observed were recorded until: a) at least 200 pollen grains had been counted as suggested by Barkeley (1934), or b) calculation of pollen concentration after 75 or more tracer spores were counted yielding values of 1,000 pollen grains per ml of sediment (grains/ml) or less. These standards were chosen: a) because calculation using Bayesian probability intervals with a resolution of $\pi = 0.0005$ indicates that where a taxon is absent in a count of 200 grains (i.e., $x = 0$, $n = 200$) there is a 95 percent probability that the taxon in question comprises 1.5 percent or less of the population, b) to maximize efficient use of time, and c) because such values indicate that it is less likely the sample contains a pollen concentration sufficient for analysis (Bryant and Hall 1993; Hall 1981).

For each sample, the uncounted portion of each slide was scanned at 150-200× magnification to identify pollen of domesticates or economically valuable plants. Pollen grain identification was facilitated through recourse to the author's pollen reference collection, as well as to standard pollen references. Pollen was identified to the finest taxonomic level possible. Those grains that were too degraded to be taxonomically identified were assigned to the indeterminate category but were still tabulated within the 200+ grain count as such values are of aid in assessing preservation levels and potential biases in the sample.

Pollen percentages were calculated from the 200+ grain count; concentrations (grains/ml) were calculated using the following formula:

$$\text{Concentration} = \frac{\text{Tracer spores added}}{\qquad} \times \frac{\text{Pollen grains counted}}{\qquad}$$

Tracers counted Sample volume

Results

Pollen was identified in eight of the 11 samples examined. Pollen preservation in the sediment samples was variable and 200+ grain counts were achieved in only eight samples. Concentration values ranged from 2777 to 22,520 fossil grains/ml of sediment for those sediments yielding counts; values considered fairly low but acceptable for analysis. Concentration values for those samples containing insufficient pollen for analysis ranged from 75 to 949 grains/ml, well below the minimal acceptable threshold of 2500 grains/ml.

A minimum of 41 different pollen taxa were identified in the samples representing 23 non-arboreal and 18 arboreal types (see Table 11). Grains generally considered to be fairly fragile were present in most of the samples demonstrating that differential preservation is not a significant factor in most of the countable samples, and supporting the idea that the pollen types identified in the Ashley settlement samples are probably representative of past conditions in the area. Pollen counts and percentages are presented in Tables 12 and 13.

Table 11. Pollen Taxa and Common Names of Grains Identified in the 2013 Lord Ashley Excavation Samples.

Pollen Taxa	Common Name
Non-Arboreal	
Apiaceae	Parsley Family
high spine Asteraceae	Sunflower Type
low spine Asteraceae	Ragweed Type
Cirsium	Thistle
Liguliflorae	Dandelion Type
Brassicaceae	Mustard Family
Caryophyllaceae	Pink Family
Cheno-Am	Goosefoot, Pigweed
Cuphea	Firecracker Plant
Cyperaceae	Sedge Family
Fabaceae	Legume Family
Fagopyrum	Buckwheat
Liliaceae	Lily Family

Plantago	Plantain
Poaceae	Grass Family
Polygonaceae	Knotweed Family
Polygonum	Knotweed
Rhus	Sumac, Poison Ivy
Rosaceae	Rose Family
Solanaceae	Nightshade Family
Typha	Cattail
Vitis	Grape
Zea mays	Maize
Arboreal	
Alnus	Alder
Carpinus	Hornbeam
Castanea	Chestnut
Carya	Hickory
Corylus	Hazelnut
Fagus	Beech
Fraxinus	Ash
Juglans	Walnut
Liquidambar	Sweet Gum
Liriodendron	Tulip Poplar
Myrica	Wax Myrtle
Nyssa sylvatica	Black Gum
Ostrya	Hop-Hornbeam
Pinus	Pine
Prunus	Cherry, Plum
Quercus	Oak
Salix	Willow
TCT	Juniper, Bald Cypress
Indeterminate	Too Poorly Preserved to Identify
Unknown Z	Unknown
Osmunda	Cinnamon Fern
Fern A	
Fern B	

Table 12. Pollen Counts from the 2013 Lord Ashley Excavations Samples

Sample	1	2	3	4	5	6	7	8	9	10	11
Taxon/FS#	134A	144	162	188	210	214	215	218	242	1.9	2.4
Apiaceae		1						1		1	
high spine Asteraceae	2	1		3	3	5	3	1		3	
low spine Asteraceae	48	57	6	43	43	96	46	52		71	2
Cirsium						1					
Liguliflorae	2	26		1	1	1		1		3	
Brassicaceae	1						1	1		1	
Caryophyllaceae					1						
Cheno-Am	63	1	4	7	2	27	22	1		6	1
Cuphea								2			
Cyperaceae	3	11		7	5	3	23	24		29	
Fabaceae					1	1	1				
Fagopyrum				1							
Liliaceae	1						1	1			
Plantago				1	1			1			
Poaceae	18	26	2	15	14	12	8	28		25	1
Polygonaceae	2	4		2	2	1	2	4			
Polygonum					3		2			1	
Rhus				1							
Rosaceae							1			1	
Solanaceae	1										
Typha				1							
Vitis					1						
Zea mays	1	2			1			2		1	
Alnus				1							
Carpinus	1		1	3	3		3	1		2	
Castanea	6	10	1	11	3	10	4	3	1	5	
Carya	3			5	6	1	4	5			
Corylus							1				
Fagus	1				1		1			1	
Fraxinus							1				
Juglans							1			1	
Liquidambar		1		1	2	1	1	2		2	
Liriodendron							1				
Myrica					1						
Nyssa sylvatica				1	2						
Ostrya		1		1	1		1				
Pinus	15	18	2	32	32	13	34	16	1	9	

	1	2	3	4	5	6	7	8	9	10	11
Prunus					1		1	1		1	
Quercus	18	22	1	43	55	16	25	33		22	1
Salix		3						3		2	
TCT	5	7	1	4	4	3	4	6		6	
Indeterminate	10	10	3	17	11	9	9	11	1	11	
Unknown Z							1	1			
Total	201	201	21	201	200	200	202	201	3	200	5
	861	819	94	277	1153	1194	2252	589		903	
Concentration Value	9	8	9	7	3	5	0	7	75	9	364
Osmunda		2		6	2	6	3	2		3	
Fern A		1		1	2	1	1			1	
Fern B							1				

Table 13. Pollen Percentages from the 2013 Lord Ashley Excavation Samples.

Sample	1	2	3	4	5	6	7	8	9	10	11
Taxon/FS#	134A	144	162	188	210	214	215	218	242	1.9	2.4
Apiaceae		0.5						0.5		0.5	
high spine Asteraceae	1	0.5		1.5	1.5	2.5	1.5	0.5		1.5	
low spine Asteraceae	23.9	28.3	*	21.4	21.5	48	22.8	25.9		35.5	*
Cirsium						0.5					
Liguliflorae	1	12.9		0.5	0.5	0.5		0.5		1.5	
Brassicaceae	0.5						0.5	0.5		0.5	
Caryophyllaceae					0.5						
Cheno-Am	31.3	0.5	*	3.5	1	13.5	10.9	0.5		3	*
Cuphea								1			
Cyperaceae	1.5	5.5		3.5	2.5	1.5	11.4	11.9		14.5	
Fabaceae					0.5	0.5	0.5				
Fagopyrum				0.5							
Liliaceae	0.5						0.5	0.5			
Plantago				0.5	0.5			0.5			
Poaceae	9	12.9	*	7.5	7	6	4	13.9		12.5	*
Polygonaceae	1	2		1	1	0.5	1	2			
Polygonum					1.5		1			0.5	
Rhus				0.5							
Rosaceae							0.5			0.5	
Solanaceae	0.5										
Typha				0.5							
Vitis					0.5						
Zea mays	0.5	1			0.5			1		0.5	
Alnus				0.5							
Carpinus	0.5		*	1.5	1.5		1.5	0.5		1	
Castanea	3	5	*	5.5	1.5	5	2	1.5	*	2.5	

Carya	1.5			2.5	3	0.5	2	2.5			
Corylus							0.5				
Fagus	0.5				0.5		0.5			0.5	
Fraxinus							0.5				
Juglans							0.5			0.5	
Liquidambar		0.5		0.5	1	0.5	0.5	1		1	
Liriodendron							0.5				
Myrica					0.5						
Nyssa sylvatica				0.5	1						
Ostrya		0.5		0.5	0.5		0.5				
Pinus	7.5	9	*	15.9	16	6.5	16.8	8	*	4.5	
Prunus					0.5		0.5	0.5		0.5	
Quercus	9	10.9	*	21.4	27.5	8	12.4	16.4		11	*
Salix		1.5						1.5		1	
TCT	2.5	3.5	*	2	2	1.5	2	3		3	
Indeterminate	5	5	*	8.5	5.5	4.5	4.5	5.5	*	5.5	
Unknown Z							0.5	0.5			
Total	100.2	100	*	100.2	100	100	100.3	100.1	*	100	*
Concentration Value	8619	8198	949	2777	11533	11945	22520	5897	75	9039	364
Osmunda		2		6	2	6	3	2		3	
Fern A		1		1	2	1	1			1	
Fern B							1				

Factors influencing the presence of fossil pollen grains in sediments need to be addressed prior to any interpretations based on these grains. Some taxons are wind pollinated and are produced in tremendous quantities by the plants, and are thus present in large quantities in sediment samples. Conversely, insect-pollinated grains, produced in very low quantities are often scarce, rare or seemingly invisible in the archaeological record. Durability is also a factor in pollen grain presence in archaeological sediment samples. Pollen is composed of variable quantities of a material called sporopollenin. This polymer of lignin is somewhat resistant to decay, but its presence in grains varies from low quantities (ie aspen) to a significant amount (Asteraceae, Cheno-Ams, pine). As a result of this variation, grains with large amounts of sporopollenin are generally more durable and are more common in archaeological pollen assemblages. Other factors also come into play including ornamentation and decoration, dispersal and the ability to identify grains when eroded. Some of the important factors regarding the Ashley settlement pollen taxons are discussed below.

Lord Ashley Settlement Pollen Taxa

Apiaceae

Pollen from the Parsley Family is usually diagnostic to the family level only. Members of this family are insect pollinated, but the sheer abundance of these plants on the landscape explains their common appearance in archaeological sediments. Most members of this family favor moist and shaded environments, although others, such as *Daucus carota* (Queen Anne's lace) prefer an open or even disturbed habitat. A number of Old World economic members of this family are known including carrots, parsley, caraway and fennel.

Asteraceae

Pollen from members of the Asteraceae (Compositae or Composite) family can usually be separated into a subfamily based on the grain's diagnostic morphology. Members of this family that are readily recognized include *Cirsium* (thistle) type, Liguliflorae (dandelion or chicory) type, and both high and low spine Asteraceae types.

Insect pollinated members of this group, the high spine Asteraceae types, are poorly represented in the Ashley settlement pollen assemblages, despite their general abundance in the region. The high spine Asteraceae group encompasses many genera including *Aster* (aster) and *Helianthus (*sunflower*).* The high spine group represents a large number of ornamental flowers as well as native plants, although the generally low occurrence of its pollen argues against its use as a cultivar at the site.

Grains from low spine Asteraceae, being wind-pollinated, are produced in very large numbers and are dispersed over large areas. Two of the most important members of this group include *Ambrosia* (ragweed) and *Solidago* (goldenrod). These grains also tend to be over-represented in poorly preserved assemblages as their morphology makes them readily recognizable even when highly degraded.

Cheno-Am and Amaranthaceae

Cheno-Am pollen, representing plants in the Chenopodiaceae family and in the genus *Amaranthus* in the Amaranthaceae family are among the most commonly encountered grains in North America. The reason for this pollen type's abundance is that the grains are generally produced in large numbers, are readily dispersed by the wind, are extremely durable, and are readily recognizable even when degraded. Many members of the Cheno-Am group are disturbance indicators, favoring farmland and cleared areas around human habitation. In many parts of the United States, Cheno-Ams represent economic plants especially *Chenopodium* and *Amaranthus,* deliberately cultivated for their seeds or leaves. Old World domesticated members of this family include beets (*Beta vulgaris*) and spinach (*Spinacia oleracea*). Several members of the Amaranthaceae Family produce pollen with diagnostic features sometimes allowing identification to this level.

Cyperaceae

Sedge pollen is a common component of the natural pollen rain of many regions as it is produced in large quantities and is readily dispersed by the wind. These grains are generally quite fragile and are among the first grains to deteriorate in soils, thus the presence of appreciable quantities of sedge pollen often indicates good pollen preservation. Sedges generally favor moist environments.

Fabaceae

Members of the Fabaceae Family include the pulses and clovers as well as other arboreal and non-arboreal species. These grains are usually insect- or self-pollinating, and for the most part, their pollen is infrequently encountered in archaeological sediment samples. Economic members of this family found in the United States include several species of bean (*Phaseolus* spp.). The presence of significant quantities of pollen from this family may indicate the economic use of a member of this important family, but generic-level identification is problematic.

Polygonaceae and *Fagopyrum*

Pollen from the Knotweed Family was noted in all of the Ashley settlement samples. *Polygonum* is a widespread plant found in a number of habitats throughout the world, and is likely the source of some of the Ashley settlement grains. Many members of the Polygonaceae family favor disturbed habitats including gardens, wetlands and fields, while other species prefer more forested environments. Most members of the Polygonaceae family are insect pollinated, however, many are also opportunistically wind pollinated, thus pollen from these plants are routinely encountered in archaeological sediments.

Fagopyrum, buckwheat, is an Old World domesticated plant, widely grown for its seeds (called groats) that are ground for flour. Buckwheat has also been used as a green manure to help build soils. Because the plant was introduced from Europe, the occurrence of this pollen grain must be associated with historical-age agriculture.

Liliaceae

Liliaceae pollen is strictly insect-pollinated, and its grains are infrequently encountered in archaeological sediments. A large number of mostly Old World economic plants are represented in the Lily Family, including *Allium* (onion, garlic, leek), *Asparagus* (asparagus), *Lilium* (lily), *Trillium* (trillium), *Tulipa* (tulip), *Agapanthus* (Africa lily), *Hyacinthus* (hyacinth) and *Muscari* (grape hyacinth). Native economic members of this family include *Camassia* (camas) and *Allium* (wild onion). *Yucca* (yucca or Spanish dagger) is an important member of this family whose pollen can usually be recognized based on its distinctive surface patterns. As these grains are all scarce in the pollen record, the presence of more than a few grains in a sample may indicate economic activity.

Poaceae, Cerealea and *Zea mays*

All grasses are wind pollinated and produce large amounts of distinctive pollen, thus these grains generally make up a significant proportion of most pollen assemblages. However, the morphology of grass pollen does not allow for the identification below the family level, with the exception of cultivated Old World grains (Cerealea, including wheat [*Triticum*], barley [*Hordeum*], rye [*Secale*] and oats [*Avena*]), and *Zea mays* (corn or maize). The domestication process has led to a significant enlargement of the pollen grains in these genera. *Zea mays* grains, positively identified in the Ashley settlement samples, were noted in samples 3 and 3a.

Rosaceae

Pollen from the insect pollinated Rose Family is actually fairly common in archaeological assemblages, probably due largely to the ubiquity of the various members of this family. The grains are fairly fragile and diagnostic morphological features are easily lost, thus many eroded grains from this family can only be identified at the family level.

Miscellaneous herbs

A number of the Ashley settlement herbaceous pollen types can be identified only to the family level, although cattail, here *Typha angustifolia* (narrowleaf cattail), can be identified to the species level. Members of this genus usually produce copious quantities of pollen. The presence of only a single grain in one sample might indicate that this plant is somewhat removed from the site area. Significant members of the Solanaceae Family include *Lycopersicum* (tomato), *Capsicum* (chili peppers), *Solanum* spp. (potato, nightshade, eggplant), *Nicotiana* (tobacco), and a number of ornamentals including *Datura* and *Petunia*. A single grape (*Vitis*) pollen grain was noted in one sample. Grapes are found throughout the region and could well have been an important resource in the past.

Other non-arboreal pollen taxa identified in the sample include Brassicaceae (mustard family), Caryophyllaceae (pink family), *Cuphea* (firecracker plant) and *Plantago* (plantain). Although all of these taxa possess economically significant members, their occurrences in these samples are in low frequencies suggesting they represent background pollen types.

Alnus

Alder pollen is produced in huge numbers, is dispersed widely by the wind and is very diagnostic, thus these grains are usually well represented in archaeological sediment samples even if the trees are removed from the sampling area.

Carpinus

Hornbeam pollen is also wind pollinated, and can be widely distributed. This grain can be difficult to identify unless the grains are particularly well preserved. A single probable *Corylus* (American hazelnut) grain was noted in one sample. This grain is similar to hornbeam and may represent an aberrant or distorted *Carpinus* grain.

Carya

Hickory pollen is produced in large numbers and is widely dispersed by the wind. The grains are fairly fragile, however, and they are easily lost in oxidizing conditions. Hickory grains were noted in all samples, though in low percentage s suggesting the trees may have been somewhat removed from the sampling areas.

Castanea

Chestnut pollen tends to be well represented in both prehistoric and historical age samples from the eastern and southeastern United States for a number of reasons. Chestnut trees produce large numbers of wind dispersed grains, and their distinctive morphology allows for ready identification. Further, the grains are moderately durable allowing for preservation often under less than optimal circumstances. Chestnut pollen was a common component in all of the Ashley settlement sediment samples, suggesting that these trees were formerly located near the sampling area.

Fagus

Pollen from beech is diagnostic, but fairly fragile. Despite the fact that beech pollen is produced in large quantities and is distributed by the wind, its pollen is uncommon in archaeological samples because it is easily lost in oxidizing sediments.

Fraxinus

Ash pollen is a fairly common component of most eastern woodland samples, though the grains are generally not produced in large quantities, and they are notably fragile. A single ash grain was noted in one of the 2013 Ashley settlement samples.

Juglans

Walnut pollen is distinctive and can often be identified to the species level. The two grains identified in the Ashley settlement samples compare favorably to *Juglans nigra* (black walnut) though erosion and grain distortion do not allow for a positive identification. Walnut pollen is fairly durable and widely disseminated by the wind.

TCT

The category TCT consists of pollen grains in the Taxodiaceae (bald cypress family) and Cupressaceae (cypress family) families and from the genus *Thuja* (arborvitae). Grains from this group are difficult to identify beyond this grouping, even when perfectly preserved, thus palynologists group these cryptic grains into one large category. In the Ashley settlement sediment samples, most of our grains are likely to be from *Juniperus (*juniper), but *Taxodium* (bald cypress) may also be represented here. All of these plants produce copious amounts of readily dispersed pollen, and TCT pollen is among the most common pollen types encountered throughout most of North America.

Liquidambar

Pollen from sweet gum is readily recognizable, but is usually uncommon. The pollen is dispersed by the wind, but the grains are apparently produced in low numbers.

Myrica

Wax myrtle pollen can be difficult to identify if the grains are imperfectly preserved. These plants produce huge numbers of pollen grains and they are widely distributed by the wind, thus they tend to be abundant in southeastern pollen assemblages.

Nyssa

Pollen from *Nyssa sylvatica* [black tupelo]) was identified in the Ashley settlement samples. This tree produces moderately large quantities of pollen that is dispersed mostly by insects, but also, to a lesser extent, by the wind. Tupelo grains are moderately durable and readily recognizable. As a result of the sheer abundance of these trees in river bottoms, sloughs and wetlands of the southeast, in proper habitats, these grains can be plentiful in archaeological sediments.

Ostrya

Hop hornbeam is a common eastern forest understory component. Grains are abundant and are readily dispersed, but are not particularly durable. Moderate numbers of these grains are frequently found in archaeological samples if the preservation is good.

Pinus

Pine pollen is among the most commonly encountered grains in North American sediment samples, as it is abundant, widely dispersed, readily recognizable even when highly degraded, and is very durable. Like many other conifers, pine pollen grains possess buoyant bladders that aid in the grain's dispersal thus they tend to travel great distances. Pine pollen can often be separated into sub-genera based on micro-morphological features. However, these features can usually be seen only on perfectly preserved grains. Pine is apparently common in the Ashley settlement area, and is the most common pollen type identified in the assemblages.

Prunus

The distinctive pollen from *Prunus* is uncommon in archaeological sediment samples as the grains are produced in low numbers and are dispersed by insects, thus rarely traveling far from the tree. Several members of this genus are native to the region, although introduced or cultivated species could also be represented, including various species of cherry, plum, peach, apricot and almond. Because of its ornamental and economic value, this plant was widely planted at many early historical sites in the eastern United States, although it is equally possible that the *Prunus* grains encountered in the samples represents native species, including *P.serotina* (black cherry), *P.caroliniana* (Carolina laurel cherry), *P. americana* (American plum), *P. umbellata* (flatwood plum) and *P. angustifolia* (Chickasaw plum) (Elias 1980). As many members of this genus produce edible fruit, the occurrence of significant quantities of its distinctive pollen in sediments may indicate the deliberate cultivation of this species.

Quercus

Oak pollen is produced in large quantities, and is moderately durable and distinctive, thus is commonly encountered in archaeological sediments. These grains can travel great distances, thus the presence of a few grains might be expected in archaeological samples, even if located some distance from an oak environment. Oak trees have likely always been a dominant member of the forests in this part of South Carolina, accounting for the relative abundance of this taxon in all of the sediment samples.

Rhus

Pollen from *Rhus* (sumac or poison ivy) in the Anacardiaceae or sumac family was noted in one of the Ashley settlement samples. Although generally insect pollinated, *Rhus* grains are very distinctive and are fairly commonly encountered in archaeological sediments. Because of the ubiquity of these plants, pollen from this taxon is a common component in many North American archaeological sediment samples.

Salix

Willow pollen is a commonly encountered pollen type, as the grains are abundant and widely dispersed. The grains are readily recognizable, but are not particularly durable. Willows generally prefer moist habitats. Willows are widely distributed throughout North America, and are also commonly planted along water courses where they serve as windbreaks.

Indeterminate

In every pollen sample, a number of grains were noted which were distorted, folded, eroded, crumpled or in some other way unidentifiable. These poorly preserved grains were placed into the category indeterminate. Statistical calculations were made in consideration of this group. *Osmunda* (royal and cinnamon fern) is one of the few North American ferns identifiable to the genus level. These grains were identified when encountered, but were not included in the counts.

Lord Ashley Settlement Features

Feature 46

Feature 46, represented by one sample (FS 214) comes from level 2, and is thought to represent clean-up of the settlement around 1685. Associated with this context were burned soil, charcoal and well-preserved bones. Level 2 is thought to be below the plow zone or other potentially mixed deposits. Pollen preservation was fair in this sample, with a concentration value of 11,945 grains/ml; a large amount of fine particulate carbon was present, consistent with this deposit representing sweepings. Interestingly, this sample reflects a disturbed setting in an otherwise forested environment. Low spine Asteraceae, weeds associated with settlement, clearing and agriculture, reaches its highest percentage occurrence in this sample with 48%.

Chestnut pollen is moderately high at 5% and pine and oak are both reduced in this sample. While it may seem counterintuitive, the low occurrence of pine and oak pollen probably reflect a more closed forest surrounding the settlement as the pollen of these types usually increases with clearing as these grains are readily transported great distances by the wind. Cultigen or economic pollen is wholly lacking in this sample and grains present in the sediments probably represent largely background types from the area.

Discussion of Samples

Feature 99

Feature 99, the moat in the south side of the site, is represented by two samples from zone 4 (FS 210) and zone 5 (FS 215). Both of these zones represent deeply buried sediments well below later plow zones, thus were thought to have minimal disturbance. Both samples contained fairly well-preserved pollen, with concentration values of 11,533 (FS 210) and 22,520 (FS 215) grains/ml of sediment with zone 5 showing particularly good preservation. Both samples represent moat deposits, though it is likely that the better preservation in the deeper zone 5 deposits reflects a greater presence of water, inhibiting fungal and bacterial degradation of pollen. Pollen assemblages from both samples are similar in composition, though there are some notable differences. The sample from zone 5 contained 10.9% Cheno-Am pollen while Zone 4 contained only 1 percent; likewise sedge pollen is represented in the basal sample by 11.4% while zone 4 contained only 2.5% sedge grains. As sedge favors a wetland environment, these grains are probably directly associated with the moat feature hinting along with the higher concentration values that the moat contained water for at least part of the year. The deeper and presumable older zone 5 deposits reflect a more forested environment. An array of woodland pollen types were noted in this well-preserved sample, including forest types not noted in other samples such as hazelnut (*Corylus*), ash (*Fraxinus*) and tulip poplar (*Liriodendron*).

The zone 4 deposit shows more oak pollen, perhaps reflecting a more open setting, along with evidence of agriculture, represented by a single grain of maize. A single grape (*Vitis*) grain could well reflect an attempt at viticulture, or perhaps could signal the presence of a native grape variety, likely the latter as this grain represents the only occurrence of grape at the site.

Feature 106

Feature 106 is the top portion of the moat, exposed along the south wall. This feature is represented by two samples, FS 162 and FS 188. Sample FS 162 contained very little poorly preserved pollen, and a count could not be achieved. The concentration value for this sample was 949 grains/ml well below the minimal acceptable threshold for analysis. The few grains identified in the sample were all durable types known to be most resistant to decay. Sample FS 188 offered somewhat better preservation though the concentration value was still low at 2777 grains/ml. Pollen types in this feature were dominated by low spine Asteraceae, grasses, pine and oak. Four taxa make their only appearance at the site in this sample; *Fagopyrum* (buckwheat), *Rhus* (sumac or poison ivy), *Typha* (cattail) and *Alnus* (alder). The occurrence of the Old World cultivar buckwheat in this sample is noteworthy. Documentation of the cultivation of this plant at the Ashley settlement is not known, though In 17th Century Europe it was a widely planted and important crop. Buckwheat is also useful as green manure for the purpose of enriching soils. While close relatives of this plant are known from the New World, namely *Eriogonum* (wild buckwheat), buckwheat pollen is distinctive and if the pollen here dates to the 17th Century, this occurrence could well represent the earliest occurrence of this crop in the New World.

Feature 108

Feature 108 represents a "dark silt" deposit located south of the moat where the old surface was thought to be. This deposit is capped by a clay layer protecting these sediments from later plowing. Sadly, pollen was not preserved in this section, and based on the very few grains noted a concentration value of 75 grains/ml was calculated. Associated with this section were two additional samples collected that targeted specific strata. These samples, collected at 1.9 and 2.4 feet below surface exhibited variable preservation. The sample from 2.4 feet below surface contained almost no pollen and had a low concentration value of 364 grains/ml. The sample from 1.9 feet below surface, however, contained fairly well preserved grains and did produce a count, with a concentration value of 9039 grains/ml. The assemblage overall was dominated by low spine Asteraceae, sedge, grass, pine and oak grains, mostly durable types that are often over-represented in eastern woodland samples. Sedge pollen is usually considered to be fairly fragile, and its relative abundance in this samples likely signals nearby wetlands or saturated sediments that may have facilitated these grains' preservation.

Cultigens are represented in this sample by a single maize grain indicating that this plant was being cultivated at the time these sediments were deposited. The occurrence of a single Prunus (cherry, plum, peach, apricot) could represent a cultivated tree, or simply a naturally occurring element of the nearby forest. A single poorly preserved grain identified to the Rosaceae family could also represent this genus; morphological features allowing identification were lacking on this grain, however.

FS 134A

FS 134A represents sediments from Zone 2, located near the "brick chimney building," associated with a large burned deposit. Pollen preservation was fair in this sample, and the assemblage had a concentration value of 8619 grains/ml. The assemblage was dominated by grains from low spine Asteraceae, Cheno-Ams, grasses, pine and oak. Cultivated plants were represented by a single maize grain, though single grains of Liliaceae (lily family) and Solanaceae (nightshade) could represent either cultivated plants or native vegetation.

FS 144

FS 144 represents Zone 2 deposits found outside the palisade/moat area. Associated with this section were a few post molds of unknown function. Pollen from this section was fairly well preserved and the single sample had a concentration value of 8198 grains/ml of sediment. Dominant pollen types in this assemblage were low spine Asteraceae, Liguliflorae-type Asteraceae (dandelion group), grasses, pine and oak. Most unusual was the occurrence of 12.9 percent of the ordinarily rare dandelion-type pollen. These grains are insect pollinated and rarely travel far from the plant. The source of these grains is not known. Dandelions (*Taraxacum officinale*) were introduced from the Old World as a food, though there are many New World non-economic representatives as well. The accidental inclusion of a few anthers into the sediments might account for the high frequency of this taxon. Maize pollen was represented in this sample by two grains, likely reflecting nearby cultivation of this important plant.

FS 218

This feature represents the cellar feature of Building 2. Pollen was fairly well preserved in this sample, with a concentration value of 5897 grains/ml. Dominant pollen types in this assemblage include low spine Asteraceae, sedge, grass, pine and oak. Maize is the only cultigen represented in the sample, where two grains were noted, likely reflecting nearby cultivation of this important grain. Interestingly, two grains of *Cuphea* were also identified in this sample. *Cuphea* is an introduced ornamental flower known as firecracker plant, but is also represented by a few native species. Whether these grains represent cultivated ornamentals or simply background weeds is not known.

Summary

Eleven pollen samples from excavations at the Lord Ashley settlement were examined. Pollen preservation was variable and three samples failed to contain sufficient pollen to allow counts to be achieved. Pollen in most samples exhibited some degree of erosion or degradation indicating that differential preservation may be a factor in understanding the samples. A total of 41 taxa were identified in the samples, and concentration values of those samples providing counts were generally low ranging from 2777 to 22,520 grains/ml of sediment. Most taxa identified in the pollen assemblages represent taxa expected to be found in the local pollen rain. Cultigens were represented by pollen from maize, noted in five samples, and by a single buckwheat grain. Based on context, both taxa could represent 17th Century agricultural activities.

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Appendix C: Lipid Analysis Report.

Absorbed Residue Analysis of 11 Pottery Samples with Matching Soil Lipid Analyses from 38DR83, the Lord Ashley site

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Eleven pottery samples with matching soil samples from the same archaeological context were submitted for absorbed pottery residue analysis from 38DR83, the Lord Ashley site. The Lord Ashley site is an important early 17th century English plantation, which housed some of the earliest African slaves in the region. All sherds submitted for the study were either Colonoware, Historic Native American pottery, or possibly prehistoric Native American pottery. Eight of the eleven sherds contained viable archaeological residues distinctively different from their matching soil samples. The contents of the pots showed considerable variety, suggesting some specialization in pot use. There were also many more sherds interpreted as 'primarily meat' than is common at prehistoric sites. This suggests either feasting behaviors or the Europeans strong preference for traded animalbased foods from their Indian allies.

Introduction

Eleven potsherds from 38DR83, the Lord Ashley site, were submitted for absorbed pottery residue analysis, along with soil samples from the matching archaeological context. All eleven sherds were unglazed and probably from the historic period, dating to 1672-1720. Sherds with a variety of different surface treatments and vessel forms were submitted, including samples from two bowls and a zoned collared vessel (see Table 1 for more detailed descriptions). The Lord Ashley site is an important historic plantation along the Ashley River in South Carolina, northwest of modern Charleston, South Carolina (which corresponds with historic Charles Towne Landing).

The plantation belonged to the Lord Proprietor Anthony Ashley Cooper, first Earl of Shaftesbury, although the owner never resided onsite; it was also known as St. Giles Kussoe plantation (Agha 2012). The plantation house was the site of the first contact between the Westo Indians and the English settlers; it was used as a trading post and contact point between the two groups, and was crucial in the development of the first major English/Indian alliance (Hartley 1984:10). The plantation also housed one of the earliest populations of African slaves in the Carolina Lowlands, probably imported from West Africa via Barbados (Agha 2012:24). Economically, the plantation focused on cattle ranching, planting, and trade with local Indians (Agha 2012).

Absorbed residue analysis involves the extraction of compounds extracted through cooking or other pot use, and absorbed within the ceramic matrix of a potsherd. They are generally the result of the slow absorption of chemical components of resources processed in a pottery vessel over its use-lifetime. If there is minimal specialization in vessel use, the result is often remarkable similarity among residues from a single site. A potential problem that has been identified with absorbed pottery residue analysis is the absorption of soil lipids during the period of sherd burial. Experimental studies suggest that this sort of soil lipid contamination is generally rare, but does occur with some compounds (Reber and Kerr 2012a, b). As a result, the optimal condition for residue analysis is to have a comparative soil sample from an archaeological context matching each submitted potsherd. In this way, it is possible to identify soil lipids absorbed within archaeological sherds; and more rarely, to identify archaeological residues that washed out of the potsherd (Reber, et al. 2010; Reber and Kerr 2012b). In this study, this optimal condition for residue analysis was met, allowing a more sensitive interpretation of the archaeological residues.

In order to be preserved within the matrix of the pottery, components must be hydrophilic enough to dissolve in cooking liquid, but hydrophobic enough that they do not wash out of the pot during archaeological deposition. Lipids chemically fit this description most closely, and lipids therefore make up the large majority of chemical components in absorbed pottery residues. The compounds extracted from the residues are analyzed chemically, with gas chromatography/mass spectrometry (GC/MS) being one of the preferred methods, and the one used in this study. This method allows for the separation of complex mixtures of compounds, and the identification of a wide range of compounds. This is performed by means of the chemical fingerprint, or mass spectrum, of each separate type of molecule that is separated by the gas chromatograph. Once the compounds have been identified, the analyst tries to identify their source or sources, keeping in mind that the lipids probably underwent some degree of hydrolysis, oxidation, or microbial breakdown over the period of archaeological deposition.

In general, all lipid residues can be interpreted using two major techniques; biomarker and relative compound abundances. Biomarkers are compounds unique to a certain resource or class of resources, and the biomarker approach allows the identification of specific resources or classes of resources. Sitosterol, a plant sterol, is a biomarker for plants, for example. The relative abundance approach utilizes the relative amounts of various common compounds to give general interpretations about the composition of the residue. For example, the presence of large abundances of unsaturated fatty acids often indicates that a residue originated primarily in either plant or marine resources. Both the biomarker and the relative abundance approach were used while interpreting residues in this project.

The goal of the project was to determine the presence and quality of residues from unglazed pottery excavated at the Lord Ashley and if possible, to interpret vessel use at the site as much as the sample size would allow. Since absorbed residue analysis only works on unglazed pottery, it was not possible to perform similar analyses on pottery made by the settlers. The research goal was nonetheless complicated by the existence of three groups of people who could have made the pottery: the Kussoe Indians, who may have had a site in the area prior to settlement, historic Indians who may (or may not) have brought some trade goods in pots to the site, and the African slaves. In this report, we did not attempt to distinguish between these groups based on pottery style.

Methods

Archaeological residues were extracted using the methodology published by Evershed, et al. (1990). Sherds were cleaned with a solvent-washed model drill to remove surface impurities, crushed in a solvent-washed mortar and pestle, an internal standard of 20μL *n*-tetratriacontane was added, and the sherd was extracted with approximately 10 mL of 2:1 v/v chloroform/methanol per 2 g of powdered sherd. Soil samples were extracted using a similar methodology, with the soil treated identically to the powdered potsherd. All glassware was solvent-washed for both sampling regimes.

Each sample vial was then ultrasonicated for 20 min x 2, with a 10 min cooling period. The samples were centrifuged at 2000 rpm for 20 min, the supernatant was pipetted into solvent-washed vials, and samples were then filtered through solventwashed 220-440 mesh amorphous silica gel to remove the remaining fine clay particles from the residue-impregnated solvent.

The clean solvent/residue mixture was evaporated under N_2 gas and mild heat to dryness. An aliquot of this residue was derivatized with approximately 200 µl N,Obis(trimethylsilyl)fluoroacetamide (BSTFA) +1% trimethylchlorosilane (TMCS) and analyzed in a Fisons 8065 gas chromatograph interfaced to a Trio 1000 mass spectrometer, using a DB-1HT 15 m x .32 mm column with .1µl film thickness and with a column head pressure of 7.5 psi. The temperature was held at 50˚ for 2 min, then ramped at 10˚/min until 350˚, followed by a 10 min hold at that temperature. Total runtime was 42 min. Prior to analysis each day, the GC/MS was tuned with DFTPP to EPA standards to ensure consistent and precise mass spectrometry. This portion of the analysis is called the total lipid extract (TLE) since it contains all the components in the residue without saponification.

Residue samples were also separated into neutral and fatty acid (FA) fractions for better quantification and analysis of the various compounds in the residue. Approximately 60% of the total residue extracted from sherds was transferred to solventwashed culture tubes, then saponified with 2 mL NaOH/methanol and heated at 75˚ for 1 h. The saponified residues were then extracted with 3 x 2 mL hexane, which was blown down. This extraction became the neutral fraction, and contained compounds such as alkanes, long-chain alcohols, sterols, and terpenoids. This fraction was stored under N_2 gas and refrigeration until analyzed using the same instrument and temperature program as the TLE.

The remainder of the residue, containing primarily free fatty acids, was acidified to pH 3-4 with 2 M HCl, and extracted with 3 x 2mL hexane into cleaned and solventrinsed culture tubes. This solution was evaporated, stored under N_2 and refrigerated until analyzed. Approximately half of the fatty acid fraction was derivatized to trimethylsilyl esters with BSTFA and analyzed using the same instrument and column as the TLE, but with a temperature program ramping from 50-150˚ C at 15˚C min^{-1}, followed by 150250˚ C at 3˚ C min^{-1}, and a 10 min hold at 250˚ C.

Semi-quantification was done for the absolute amount of residue present in each sample by adding the amount of all identified lipids from the TLE fraction, and calculating the amount based on the amount of the internal standard known to be present in the sample. This quantification was an interesting, but not conclusive measure of viable residue present in a potsherd. Because amounts of heavy components such as triacylglycerols and waxes are less accurately quantified on a GC/MS, samples with more of these heavy components had lower residue quantities measured. Since these are also the best-preserved residues, it led to a situation where better-preserved residues looked less abundant than badly degraded ones. Further, semi-quantification assumes, for calculation purposes, that the molecular weight of all substances in the TLE is the same as that of the internal standard (Tissot, et al. 2012). This is because of the complexity of the lipid mixture, and the fact that there are some compounds in the TLE with unknown molecular weights. Nonetheless, it was interesting to compare the amounts of lipid in the sherd and the adjacent soil sample. Although Richard Evershed has suggested that 5 µg/g is the lower limit for correct interpretation of an archaeological sample (2008), Evershed was utilizing an extremely sensitive GC-FID mode of quantification. In this project, therefore, we combined quantification and the comparison of archaeological and soil lipids to determine which residues were interpretable. If the residue was noticeably different from the soil lipids (Tables 2-4) and had a residue quantity of 1µg/g or greater, we interpreted it as an archaeological residue. Sherds with smaller amounts of lipid, however, might be interpreted as coming from vessels that were used less, or differently, than those coming from sherds with large amounts of lipid.

Blanks were run in parallel with the archaeological samples, and used to control for laboratory contamination. Blanks were generally clean for this project. Samples were run in a semi-blind fashion, in that each sample was assigned a lab number for analysis, and the true provenience of the samples was never used until interpretation began to take place. Lab numbers and the original sample numbers, as well as a basic interpretation of all residues in the project with comments and the sample type, is given in Table 1.

How to Interpret a Lipid Residue

When interpreting a lipid residue, several different classes of compounds are examined. The fatty acid relative abundances, particularly in terms of chain length and saturation, are examined to determine the general overall composition of the residue, as described above. Saturation is the number of double bonds present in a carbon chain.

Fatty acids are generally written in the form $C_{\text{carbon chain length: \# of double bonds}}$. Fatty acids most commonly occur linked to a glycerol backbone in the form of triacylglycerols, which are the most abundant constituents of fats and oils in nature. Free fatty acids, although present in normal lipids, occur in only small amounts and tend to dissolve in water more easily than the glycerol forms (Evershed 1993; Evershed, et al. 1992) and many others.

In most cases, fatty acids with more unsaturated fatty acids, particularly $C_{16:1}$ and $C_{18:1}$, and more $C_{16:0}$ than $C_{18:0}$, tend to originate in either vegetables or fish. Fatty acids with less unsaturated fatty acids and more $C_{18:0}$ than $C_{16:0}$ tend to be comprised primarily of meat lipids. Odd chain fatty acids often originate in bacterial or fungal lipids. Also, fatty acids with shorter chain lengths tend to wash out of absorbed residues earlier, while more unsaturated fatty acids are more prone to hydrolysis or oxidation. Due these and other issues described at length in other publications (Evershed 2008; Reber and Evershed 2004), this preliminary interpretation of fatty acid composition must be paired with the interpretation of other compound types. In most cases, a residue containing highly unsaturated fatty acids can only be interpreted as 'primarily plant/fish' in origin, due to the difficulty of distinguishing between unsaturated fatty acids originating in plants and fish. In this project, this is a particular handicap.

Due to the tendency of unsaturated fatty acids to undergo hydrolysis or oxidation, it is unusual for an archaeological residue to be very strongly unsaturated. This can be defined such that an unsaturated fatty acid makes up more than 50% of the total fatty acid fraction of a residue. If a residue is that strongly unsaturated, it suggests either that the residue was comprised almost completely of plant or marine resources, or that the residue was contaminated. Modern oils and lotions are often very highly unsaturated. If a residue with a strongly unsaturated fatty acid fraction is present in a residue also containing biomarkers of modern contamination, such as DEET, vitamin E, or sunscreen compounds, then it must be classified as so contaminated that interpretation is either very difficult or impossible. If those biomarkers of modern contamination are not present, however, it is possible that the archaeological residue was comprised almost entirely of plant, fish, or shellfish resources. One of the suggested indicators for a primarily fish/shellfish residue is a high degree of unsaturation, a $C_{18:0}/C_{16:0}$ ratio lower than .48, and the presence of cholesterol (Isaksson and Hallgren 2012). Other, less common indicators for fish and shellfish are the presence of isoprenoid fatty acids, (Baeten, et al. 2013; Corr, et al. 2008), and the presence of ω-(o-alkylphenyl) alkanoic acids, pyrolytically formed from isoprenoid fatty acids (Hansel, et al. 2004).

Sterols are one of the compound types most likely to produce general category biomarkers. Cholesterol is a biomarker for the presence of meat resources, while there is a series of plant biomarkers, including sitosterol, campesterol, and stigmasterol that indicate the presence of plant resources. The presence of cholesterol or plant sterols can help support a fatty acid composition interpretation, as well as definitively determining whether plant and meat resources were present in the lipid residue. Unfortunately, sterols are not as common as fatty acids, and are not always present. When they are present, however, they provide valuable and clear information concerning vessel contents. In this study, every sample contained sterols, some rather obscure.

Terpenoids are another compound type particularly useful in interpreting residues. They are plant biomarkers; pentacyclic triterpenoids are commonly found in non-pine plant resins and surface waxes (Glastrup 1989; Harborne and Tomas-Barberan 1991; Langenheim 2003). Diterpenoids, particularly those with the pimarane and abietane carbon skeletons, are often biomarkers for pine resin. Labdane diterpenoids occur both in pine resins and in resin from other plants, and thus can be used as a category biomarker for plant resin, but not for any particular class of plants.

Alkanols are long-chain alcohols—carbon chain lengths of 12-34 are often found in lipid residues. Alkanols often originate in wax esters, linked to alkanes. As such, alkanols give valuable information concerning the presence of waxes in the lipid residue. Waxes occur in all resource types, but even-chain alkanols are particularly prevalent in higher plant waxes (Kolattukudy 1976). In this report, alkanols will be notated by the form $OL_{\text{chain length}}$. By carefully examining references on plant waxes, sometimes a plant resource or a range of resources may be identified partially through alkanol composition. For example, very long-chain alkanols, such as OL_{32} are rare in most plants but relatively common in panicoid grasses (Bianchi, et al. 1984; Reber, et al. 2004). Panicoid grasses are a large subfamily of about 2000 grasses, including maize and many other grasses from around the world. The presence of this compound indicates that a panicoid grass or grasses may be present in the residue. Additionally, most (but not all) plant waxes consist of a small number of alkanols esterified with a range of alkanes, or of a range of alkanols with a gradual increase in abundance of chain length to the most abundant alkanol, followed by a gradual decrease in chain length abundances (Kolattukudy 1976). Residues containing a wide range of alkanols, particularly those of very different chain length and not fitting either of these patterns, probably indicate that more than one plant resource is present.

Alkanes are unsaturated carbon chains, usually originally found linked to alkanols in waxes, or to sterols. Alkanes will be described in this paper in the form $AL_{\text{carbon chain length}}$. Like alkanols, they occur in all resource classes. Higher plant alkanes usually have odd carbon chains; highly branched alkanes often indicate microbial or fungal breakdown of the original wax ester. Furthermore, the alkane AL_{29} can be used as a biomarker for higher plant epicuticular wax (Evershed 2008: 898). They can also be used to determine whether more than one resource source is present in a lipid similarly to the way alkanols are used.

It is important to remember that all residue interpretation must be done with some knowledge of the local biome of the site being investigated, or at least with the knowledge that more knowledge of the local biome is needed. For example, coniferous resins can be easily identified in a residue through the presence of abietane and pimarane diterpenoids, which are well-established biomarkers for this type of resin. Determining the source of such a resin, however, requires knowledge of what coniferous trees would be found near the site and likely to be utilized by the ancient inhabitants of the site. From a residue standpoint, a coniferous resin from South Carolina and one from Mississippi look identical, but the interpretation of the source and use of the resin would be different in the two places, based on environmental and cultural considerations. This is why collaboration between residue analysts, site archaeologists, and paleoethnobotanists is so crucial to a successful residue analysis.

Results and Discussion

Since the sherds were sampled almost directly from the field, left surrounded by soil matrix, and stored in paper envelopes, it is not surprising that contamination issues were minimal. There were some plasticizers in many of the residues, particularly the soil samples, but plasticizers were much less ubiquitous than is common in absorbed residue studies. DEET was found in three of the soil samples (see Table 2) but not in any of the archaeological samples. As a result, contamination issues did not affect interpretation of any of the residues in the project.

Table 1. Sherd provenance, description, lipid quantification, and residue description and interpretation for all pottery and soil samples in the project.

#	Provenance	Description	Lipid µg/g	Residue description	Interpretation
RL 275	38DR83A N 992.5 E915 Z. 2 L. 3 FS #190	Cordmarked rim/necksherd, highly constricted, fine grit-tempered, compacted paste, blackened interior	73.5	AL_{29} in N, sitosterol in N, ketone series in N, FAs unsaturated, dominated by $C_{18:0}$	Primarily meat, some plant present
RL 276	38DR83A N992.5 E915 Z. 2 L. 3 FS #190	Soil	6	DHA in TLE and N, ketone series in TLE and N, AL_{29} in N, plant sterols in N, diterpenoids in N, amyrin in N	Typical soil in area with regular forestfires
RL 277	38DR83A N992.5 E15 F46 FS #200	Plain buff bodysherd, grittempered, reddish interior surface, buff exterior	2809	AL_{29} in N, cholesterol in N, sitosterol in N, $C_{16:0}$ and $C_{18:0}$ fairly balanced, TLE dominated by $C_{15:0}$	Primarily meat, or mixture of plant/fish and meat, extensively degraded TLE

RL 278	38DR 83A N992.5 E15 F46 FS #200	Soil	4	DHA in TLE and N, some phthalates, ketone in TLE and ketone series in N, AL_{29} in N, stigmasterol in N, amyrin in N	Typical soil in area with regular forestfires
RL 279	38DR83A N992.5 E915 F 46 FS #200	Plain rimsherd, everted rim, grittempered, black paste	104	Some phthalates, AL_{29} in N, cholesterol in N, sitosterol in N, FAs dominated by $C_{18:0}$, but $C_{18:1}$ also present	Primarily meat, some plant present
RL 280	38DR83A N992.5 E915 F 46 FS #200	Soil	6	DHA in TLE and N, triterpenoids in N, some phthalates, TAG in TLE, AL_{29} in N, plant sterols in N, ketone in N	Typical soil lipids, less evidence of burning.
RL 281	38DR83A N1055 E885 Base Zone 3	Soil stuck to sherd	5	DHA in TLE and N, triterpenoids in N, some phthalates, sitosterol in TLE, plant sterols in N, AL_{29} in N	Typical soil lipids, less evidence of burning
RL 282	38DR83A N1055 E885 Base Z. 3	Grit-tempered plain bodysherd, reddish buff interior, thick black core	148	Cholesterol in N, sitosterol in N, Fas dominated by $C_{18:0}$	Primarily meat, some plant present

#	Provenance	Description	Lipid µg/g	Residue description	Interpretation
RL 283	38DR83A N950 E855 Z. 2 @ point where 22 meets mottled subfeatures	Soil	15	Some phthalates, ketone series in TLE and N, v. abundant, Me DHA in N, triterpenoids in N, AL_{29} in N, cholesterol in N, sitosterol in N.	Typical soil in area with regular forestfires
RL 284	38DR83A N950 E855 Z.	Fine grit-tempered, cord-marked bodysherd, dark exerior, light gray interior	208	Some plasticizers, amyrin in N, FAs have more $C_{18:0}$, no sterols present.	Primarily meat with some plants present, or mixture of plant/fish and meat

#	Provenance	Description	Lipid µg/g	Residue description	Interpretation
RL 285	38DR83A 950N 860E Z. 2 L. 3	Soil	4	Cholesterol in TLE and N, plant sterols in N, some plasticizers, ketone series in TLE and N, Me DHA in N, triterpenoids in N, AL_{29} in N, stigmastanol in N	Typical soil in area with regular forestfires
RL 286	38DR83A 950N 860 E Z. 2 L. 3	Zoned plain collar, cordmarked body, grit-tempered, punctated or single stamped zone below plain collar	4	Cholesterol in TLE and N, plant sterols in TLE and N, TAGS in TLE, phthalates in N, AL_{29} in N, FAs have more $C_{18:0}$, but some unsaturates, including $C_{16:1}$	In good condition, primarily mixture of plant/fish and meat
RL 287	38DR83A N992.5 E975 Z. 2 L. 3 FS 190	Soil	7	Cholesterol in TLE and N, sitosterol in TLE, plant sterols in N, amyrin in N, TAGS in TLE, ketone series in TLE and N, AL_{29} in N	Typical soil in area with regular forestfires
RL 288	38DR83A N992.5 E975 Z. 2 L. 3 FS 190	Plain grit-tempered bowl rimsherd with thickened rim, v dark core, reddish exterior and interior	240	Some phthalates, AL_{29} in N, ketone series in N, FAs dominated by $C_{18:0}$, no sterols present	Primarily meat with some plant present
RL 289	38DR83C N910 E940 F 99 L. 4 just above sterile	Fabric-impressed, grit-tempered bodysherd	1	Some phthalates, cholesterol in TLE and N, very abundant plant sterols in TLE and N, AL_{29} in N, stigmastanol in N, ketone in N, amyrin in N, FAs unsaturated, more $C_{16:0}$	Small amount of residue, primarily plant or fish with some meat present

RL 290	38DR83C N910 E940 F 99 L. 4 just above sterile	Soil	3	Some phthalates, ketone series in TLE and N, AL_{29} in N, cholesterol in N, sitosterol in N, stigmastanol in N	Typical soil lipids, less evidence of burning
RL 291	38DR83A N992.5 E915 F 46 FS #200	Plain bowl rimsherd, grit-tempered buff paste, maybe burnished?	1	Some phthalates, cholesterol in TLE and N, plant sterols in TLE, sitosterol in N, TAG in TLE, AL_{29} in N, amyrin in N, FAs very highly unsaturated	Primarily fish or shellfish with some plants present
RL 292	38DR83A N992.5 E915 F 46 FS #200	Soil	18	Plant sterols in TLE and N, ketone series in TLE and N, v. abundant, DHA in N, AL_{29} in N, amyrin in N, stigmastanol in N	Typical soil in area with regular forestfires
RL 293	38DR83A N950 E855 Z. 2	Z-twist cordmarked, grittempered bodysherd	trace	DAGs in TLE, some phthalates in N, AL_{29} in N, cholesterol in N, sitosterol in N, stigmastanol in N, amyrin in N, $C_{16:0}$ and $C_{18:0}$ equally abundant, moderately unsaturated	Not interpretable; vessel may not have been used.
RL 294	38DR83A N950 E855 Z. 2	Soil	17	DHA in TLE,Me DHA in N, very abundant ketone series in TLE and N, AL_{29} in N, plant sterols in N	Typical soil in area with regular forestfires, more longchain fatty acids than most soil lipids in this study
#	**Provenance**	**Description**	**Lipid µg/g**	**Residue description**	**Interpretation**
RL 295	38DR83AN 1055 E885 Z. 2 L. 2 FS #147	Grit-tempered burnished bodysherd, reddish buff interior surface	1	Some phthalates, plant sterols in TLE and N, TAGs in TLE, AL_{29} in N, cholesterol in N, FAs highly unsaturated, dominated by $C_{16:0}$	Small amount of residue, particularly compared with soil sample. Not interpretable.

RL 296	38DR83A N1055 E885 Z. 2 L. 2 FS 147	Soil	17	Plasticizer contamination, ketone series in TLE and N, Me DHA in N, amyrin in N, AL_{29} in N, plant sterols in N, stigmastanol in N	Typical soil in area with regular forestfires, more longchain fatty acids than most soil lipids in this study, plasticizer contamination.

Residues deriving primarily from fish and/or shellfish

RL 291, from a plain, grit-tempered bowl, possibly Colonoware, was the only residue in the project interpreted as originating primarily from fish or shellfish. This sherd contained little residue—so little that it was on the borderline of interpretable (Table 1). The high incidence of triacylglycerols and the difference between the archaeological residue and the associated soil sherd, however, suggest that this residue was interpretable. The incidence of unsaturated fatty acids was very high (Table 4), and the most abundant fatty acid in the residue was $C_{16:0}$. The ratio of $C_{18:0}/C_{16:0}$ was .31. As mentioned above, a combination of a $C_{18:0}/C_{16:0}$ ratio below .48 and the presence of cholesterol in the residue is a potential marker for a primarily fish and/or shellfish origin (Isaksson and Hallgren 2012). This, with the highly unsaturated nature of the fatty acids in the residue, suggests that the residue did originate primarily in fish and/or shellfish processing, but that plant resources were also present, as signified by the plant sterols in the residue (Table 3). Since fish and shellfish tend to be low in lipids, it is not unusual for sherds containing primarily fish and/or shellfish lipids to be low in overall lipid residues. It is not surprising that a site located along a tidewater river should show fish or shellfish utilization. It is somewhat unusual, however, for a vessel at a site to be used primarily for these contents, which seems to be the case with this bowl.

Unfortunately, it is not possible at this time to distinguish between fish and shellfish resources through lipid residues alone. The lipids of both types of resources are remarkably similar. Since the faunal analysis at the site has found fish bones (stingray, catfish, and gar) but no evidence for shellfish, it seems most likely that fish was processed in the bowl, instead of shellfish.

Table 2. Percentage of Total Lipid Extraction (TLE) fraction for each compound in each residue in the project. Compounds are organized by variety, and then by chain length. Unknowns are labeled by elution time. Each pottery sherd and associated soil sherd are placed together in the table, with the archaeological sample results in boldface.

Compound	**RL 275**	RL 276	**RL 277**	RL 278	**RL 279**	RL 280	RL 281	**RL 282**	RL 283	**RL 284**	RL 285	**RL 286**	RL 287	**RL 288**	**RL 289**	RL 290	**RL 291**	RL 292	**RL 293**	RL 294	**RL 295**	RL 296
$C_{14:0}$		1		1	**1**	1			1		2		1						**1**	2	**1**	2
$C_{15:0}$			**61**																	1		
$C_{16:0}$	**31**	4	**8**	6	**23**	8	7	**28**	7	**9**	7	**9**	15	**23**	**9**	9	**5**	6	**25**	7	**19**	5
$C_{17:0}$	**2**			1	**1**	1		**2**	1	**1**	1	**1**	1	**2**					**1**	1		1
$C_{18:1}$		1		2	**1**			**3**			1	**1**	1					1	**4**	1		
$C_{18:0}$	**63**	7	**30**	9	**34**	14	10	**64**	9	**16**	10	**28**	19	**72**	**12**	10	**5**	8	**36**	5	**19**	5
$C_{20:0}$									1	**2**		**1**							**1**			
$C_{22:0}$							1												**1**	1		1
$C_{23:0}$				1																1		
$C_{24:0}$		1		2		2	3		1		1								**1**	3		2
$C_{25:0}$		1		1		1	1													1		
$C_{26:0}$		2		2		2	5		1		1									2		2
$C_{27:0}$		1		1		1														1		
$C_{28:0}$		3		4		3					1									2		2
$C_{30:0}$		1																				1
C_{12}br											1											1
C_{15}br																		1				
C_{16}br																				1		
C_{17}br	**1**					1		**1**							**1**	1			**1**			
C_{31}br		1																				
C_{16} tetramethyl												**1**										
C_{20}hydroxy																		1				
C_{22}hydroxy				1		1														1		1
C_{24}hydroxy		4		5		5	5		3		2									5		3
C_{28}hydroxy																				1		
C_{30}hydroxy		1																				
MAG 14		1														1	**2**					
MAG 16:1																					**2**	
MAG 16		1			**1**	1	1		1			**4**			**2**	2	**7**		**4**		**4**	

MAG 18:1																					**2**	
MAG 18		2		1	**2**	5	1		1	**15**					**3**	2	**15**	1	**5**		**7**	
MAG 26																		1				
DAG 14, 16												**1**										
DAG 15, 16												**2**							**1**			
DAG 16, 16									1			**7**							**2**			
DAG 16, 17												**1**										
DAG 16, 18												**15**							**2**			
DAG 17, 18												**1**										
DAG 18, 18												**8**							**1**			
TAG 8,8,8													1									
TAG 8,10,10													2									
TAG 14, 16;1, 16												**3**										
TAG 16, 16, 16												**3**									**1**	
TAG 16, 16, 18:1																					**2**	
TAG 16, 18, 18												**1**					**2**				**5**	
14nonacosanone									2							1		3		1		1
16-		1		9					10		3		4			11		12		5		4

Compound	**RL 275**	RL 276	**RL 277**	RL 278	**RL 279**	RL 280	RL 281	**RL 282**	RL 283	**RL 284**	RL 285	**RL 286**	RL 287	**RL 288**	**RL 289**	RL 290	**RL 291**	RL 292	**RL 293**	RL 294	**RL 295**	RL 296
hentriacontanone																						
16tritriacontanone									12		5		6			12		11		10		5

Compound	**RL 275**	RL 276	**RL 277**	RL 278	**RL 279**	RL 280	RL 281	**RL 282**	RL 283	**RL 284**	RL 285	**RL 286**	RL 287	**RL 288**	**RL 289**	RL 290	**RL 291**	RL 292	**RL 293**	RL 294	**RL 295**	RL 296
18pentatriacontanone		1							3		1		1			1		2		2		1
Glycerol					**3**																**1**	
DEET				1							1											1
N-propyl benzamide									6											3		3
Isopropyl myristate				1											**1**							
2-ethoxy cyclo hexanol															**2**							
2-ethylhexyl maleate		2		3							6		5			7		4		1		5
Dehydroabietic acid		1		2		2	1													1		
Amyrin		1		2	**1**	2	3				1		1					2				1
Cholesterol											2	**1**	1		**1**		**2**					
Stigmasterol															**1**			1				
Campesterol												**1**			**9**		**4**				**3**	
Sitosterol							5					**1**	1		**9**		**3**	1			**1**	
Dihydrolanosterol															**1**							
Germanicol		1		1			1															
OL_{12}											2				**1**							1
OL_{14}				1							1				**1**					1	**1**	
OL_{16}				5					1				2			2		1		2		
OL_{17}																1						
OL_{18}		1		1					1		1		5			1		1		1		1

Compound	**RL 275**	RL 276	**RL 277**	RL 278	**RL 279**	RL 280	RL 281	**RL 282**	RL 283	**RL 284**	RL 285	**RL 286**	RL 287	**RL 288**	**RL 289**	RL 290	**RL 291**	RL 292	**RL 293**	RL 294	**RL 295**	RL 296
OL_{22}		1		1		1	2		1		1					1		2		1		2
OL_{23}		1					1		1									1				
OL_{24}		4		5		5	7		2		3	**1**	1		**1**	2	**1**	4		3	**1**	2
OL_{25}		1		1		1	2		1		1					1		1		1		
OL_{26}		3		3		3	4		1		2		1		**1**	1	**2**	3		2	**1**	1
OL_{28}		3		4		4	6		2		2		2			1		3		2		1
OL_{29}						1	1															
OL_{30}		4		5		4	4		2		2		1					2	**1**	1	**1**	1
OL_{31}		1				1																
OL_{32}		8				8	11		5		4		3			1		4		4		3
OL_{34}		1				1	1		1													
OL_{14}br																						1
OL_{16}br										**3**												
OL_{29}br		1																				
OL_{32}br							1															
di-OL_{20}				1																		
di-OL_{24}		1		1																		
di-OL_{26}						1	2													1		
di-OL_{28}									1		1							1				
di-Olbr 20.08																			**1**		**1**	
AL_{16}																1						
AL_{17}															**1**							
AL_{18}						1					1	**1**			**1**							
AL_{20}										**12**					**1**	1						1
AL_{21}																1						1
AL_{22}										**5**					**2**	1				1		1
AL_{23}																1						1

Compound	**RL 275**	RL 276	**RL 277**	RL 278	**RL 279**	RL 280	RL 281	**RL 282**	RL 283	**RL 284**	RL 285	**RL 286**	RL 287	**RL 288**	**RL 289**	RL 290	**RL 291**	RL 292	**RL 293**	RL 294	**RL 295**	RL 296
AL_{24}										**7**					**1**	2	**1**	1				1
AL_{25}									1				2		**2**	2	**7**	1				
AL_{26}									1		1	**1**	1		**2**	2	**5**	1				
AL_{27}		1							1		1	**1**			**2**	1	**6**	1			**2**	1
AL_{28}													2			1		1				
AL_{29}		1		1		1	1		1		1		1		**2**	1	**6**	1			**3**	1
AL_{30}									1		1	**1**	1		**2**	1	**6**	1			**2**	
AL_{31}		2		2		1	2		1	**1**	1	**1**	1		**2**	1	**5**	1			**2**	1
AL_{32}												**1**	1		**2**	1	**3**				**1**	
AL_{33}		2				2	2		1		1				**1**	1	**2**	1		1		1
AL_{35}									1													
AL_{16}br																						1
AL_{18}br		1		1							1				**2**							
AL_{19}br															**1**							
AL_{21}br															**1**					1		
AL_{22}br									1						**1**							
AL_{23}br															**1**							
AL_{27}br													1									
AL_{29}br									1								**1**					
AL_{30}br		1					1								**2**							
AL_{31}br																				1		
AL_{32}br										**1**								1				
AL_{33}br													2								**1**	
AL_{35}br		1					1				1		1					1		1		
? 9.20 119																						1
? 9.49 119 103, 287																				1		

Compound	**RL 275**	RL 276	**RL 277**	RL 278	**RL 279**	RL 280	RL 281	**RL 282**	RL 283	**RL 284**	RL 285	**RL 286**	RL 287	**RL 288**	**RL 289**	RL 290	**RL 291**	RL 292	**RL 293**	RL 294	**RL 295**	RL 296
? 9.60 Methoxy alkanol											1											
? 10.25 195				3									3		**1**	2				1	**1**	3
? 10.35 195		2				2					3										**2**	
? 10.44 Cyclo AL															**1**							
? 10.50 195						1							1									
? 10.75 195													2		**2**	1					**6**	
? 10.80 270										**8**												
? 10.95 195		5				3	1		1		4						**2**			1		4
? 11.12 147,335,350, 219,203													1									
? 11.32 293					**1**																	
? 12.65 293					**1**																	
? 13.88 Triol																						1
? 14.14 hydroxy?																		1				
? 14.24 Triol		2									1							1				
? 14.30 br diol						1	1															
? 14.32 105, 163																				1		
? 14.63 Nitrile																				1		
? 14.94 145													1									
? 15.69 249,																		2				

204, 105											
? 15.77 204,232,249, 360	1	1				1	1				
? 16.33 glucoside or sugar			**5**								
? 16.46 glucoside or sugar			**5**								
? 16.49 glucoside or sugar			**4**								
? 17.14 glucoside or sugar			**7**								
? 18.33 80, 515, 530, 473, 459					**2**						
? 18.96 204, 316, 301, 268			2								
? 19.69 217,231,513										**1**	
? 20.61 495,273,135, 95,75								**1**			
? 20.79 triterp.								**1**			
? 20.98 Triterpenoid 189,203									1		

Compound	**RL 275**	RL 276	**RL 277**	RL 278	**RL 279**	RL 280	RL 281	**RL 282**	RL 283	**RL 284**	RL 285	**RL 286**	RL 287	**RL 288**	**RL 289**	RL 290	**RL 291**	RL 292	**RL 293**	RL 294	**RL 295**	RL 296
? 21.07 cyclo AL																				1		1
? 21.18 512,383,273, 135,73															**1**							
? 21.41 Triterpenoid						2	2															
? 22.09 MW 532											1											
? 22.69 branched hydroxyl FA																		1				
? 22.73 217, 307		1																				
? 22.88 579													1									

Residues originating primarily from meat or animal resources

Six of eleven sherds in this study (55%) were interpreted as containing primarily animal-based components: RL 275, RL 277, RL 279, RL 282, RL 284, and RL 288. In our experience, the majority of North American residues derive primarily from plant and/or fish resources (Reber and Evershed 2006). There were more vessels used to process primarily meat than we expected. This higher abundance of animal-based residues does make sense in terms of the abundance of faunal remains at the site. Lord Ashley was used as a cattle-ranching center, and cow bones were very abundant in the faunal record, with the remains of pigs, chickens, and medium-sized wild animals also found (Agha 2012:91-92). The residue analysis therefore agrees with the faunal analysis, in that meat was consumed in large amounts at Lord Ashley.

As mentioned above, an interpretation of 'primarily meat' derives from a combination of the presence of cholesterol, the biomarker for animal products, and a fatty acid profile that is primarily unsaturated and generally dominated by $C_{18:0}$. All of the residues identified as containing primarily meat in the study also contained some plant components, as showed by the presence of plant sterols, AL_{29}, and terpenoids. Of these sherds, one was from a plain grit-tempered bowl, and the others were from either jars or vessel of indeterminate shape (Table 1). Surface treatment varied among these sherds, although all were grit-tempered. All the sherds in this category contained abundant lipids, as shown by the quantification in Table 1. This is fairly typical of animal lipids—since animal resources are higher than lipids than both plant and most fish and shellfish, residues comprised primarily of meat lipids tend to be abundant. A corollary to this, of course, is that abundant animal lipids can mask the less abundant plant and fish lipids that might be present in the same sherd. Vessels interpreted as containing primarily meat may also have been used to process plant, fish, and shellfish resources. The residue, itself, however, derives primarily from animal resources.

Table 3. Percentage of Neutral fraction for each compound in each residue in the project. Compounds are organized by variety, and then by chain length. Unknowns are labeled by elution time, and sherds and parallel soil samples are arranged as in Table 2.

Compound	**RL 275**	RL 276	**RL 277**	RL 278	**RL 279**	RL 280	RL 281	**RL 282**	RL 283	**RL 284**	RL 285	**RL 286**	RL 287	**RL 288**	**RL 289**	RL 290	**RL 291**	RL 292	**RL 293**	RL 294	**RL 295**	RL 296
Cholesterol			**2**		**4**			**5**	1		3	**5**	2		**3**	1	**3**		**1**		**1**	
Campesterol												**8**			**14**						**3**	
Stigmasterol		2		1		1	2				1		1		**1**			1		1		1
Germanicol, ME		2																1				1
Germanicol											1											
Sitosterol	**1**	3	**1**		**7**	9	8	**3**	2		2	**7**	2		**8**	1	**3**	2	**1**	2	**3**	2
Stigmastanol											2				**4**	2		1	**1**			1
Glycerol			**1**					**61**		**3**						2	**1**					
Methyl abietate		1		1		2	1		1		1									2		1
Dehydroabietic acid		1					1											1				
3-methoxy Friedoleanone						2																
Methoxy oleanene						2	3		1													
Methoxy friedoneogammeracene						1																
Amyrin		4		2							2		2				**1**	6				1
Amyrin		1		1		2	1			**1**	1				**10**			1	**1**			
Hopenone																			**1**			
14-nonacosanone									1					**1**		2				3		3
15-triacontanone														**1**								
15-hentriacontanone	**2**	2		14					14		5		6	**9**		14		15		16		8
16-dotriacontanone									1													
16-tritriacontanone	**1**	3		13		2			17		4		4	**21**	**1**	20		16		17		10
17-dotriacontanone														**1**								
17-tetratriacontanone														**1**								
18-pentatriacontanone				3					2					**4**		5		3		3		2

Galoxolide																	**1**					
OL_{12}		1	**2**						1		5		1		**1**			1	**1**		**5**	3
OL_{13}			**1**						1		1		2						**1**			1
OL_{14}		1	**4**	1					1		2		2			1						2
OL_{15}			**17**										2				**2**		**8**			1

Compound	**RL 275**	RL 276	**RL 277**	RL 278	**RL 279**	RL 280	RL 281	**RL 282**	RL 283	**RL 284**	RL 285	**RL 286**	RL 287	**RL 288**	**RL 289**	RL 290	**RL 291**	RL 292	**RL 293**	RL 294	**RL 295**	RL 296
OL_{16}	**6**	2	**48**	1			1		2		3	**1**	7	**2**	**2**	3	**2**	2		3	**1**	2
OL_{17}	**4**										1	**3**	1	**2**							**1**	
OL_{18}	**10**	2		1	**5**				2	**1**	2	**2**	8	**2**	**2**	2	**1**	1	**1**	3	**2**	1
OL_{20}	**1**	1		1		1	1		1		1				**1**			1		1	**1**	1
OL_{22}	**1**	3		2		3	4		3		4	**1**	2		**1**	2	**1**	3	**1**	3	**2**	3
OL_{23}		1		1		1	1		1		1	**1**	1			1	**1**	1		1	**1**	1
OL_{24}	**2**	9		6		8	11		5		9	**3**	4		**2**	4	**2**	6	**2**	7	**3**	6
OL_{25}		2		1		1			1		1	**1**	1			1	**1**	1		1	**1**	1
OL_{26}		6	**1**	5		7			3		7	**4**	3		**1**	2	**2**	4	**1**	4	**2**	3
OL_{27}						1															**1**	
OL_{28}	**3**	7		6		7	11	**4**	4		6		4			2	**1**	5	**2**	4	**1**	5
OL_{30}	**3**	6		5		7	8	**3**	2		4	**3**	3			2		3	**1**	3	**1**	3
OL_{31}						2	2															
OL_{32}	**2**	13	**1**	12		14	20		8		8		3			2	**1**	5	**3**	7	**2**	7
OL_{34}	**1**	2		1		2	2															
OL_{36}						1															**1**	
15-one OL_{30}		1																				
22-Me di-OL_{22}								**4**														
OL_{15} br		1		1														1				
OL_{16} br																						1
OL_{17} br															**4**							

OL_{24} br								**8**														
OL_{25} br							2															
AL_{15}		1																				
AL_{16}	**1**	1	**2**												**2**							1
AL_{17}	**2**		**1**	1						**4**	1	**2**	1		**4**						**2**	2
$AL_{18:1}$																						
AL_{18}	**2**	1	**1**	1							1					1		1	**3**			
AL_{19}		2																				2
AL_{20}		1		1						**14**	1		1		**2**	2		1	**5**			2
AL_{21}									1							2		1	**2**	1		2
AL_{22}									1	**10**			1		**2**	3		1		1	**3**	
AL_{23}									1	**1**		**2**			**1**	1	**2**	1	**1**	1	**2**	2
AL_{24}	**3**								1	**13**			1		**2**	2	**4**	1	**1**	1	**3**	2

Compound	**RL 275**	RL 276	**RL 277**	RL 278	**RL 279**	RL 280	RL 281	**RL 282**	RL 283	**RL 284**	RL 285	**RL 286**	RL 287	**RL 288**	**RL 289**	RL 290	**RL 291**	RL 292	**RL 293**	RL 294	**RL 295**	RL 296
AL_{25}	**5**	1					1		1	**1**	2		4		**4**	2	**8**	1	**2**		**6**	1
AL_{26}	**7**		**1**				1		1	**12**	1	**6**	4	**1**	**5**	3	**9**	1	**2**	1	**7**	1
AL_{27}	**7**		**2**	1	**15**	1	1		1		1	**7**	4	**1**	**4**	2	**9**	1	**2**		**7**	1
AL_{28}	**6**	1		1			1		1	**21**	1	**7**	5	**1**	**4**	2	**8**	1	**2**		**6**	1
AL_{29}	**6**	1	**2**	1	**23**	1	1		1		2	**6**	4	**1**	**4**	2	**7**	1	**2**	1	**5**	1
AL_{30}	**5**	1	**1**	1	**15**	1	1		1	**6**	1	**5**	3	**1**	**4**	2	**6**	1	**2**		**4**	
AL_{31}	**3**	3	**2**	2	**12**	3	3		2		3	**5**	3	**1**	**2**	2	**3**	1	**2**	1	**3**	1
AL_{32}	**3**		**1**	1	**8**	1			1	**1**		**4**	2			1	**4**		**1**		**2**	
AL_{33}	**1**	2	**1**	2		3	3		2			**2**	2		**1**	1	**2**	1	**1**	1	**1**	
AL_{35}		1		1		2	1		1				1		**2**		**1**					1
AL_{36}	**2**					1										1	**2**		**1**		**2**	
AL_{15}br										**1**												
AL_{16}br										**1**											**2**	1
AL_{17}br				1																	**1**	2

$AL_{18}br$																	**3**	1	**2**			
$AL_{19}br$													1					1	**11**	1	**3**	1
$AL_{20}br$		1	**2**			2											**1**		**4**	1	**2**	
$AL_{21}br$	**1**										1		1						**5**		**1**	
$AL_{22}br$																	**1**		**1**			
$AL_{23}br$																				1		
$AL_{24}br$																				1		
$AL_{29}br$	**1**																**1**					
$AL_{31}br$	**3**																					
$AL_{32}br$							1															
$AL_{33}br$					**6**						2											
$AL_{35}br$											1											
$AL_{36}br$		1																				
? 8.49 Cyclo AL																			**1**			
? 10.07 Cyclo Al		1							1										**7**	1		1
? 10.19 131																					**1**	
? 11.29 350, 219, 203, 147, 7								**6**														
? 11.29 293					**6**							**3**										
? 12.37 cyclo AL									1										**2**			

Compound	**RL 275**	RL 276	**RL 277**	RL 278	**RL 279**	RL 280	RL 281	**RL 282**	RL 283	**RL 284**	RL 285	**RL 286**	RL 287	**RL 288**	**RL 289**	RL 290	**RL 291**	RL 292	**RL 293**	RL 294	**RL 295**	RL 296
? 15.39 175, 129,73			**1**																			
? 15.62 cyclo AL										**1**												
? 15.96 252,397	**1**																					
? 16.97 205								**5**														
? 17.89 (v. branchy)																	**1**				**1**	
? 16.37 137, 95, 191, 395																			**2**			
? 18.29 triterp. 438		2																1				

? 18.38 triterp. 189, 204, 269, 316, 135, 121																					**1**	
? 18.48 triterp. 204, 189, 269, 301, 316, 453																						3
? 18.56 triterp. 191, 189, 410																			**1**			
? 18.8 stanol?															**1**							
? 19.11 triterp. 189, 177, 204, MW 440							1															
? 19.75 br diol				1			1															
? triterp. 19.61																			**1**			
? 19.67 triterp. 189, 204, 117, 75, 269, 298, 374, 359						1																
? 19.71 triterp. 398, 204, 73, 121											1											
? 19.86 stanol? M.W. 496										**1**												
? 20.20 triterp. 191, 248, 496, 528						1													**1**			
? 20.08 205, 221																		2				
? 20.26 triterp. 191, 231, 275, 413							1												**1**			
? 20.39 triterp. M.W.										**2**												

Compound	**RL 275**	RL 276	**RL 277**	RL 278	**RL 279**	RL 280	RL 281	**RL 282**	RL 283	**RL 284**	RL 285	**RL 286**	RL 287	**RL 288**	**RL 289**	RL 290	**RL 291**	RL 292	**RL 293**	RL 294	**RL 295**	RL 296
498																						
? 20.71 512, 183, 273, 189																			**1**			
? 21.30 512, 95, 383, 273										**1**												

? 21.44 512, 383, 273, 135					**1**						
? 21.54 triterp. 203, 205					**1**	**1**					**1**
? 21.35 130, 299, 342, 485, 496				1							
? 21.98 dioxolane?		1	1								
? 22.06 217, 307, 95										**1**	
? 22.07 217, 191								**1**			
? 22.34 95, 177, 307											**1**
? 22.66 191, 217, 307, 369										**1**	
? 22.93 217, 117, 307											**1**
? 23. 68 580, 130, 143, 75, 328, 382, 367, 313			1								

Residue originating from a mixture of plant and animal resources

One residue, RL 286, was interpreted as originating from a more-or-less equal mixture of plant and animal resources. The sherd was also unusual, as it was a zoned collared vessel that *may* correspond to the Ashley series. This pottery style is associated with 17th century Native American peoples (Agha 2012:75). All other interpretable residues in the study were comprised primarily of meat, fish, or shellfish components, with a clear but small plant contribution. RL 286 had a strong plant contribution, although animal-based components were also present and abundant in the residue. RL 286 contained the most plant sterols of any of the interpretable archaeological samples—8% of the neutral fraction was campesterol, and 7% was sitosterol (Table 3). Cholesterol also made up 5% of the neutral fraction, showing the presence of animal-based components in the residue. The fatty acids for this residue appeared fairly evenly mixed, with unsaturated fatty acids typical of plant-based residues, but with $C_{18:0}$ dominating the fatty acid fraction, which is typical of animal-based residues (Table 4).

Although only 4 µg/g of lipid were identified in this sherd, it seems likely that this amount, with the quantification system used in the UNCW Lab, is equal to or greater than 5 µg/g using GC-FID quantification. Further, the lipids from the archaeological sample and the parallel soil sample were noticeably different. For this reason, RL 286 was viewed as interpretable, and containing an equal mixture of plant and animal components. This residue may represent pot use by Indians, either traders, servants, or slaves, as opposed to the bulk of pots in this study, which were probably produced and used by African slaves.

Sherds containing no, or very little, residue

Sample RL 293 contained a very small quantity of lipid overall, as shown in Table 1. This cordmarked grit-tempered bodysherd contained only a trace of lipid overall (less than .3 µg/g)--much less than was present in the soil sample from the same context, which contained 17 µg/g lipid. This sherd was therefore interpreted as containing functionally no residue. Samples RL 289 and RL 295, a fabric-impressed grit-tempered bodysherd and a burnished grit-tempered bodysherd, respectively, were interpreted similarly. Although there was more lipid in these two sherds overall, there was much less residue in the potsherds than was present in the surrounding soil (see Table 1). Further, the compositions of the archaeological samples and the corresponding soil samples were similar enough that these samples were not interpretable.

In all three of these cases, either the original vessels were never used at all, they were used to contain or serve dry foods, they were used perhaps once or twice for short periods of time to process resources that contained relatively few lipids, or they were used to contain water. Given the nature of the site, a completely unused vessel seems somewhat unlikely. The sherds may have been from containers for dry or uncooked resources, such as cornmeal, fruit, or vegetables, or for water.

Table 4. Percentage of fatty acid fraction for each compound in each residue in the project. Compounds are organized by variety, and then by chain length. Unknowns are labeled by elution time, and archaeological and soil lipids are laid out similarly to Tables 2 and 3.

Compound	**RL 275**	RL 276	**RL 277**	RL 278	**RL 279**	RL 280	RL 281	**RL 282**	RL 283	**RL 284**	RL 285	**RL 286**	RL 287	**RL 288**	**RL 289**	RL 290	**RL 291**	RL 292	**RL 293**	RL 294	**RL 295**
$C_{8:0}$													1								
$C_{12:0}$				1																	
$C_{14:0}$	**1**	2	**1**	8		2	2		4	**2**	7	**2**	6		**2**	6	**1**		**1**	5	**2**
$C_{15:0}$		1		2			1		2	**1**	2	**1**	1		**1**	1		2		2	**1**
$C_{16:1}$		3		2		2	2				3	**2**	4		**3**	5	**25**	2		1	**8**
$C_{16:0}$	**32**	33	**48**	27	**15**	24	25	**32**	37	**33**	34	**34**	37	**25**	**48**	37	**33**	35	**45**	29	**36**
$C_{17:0}$		2		2		1		**2**	3	**2**	2	**2**	1	**1**	**1**	1		1	**1**	3	**1**
$C_{18:2}$									1		1		1		**1**	2				1	**1**
$C_{18:1}$		11		22	**16**	17	32	**1**	7	**3**	5	**4**	8		**5**	16	**25**	16	**5**	8	**15**
$C_{18:0}$	**67**	30	**51**	12	**62**	39	13	**63**	30	**50**	29	**51**	32	**73**	**39**	25	**10**	22	**44**	13	**27**
$C_{19:1}$							1														
$C_{19:0}$							1			**1**											
$C_{20:0}$		4		3		1	4		2	**1**	1	**1**	1					3		2	
$C_{22:0}$		1		2		1												1		2	
$C_{23:0}$							1													1	
$C_{24:0}$		1		2		2	2		1									1		3	
$C_{25:0}$																				1	
$C_{26:0}$				1		1														2	
$C_{28:0}$						1														1	
$C_{30:0}$						1															
C_{18} ME																	**1**				
C_{22} hydroxy																				1	
C_{23} hydroxy						2															
C_{24} hydroxy																		1		4	
C_{26} hydroxy						1														2	

Compound	**RL 275**	RL 276	**RL 277**	RL 278	**RL 279**	RL 280	RL 281	**RL 282**	RL 283	**RL 284**	RL 285	**RL 286**	RL 287	**RL 288**	**RL 289**	RL 290	**RL 291**	RL 292	**RL 293**	RL 294	**RL 295**
C br				1							1										
C_{15}br		2		4		1	3		2		5		2			2	**1**	3		3	**1**
C_{16}br		1		3		1	5		2	**1**	2	**1**	2			3		3	**1**	4	**3**
$C_{17:1}$br																					
C_{17}br		3		5		1	4	**1**	4	**1**	5	**1**	2			2		3	**1**	4	**2**
C_{18}br				1			2														
$C_{19:1}$br																					
C_{19}br				1			1											1			
C_{29}br																		1			
Dehydroabieti c acid		1		1		1	1		1		1							1		1	
? 6.39 207, 221																					
? 7.83 195, 251																					
? 8.63 293											2										
? 11.61 205, 299											1							1			
? 12.26		2																			
? 30.34 triterp. 189, 203, 393, 483, 497																				1	
? 30.95 135, 273, 383, 512										**1**											
? 33.13 Triterp. 189, 203									1												

Soil Samples

All soil samples in the project were fairly similar, and were typical of the soil in an area with extensive coniferous vegetation and regular forest fires. The plant lipids in the soil, such as plant sterols, terpenoids, and AL_{29}, derived from the decay of plant matter. The diterpenoids dehydroabietic acid and methyl dehydroabietate were present in many (but not all) of the soil samples, as shown in Table 3. These compounds almost certainly derive from the coniferous forests that dominate the region. The regular presence of ketone series in the soil samples (Tables 2 and 3) is almost certainly due to the pyrolysis of the common fatty acids found in the soil during forest firest. Ketones are known to form pyrolytically (Evershed, et al. 1995), and the regular forest fires in long leaf pine ecosystems are well known.

As a result, if a ketone series was present in both a soil sample and an absorbed pottery residue from a context, the ketone series in the absorbed residue was interpreted as deriving from the soil. Interestingly, although diterpenoids were present in eight of the eleven soil samples, diterpenoids were not present in any of the absorbed residues.

Experimental studies suggest that these compounds are prone to absorption from the soil (Reber and Kerr 2012b); however, this type of soil contamination did not occur in the Lord Ashley samples. Stigmastanol, a breakdown product of sitosterol known to derive from manuring or sewage (Evershed, et al. 1997), was present in four of the soil samples and two of the pottery residues. Since one of these pottery residues was the only sample in the study definitively interpreted as containing little to no lipid, it seems likely that stigmastanol originated from soil contamination in at least one archaeological sample in the study, and probably both. The soil samples were very successful in allowing a more precise interpretation of the archaeological residues, and in preventing false-positive identifications of high-temperature cooking or burning (the ketones) or conifer resins (the diterpenoids). They were also useful in determining interpretability of residues from sherds with small amounts of absorbed lipids. Without the parallel soil samples, RL 291 and 286 would probably have been judged to be uninterpretable. With the samples, these residues could be successfully analyzed and interpreted.

Discussion

The residues from the Lord Ashley site are different from those in many previous residue studies because the samples from this site represent unglazed pottery at an early historic period trading post and point of contact between Indians, enslaved Africans, and colonists. Unsurprisingly, the pottery from this site seems to have been used differently from that analyzed from prehistoric Indian sites. Of the eleven sherds submitted, 3 (27%) were uninterpretable due to small amounts of residue and may have come from vessels used to contain dry contents or water. Six archaeological residues (54%) were comprised primarily of components from animal resources—meat or animal fat with a small plant contribution, possibly for flavoring. One, the RL 291 bowl sherd, came from a vessel used to process or contain primarily fish or shellfish. The remaining sherd, the RL 286 collared jar, contained the only mixed plant/animal residue in the project and may represent Indian pot use. This variation in pottery use and residues across the project is unusual compared to prehistoric residue studies. Prehistoric North American pottery residues are usually consistent across the site, with relatively small amounts of vessel specialization. All vessel types at a site have been used to process the same general mixture of foodstuffs that made up the general diet of the people at a location, and sherds with few or no absorbed lipids are very unusual.

This was not the case at Lord Ashley. These differences could be due to their relatively recent age, but seem most likely to result from the presence of enslaved

Africans at the site, and the role of the site as a cattle ranch. Residues resulting from African pot use would naturally demonstrate difference from Indian pot use, and would result from cultural differences in food choices and cooking practices. Pottery at this site was used with some degree of specialization. Some of the pots were used to process primarily meat, while others were used (probably) for dry resources and/or water. The vessel used to hold fish seems to have been used separately from the meat-processing vessels. This specialization of pot use may well result from the practices of the enslaved Africans on-site.

Further understanding of the archaeology of the Lord Ashley site, and the nature of the interaction between African slaves, native peoples, and colonists will add to the accuracy and precision of residue interpretations from the site's pottery. In combination with archaeology, further faunal, paleobotanical and scientific analyses, and the historic record, residue analysis can be of great assistance in the interpretation of the use of

Indian-made pottery at this complex and important site.

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Appendix D: Faunal Analysis

Analysis conducted by Dr. Elizabeth Reitz
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Written by Andrew Agha

Excavations during the 2013 field season recovered a minimal amount of bone and an even smaller amount of identifiable taxa. Some proveniences did contain bones large and intact enough for analysis. Table 1 lists all identified taxa and unidentifiable specimens recovered in 2013. Also included in this list are faunal remains recovered through the flotation sample collected from the east half of Feature 10 in 2011. Since that soil was processed and was included in the paleoethnobotanical analyses listed in this report, the bones from that flotation sample were sent to Dr. Reitz for a complete analysis of Feature 10.

Table 1. A listing of all identified and unidentified taxa from the 2013 excavations.

Lord Ashley 2014	m	m	m	m	m	m	m	108	
FS#	191	201	202	210	210A	215	233	242	Feat 10
UID Fish									x
Lepisosteidae (Gar)									x
Caranx sp. (Jack fish)									x
UID Bird									x
Gallus gallus (chicken)									x
UID Mammal	x		x			x	x		x
Didelphis virginiana (possum)									x
Artiodactyla (hoofed animal)						x			
Sus scrofa (wild boar)			x						
Bos taurus (cow)		x	x	x	x		x	x	
UID Vertebrate							x		x

The only bone identified from the 2013 field season came from Features 99 and 108 at the South Moat excavation block. Unidentifiable mammal was recovered from Feature 99 Levels 1, 3, 5 and 6. Evidence of an even-toed hoofed animal was found in Feature 99 Level 5, as well as a bone from a wild boar in Level 3. Cow was identified in Levels 2, 3, 4 and 6, as well as in Feature 108. The deteriorated state of all bone from the moat made for incomplete specimens with poorly preserved distal ends and diagnostic features.

Feature 10, however, provided excellent faunal preservation and several taxa were identified that reveal interesting information about the site in general. Two fish species were identified: Gar and Jack fish. Besides an unidentifiable bird species, evidence of chicken was confirmed. Lastly a bone belonging to a possum was identified.

Woodland creatures, domesticated birds and different fish varieties speak to the resourcefulness of the inhabitants at the Lord Ashley site in the first decades of the colony’s founding. Evidence of cows being consumed also continues the noted trend of beef being the dominant meat of choice for Carolina’s early English settlers.

The following faunal report is the original analysis from the 2011 field season, with the Miller Site at Charles Towne Landing State Historic Site included in Dr. Reitz's analysis and interpretations.

3/8/12

Appendix E: ANIMAL REMAINS FROM TWO EARLY SOUTH CAROLINA SITES

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Abstract

Vertebrate remains from two early sites represent colonial English animal use in the South Carolina low country near Charleston, South Carolina. Materials from 38DR83A, the St. Giles Kussoe House/Lord Ashley Settlement, contain 250 vertebrate specimens, weighing 299.907 g, and the remains of an estimated 12 individuals. Materials from 38CH1-MS, the Miller Site at the Charles Towne Landing State Historic Site, contain 332 vertebrate specimens, weighing 288.061 g, and the remains of an estimated 17 individuals. As in samples from early Spanish and French deposits elsewhere on the southeastern coastal plain, the vertebrate remains from these two sites indicate that early English colonists combined local wild animals, particularly turtles, deer, opossums, and raccoons, with pigs and cows introduced during European colonial enterprises. Indigenous animals contribute between 58 and 99 percent of the individuals (average 78 percent) in collections from Spanish St. Augustine, French Old Mobile, and these two early English sites. The English collections, however, distinguish themselves from the Spanish and French collections in the evidence they offer for a much higher use of biomass from introduced domestic animals, specifically for a much higher use of beef. This characteristic persists throughout the long Charleston archaeological record.

-3Most traditional European modes of agricultural production were unproductive in early Spanish, English, and French colonies on the southern Atlantic and Gulf coasts. During a period of experimentation and adjustment early settlers modified traditional husbandry, economic, and dietary practices to include resources that were productive in coastal plain environments. The newly developed habits came to characterize each colony's use of animals for decades. Some persist in regional cuisines today. It is likely that both acculturation and adaptation occurred in these early multi-ethnic colonial settings, making it difficult to distinguish between these two processes and their consequences. Periods of experimental and adjustment are predicted for new immigrants to novel environments. These periods appear to follow broad stages similar to those defined by Bökönyi (1975:4). He argues that initially settlers try to maintain their original husbandry system in unfamiliar colonial circumstances; perhaps the source of the common association of "starving times" with many early colonial enterprises. People try to maintain their familiar habits even when these are unproductive, making up the resulting shortfalls initially by increasing their use of wild foods and, subsequently, incorporating a different suite of domestic resources into maturing colonial economies. In animal remains from Spanish St. Augustine and French Old Mobile, for example, this can be seen in the rapidity with which traditional local resources and techniques were incorporated into the settlers' subsistence systems (Clute and Waselkov 2002; Gremillion 2002; Hardy 2011; Reitz et al. 2010; Reitz and Scarry 1985; Scott and Dawdy 2011). Because the Spanish experience preceded the English and French colonies by several decades, it is probable that by the time these other colonial powers established colonial presence elsewhere on the

-4Atlantic coastal plain, the Spanish model was already known and provided an important example to later colonial enterprises. Some of these dietary habits persist in present-day southern cuisines. Spanish efforts to survive in the subtropical Atlantic coastal environment conform to Bökönyi's (1975:4) predictions. Initially, attempts were made to introduce domestic livestock in proportions that would maintain the traditional primacy of mutton and pork over other domestic meats (Reitz and Scarry 1985:96-97). When this failed, the gap was filled by consuming wild species, especially marine fishes, before beef supplanted both pork and mutton as the major source of animal protein. This transition occurred rapidly. The Spanish settlement of St. Augustine (Florida) began in 1565 when Pedro Menéndez de Avilés established an outpost in a Timucuan village led by a cacique known as Seloy. In addition to occupying houses in this village, Menéndez fortified one of the houses, constructed a palisade, and dug a well. This original Spanish settlement was attacked and burned by Timucuans in 1566, forcing Spanish colonists to relocate to a more secure location and leading to the eventual placement of St. Augustine in its present location in 1571. The vertebrate faunal remains from Menéndez's brief settlement among the Timucua, however, contain most of the characteristics that persisted for centuries throughout coastal Spanish Florida (e.g., Orr and Colaninno 2008; Reitz 1993, 1994; Reitz et al. 2010; Reitz and Scarry 1985). Table 1 shows the Minimum Number of Individuals (MNI) and biomass estimates for the major vertebrate groups (these methods and groups are clarified below). Indigenous vertebrates contribute 99 percent of the individuals and 79 percent of the biomass. Chickens, cattle, as well as sheep and goats (caprines) are absent. Fish and deer are the dominant sources of non-commensal meat. This strategy persisted into the nineteenth century, with the primary change being the eventual dominance of beef over pork. Although domestic meats never completely replaced fish and other wild resources, by the early eighteenth century meat from domestic mammals contributed 79 percent of the non-commensal biomass in St. Augustine (Reitz et al. 2010:82-83).

Evidence from sixteenth-century Spanish settlements in Florida attests to a period of experimentation. Initial shipments of livestock to the Spanish colony included a large number of sheep, which were important in the Iberian economy but impractical in subtropical Spanish Florida. The inability of sheep to flourish and the ability of cattle to be raised under a regime of neglect were soon noted and the proportions of animals shipped shifted to the colony eventually ceased.

This outcome was not unique to Spanish Florida. A similar pattern is found in vertebrate assemblages from French colonies on the northern coast of the Gulf of Mexico. Results from French zooarchaeological studies are difficult to summarize briefly. Nonetheless, data from New Orleans and plantations near New Orleans broadly indicate that pigs and cows were the primary domestic mammals; deer was the primary wild terrestrial animal, supplemented by other wild terrestrial animals such as opossums, rabbits; and raccoons; birds included chickens, as well as turkeys and ducks; and both turtles and fishes were commonly used (Clute and Waselkov 2002; Hardy 2011; Reitz et al. 2012; Scott 2001; Scott and Dawdy 2011; Waselkov and Gums 2000). Variations among the reported collections are primarily attributed to ethnicity. It is often difficult, however, to directly associate a faunal collection with a discrete time period or a single ethnic affiliation in a region where political dominance changed among French, British, Spanish, and American authority within little more than a century and the people present at each site may have

-6remained in place despite political changes. The ethnic affiliation of a specific site's occupants at a given point in time did not necessarily correspond with the identity of the prevailing political body. Among the earliest of the French deposits are those from Old Mobile (Alabama). Old Mobile was established in its present location on the Mobile River in 1702 and was occupied until mid-1711 (Waselkov 2002). Indigenous animals provide 85 percent of the individuals and 83 percent of the biomass (Table 2; Clute and Waselkov 2002). This early deposit contains no remains of either cattle or caprines, though chickens and pigs are present. Apparently, sheep failed on the Gulf coast in the eighteenth century, just as they did on the Atlantic coast in the sixteenth century. The dominant source of animal protein in the Old Mobile collection is venison, 67 percent of the biomass. A similar pattern is found in an early French deposit from the La Pointe-Krebs Plantation on the Pascagoula River. Feature 90 at this site was deposited between 1718 and 1732. Indigenous animals comprise 80 percent of the individuals in Feature 90 and 78 percent of the biomass (Table 3; Reitz et al. 2012). This early deposit contains no pigs, though the remains of chickens, cows, and caprines are present. The major sources of animal protein are fishes (31 percent of the biomass) and venison (38 percent of the biomass). That this pattern persisted for at least a century is suggested by the faunal assemblage from Dog River, or Rivière aux Chiens (Alabama). This plantation was occupied between 1725 and 1828 by a diverse group of Native Americans, Africans, French Canadians, and some people from France (Waselkov and Gums 2000). During the occupation at Dog River, political authority passed from French, to British, Spanish, and finally to American hands. Table 4 shows patterns

-7of animal use at this site, with all time periods merged into a single summary. This summary is differs in many respects from those for two early French collections. Nonetheless, both indigenous and introduced vertebrates were used and indigenous animals provided most of the individuals (71 percent of the MNI). In terms of biomass, the transition from indigenous to introduced sources of animal protein is clear, with 89 percent of the biomass obtained from introduced chickens, pigs, and cows. Nine of the domestic mammals in the Dog River collection are pigs and nine are cows, though pork provides most of the estimated biomass (84 percent). Evidence for a tannery at the Dog River site reminds us that animals serve functions other than food. Many of the cow remains were associated with two wooden tanning vats. This use of cattle hides may explain the prominence of pork in the biomass estimate if cattle waste was discarded elsewhere during the tanning operation. Changes such as these could be evidence of different demographics at early sites but they could also be attributed to other stimuli. One reason faunal remains at colonial sites are so similar to Native American deposits in the same area could be that many of the resources were provided by Native Americans. The close ties between Native Americans and early immigrants in both Spanish and French colonies might be a source of wild foods, either via trade or through social networks. Trade between local indigenous communities and colonists was a widespread and fundamental aspect of both colonial economies. Many colonists traded for local commodities that would be exported as well as for food stuffs for local consumption. Other colonists commandeered resources in the form of tithes and tribute, or simply took what they wanted. Some Native Americans were slaves serving as domestic servants and others were married to colonists of European or African descent (Reitz 1994).

Reciprocity within kin groups

-8is a particularly likely source given the presence of Native American women in some households. This phenomenon, termed *mestizaje* by Deagan (1973) and dietary acculturation by Gremillion (2002), had a profound influence in Spanish Florida that persisted into the eighteenth century (Reitz and Cumbaa 1983). It likely also was a significant influence on the Gulf coast (Gremillion 2002). Given that *mestizaje* or creolization began almost immediately, it is probable that some colonial deposits include foods collected and prepared by native women, acquired through ties of kinship, or obtained via Native American slaves or servants. Alternatively, colonists faced with the loss of many traditional resources had good examples of successful strategies in their Native American neighbors. Early Eurasian and African colonists resided among indigenous populations whose subsistence economies were based on a set of cultivated plants adapted to local environments and a complex of locally available wild species. The new colonists could have simply followed these examples without relying upon local indigenous knowledge. Some aspects of these new strategies might have developed even in the absence of the examples offered by local indigenous populations or their contributions to colonial economies. Evidence for this is seen in the similarities in foodways adopted by Eurasian and African settlers at different places along the southeastern Atlantic and Gulf coasts between the sixteenth and eighteenth centuries. Some of the resulting colonial strategies persisted for centuries after native populations were extinct or dispersed (Reitz 1986, 1994; Reitz and Cumbaa 1983; Reitz et al. 2012; Reitz et al. 1985; Reitz and Honerkamp 1983; Reitz et al. 2010; Zierden and Reitz 2009). An additional influence might be the broader economic patterns associated with the transition from sixteenth-century to eighteenth-century global economies; and from remote

-9colonies of dominant European states to territories and states in the American antebellum south of the late 1700s. Rarely is it possible to test this possibility because typically ownership of temporally stratified sites changed as colonies changed from one colonial power to another; leaving open the possibility that the animal remains represent individual and ethnic choices that remains undocumented. The identity of occupants at each site is often unknown as well. It is far more likely that all of these factors influenced animal use within each colony, and even with each site. A wide variety of stimuli and responses occurred within each colonial setting, reflecting the skills, opportunities, resources, inclinations, and social affiliations of individual colonists. It must also be recognized that many of the colonists at the earliest Spanish, English, and French colonies were not what Spaniards would have considered to be *peninsulares*, native born in the home country. Many colonists originated at outposts in Spanish, English, and French colonies elsewhere in the Americas. At the same time, Africans quickly became part of the colonial mix, often as slaves, but also as free people of color engaged in the colonial enterprise as skilled seamen, farmers, and ranchers (e.g., Reitz 1994). Although it might be anticipated that the characteristic coastal economies of these colonies reflect African influences instead of Native American ones, it must be remembered that Africans were also strangers in a strange land and had to learn productive techniques just as European colonists had to do. Given that many early Africans were skilled in raising commodities such as rice, cotton, indigo, and cattle, it is unlikely much of their valuable labor was spent on tasks that could be performed by others, perhaps more efficiently. Thus, the economies that emerged in Spanish and French colonial settings on the southeastern coast reflect eclectic fusions of indigenous and introduced animals in patterns that are more similar to one another than they were to those of the nation that held political jurisdiction. The colonists continued to use the Eurasian suite of domestic animals, but the importance of livestock within that suite altered. The distinctive aspect of the colonial strategy, however, was the extensive use of local animals. In many respects the colonial strategy was largely an indigenous one with the addition of introduced domestic resources that could survive and prosper in the subtropical coastal settings encountered on the Gulf and Atlantic coasts.

The subsistence system that emerged was molded in part by environmental conditions, it also was shaped by interactions between colonists and Native Americans. The role Native Americans played in supplying colonists or in teaching them appropriate subsistence techniques was probably significant in forming new foodways during the initial years of European settlement. Indians provided foodstuffs to the colonists as trade goods, tithes, and tribute, as well as through reciprocity within kin networks. Some colonists simply commandeered food or relied upon enslaved native peoples to provide it. Although some Native Americans did raise European livestock, this was limited (e.g., Pavao-Zuckerman 2000, 2001; Reitz 1991, 1993, 1994; Reitz et al. 2010). A large part of the foodstuffs available from them was the typical local fare, primarily fish and venison.

Although much of the new Spanish and French strategy had an indigenous flavor, it remained European in other ways, indicating that both acculturation and adaptation were factors in the development of colonial foodways, conforming to choices predicted by Bökönyi (1975). The extent to which this same pattern characterized animal use by colonists associated with the other significant southeastern colonial power of the seventeenth and eighteenth centuries, England, is unknown. Recent work at St. Giles Kussoe House/Lord Ashley Settlement and the

-11Charles Towne Landing State Historic Site affords the opportunity to expand the study of early colonial economies to include those from the English Carolinas.

Archaeological Context

The early English data are divided into two analytical units. The first of these is from 38DR38A, the St. Giles Kussoe House/Lord Ashley Settlement in Dorchester County, South Carolina (Agha and Philips 2010). Lord Anthony Ashley Cooper was one of the eight Lord Proprietors of the Carolina settlement in the 1660s. Although Lord Ashley never visited the colony, he did oversee the development of his lands on the Ashley River. The settlement began in 1674, in an area already populated by other European colonists. These settlements were associated with Charles Towne, founded in 1670. Lord Ashley's development on the Ashley River was known as St. Giles Kussoe House. This settlement and trading post was engaged in an active animal skin trade and in cattle ranching. In 1682, there were nearly 600 head of cattle at St. Giles Kussoe (Agha and Philips 2010:13).

Faunal materials were recovered from the Lord Ashley Settlement by Brockington and Associates in 2009 during a cultural resources survey designed to assess the integrity of the site (Agha and Philips 2010). The survey included regularly spaced shovel tests. Within the area containing a concentration of seventeenth-century artifacts, 14 50-x-50 cm tests units were excavated, some of which were subsequently expanded. The contents of these tests were sifted through 1/4-inch mesh hardware cloth. Faunal materials were studied from both shovel tests and units. Appendix A contains a list of the Lord Ashley samples reported here.

The second analytical unit is from 38CH1-MS, the Miller Site excavations at the Charles Towne Landing State Historic Site in Charleston County, South Carolina. The Miller Site faunal materials were excavated in 2009 by David Jones and Cicek Beeby (2010). These materials were recovered from natural levels using a 1/4-inch mesh screen in the field followed by water screening in the lab. Remains of a tabby floor were found in some of the excavation units, though it is not known at this time which of these materials were associated with the floor and which were not. The Miller tract may have been a tavern associated with Charles Towne. The site was occupied within the Charles Towne Landing time frame, 1670-1680, and is located just outside of what is interpreted as the town's palisade. A list of the Miller Site samples studied for this report is attached as Appendix B.

Zooarchaeological Methods

Vertebrate remains were identified following standard zooarchaeological methods. All identifications were made using the comparative skeletal collection of the Zooarchaeology Laboratory, Georgia Museum of Natural History, University of Georgia by Sarah G. Bergh with the assistance of Maran E. Little. A number of primary data classes were recorded. Specimens are recorded in terms of elements represented, the portion recovered, and symmetry. The Number of Identified Specimens (NISP) is determined. The only exception is the Indeterminate vertebrate category (Vertebrata), for which specimens are not counted due to their fragmentary condition. Specimens that cross-mend are counted as a single specimen. All specimens are weighed to provide additional information about the relative abundance of the taxa identified. Indicators for age at death, sex, and modifications are noted where observed. Measurements for mammals and birds from the Lord Ashley Settlement and the Miller Site are recorded following Driesch (1976) and are presented in Appendix C.

-13The Minimum Number of Individuals (MNI) is estimated based on paired elements, size, and age. In most cases, MNI is estimated for the lowest taxonomic level. An exception to this rule is made for caprines: sheep (*Ovis aries*) and goat (*Capra hircus*). No specimens could be identified to either of these species though a few specimens are identified to subfamily (Caprinae). Although MNI is a standard zooarchaeological quantification method, the measure has several well-known biases. For example, MNI emphasizes small species over larger ones. This can be demonstrated in a hypothetical sample consisting of a pig and two chickens. Although the chickens indicate use of this domestic bird, a whole pig would supply more meat. As this example illustrated, the assumption that the entire individual was used at the site is intrinsic to MNI. From ethnographic evidence, it is known that this is not always true (Perkins and Daly 1968). This is particularly the case for larger individuals, animals used for special purposes, and where food exchange or commercial enterprises were important economic activities (Thomas 1971; White 1953). In addition to these primary biases, MNI is subject to secondary biases introduced by the way samples are aggregated during analysis. The aggregation of archaeological samples into analytical units (Grayson 1973) allows for a conservative estimate of MNI. The "maximum distinction" method applied when analysis discerns discrete sample units, results in a much larger MNI. In estimating MNI for the two sites, all faunal data associated with each site were merged regardless of the unit, feature, or level from which the materials were recovered. It is anticipated that additional archaeological analysis will provide larger samples and greater control over the temporal association for each feature and level, facilitating a more behaviorally oriented analysis.

Biomass estimates

compensate for some of the problems encountered with MNI. Biomass refers to the quantity of tissue that a specified taxon might have supplied. Estimates of biomass are based on the allometric principle that the proportions of body mass, skeletal mass, and skeletal dimensions change with increasing body size. This scale effect results from a need to compensate for weakness in the basic structural material, in this case bones and teeth. The relationship between body weight and skeletal weight is described by the allometric equation:

$Y = aX^b$ (Simpson et al. 1960:397). In this equation, X is specimen weight, Y is the biomass, b is the constant of allometry (the slope of the line), and a is the Y-intercept for a log-log plot using the method of least squares regression and the best fit (Reitz and Wing 2008:236-239). Many biological phenomena show allometry described by this formula (Gould 1966, 1971) so that a given quantity of skeletal material or a specific skeletal dimension represents a predictable amount of tissue or body length due to the effects of allometric growth. Values for a and b are derived from calculations based on data at the Florida Museum of Natural History, University of Florida, and the Georgia Museum of Natural History, University of Georgia. The formulae used are listed in Table 5.

Specimen count, MNI, biomass, and other derived measures are subject to several well-known biases (Grayson 1979, 1981; Wing and Brown 1979). In general, samples of at least 200 individuals or 1,400 specimens are needed for reliable interpretations. Smaller samples frequently generate a short species list with undue emphasis on one species in relation to others. It is not possible to determine the nature or the extent of this bias, or correct for it, until the sample is made larger through additional work.

-15Specimen count, MNI, and biomass also reflect identifiably. Some specimens of some animals are simply more readily identified than others and the taxa represented by these elements may appear more significant in terms of specimen count than they were in the diet. If these animals are identified largely by unpaired elements, such as gar scales, the estimated MNI for these taxa will be low. At the same time, animals with many highly diagnostic but unpaired elements may yield a high specimen weight and biomass estimate. Hence high specimen count, low MNI, and high biomass are artifacts of analysis for some animals. Turtles are a good example of this issue because they typically are represented primarily by carapace and plastron fragments that are heavy but may provide limited information about the number of individuals. The species identified in the two assemblages are summarized into faunal categories based on vertebrate class and economic status in order to contrast the percentage of various groups of taxa in the collection. These categories are Sharks, rays, and bony fishes, Alligators and turtles, Wild birds, Domestic birds, Deer, Other wild mammals, Domestic mammals, and Commensal taxa. In order to make comparisons of MNI and biomass estimates possible, the summary tables include biomass estimates only for those taxa for which MNI is estimated. Commensal taxa include toads (*Anaxyrus* spp.), snakes (Serpentes), moles (*Scalopus aquaticus*), mice and rats (Sigmodontidae), and domestic cats (*Felis catus*). Although commensal animals might be consumed, they are commonly found in close association with humans and their built environment as pets, vermin, or working animals (Reitz and Wing 2008:137-138). Some commensal animals are ones that people either do not encourage or actively discourage. Just as some of the animals included in the commensal category might have been consumed, likewise some animals identified as consumed might have been commensal.

-16The presence or absence of elements in an archaeological assemblage provides data on animal use such as butchering practices, economic uses, and transportation costs. The artiodactyl elements identified in the two assemblages are summarized into categories by body parts. The Head category includes only skull fragments, including antlers and teeth. The atlas and axis, along with other vertebrae and ribs, and sternum, are placed into the Axial category. It is likely the Head and Axial categories are under-represented because of recovery and identification difficulties. Vertebrae and ribs of mammals cannot be identified beyond class unless distinctive morphological features support such identifications. Usually they do not, and specimens from these elements are classified as Indeterminate mammal. Forequarter includes the scapula, humerus, radius, and ulna. Carpal and metacarpal specimens are presented in the Forefoot category. The Hindfoot category includes tarsal and metatarsal specimens. The Hindquarter category includes the innominate, sacrum, femur, and tibia. Metapodiae and podiae that could not be assigned to one of these other categories, as well as sesamoids and phalanges, are assigned to the Foot category. The specimens identified as artiodactyls in each assemblage are summarized visually to illustrate their number and location in a carcass. Although the atlas and axis fragments are accurately depicted, other cervical, thoracic, lumbar, and caudal vertebrae, as well as ribs, are placed approximately on the illustrations. The last lumbar location is used to illustrate vertebrae that could only be identified as vertebrae. The last rib location is used to illustrate ribs for which the specific rib could not be identified. Specimens identified only as sesamoids, metapodiae, podials, or phalanges are illustrated on the right hindfoot.

-17Relative ages of the artiodactyls identified are estimated based on observations of the degree of epiphyseal fusion for diagnostic elements (Reitz and Wing 2008:70-73). When animals are immature, a cartilaginous plate separates the shaft (diaphysis) of the bone from the ends of the specimen (epiphyses). As maturity is reached and growth is complete, these cartilaginous plates ossify and the epiphyses and diaphysis fuse. Although environmental factors influence the actual age at which fusion is complete, elements fuse in a regular temporal sequence (Gilbert 1980; Purdue 1983; Reitz and Wing 2008:72, 173-174; Schmid 1972; Watson 1978). During analysis, specimens are recorded as either fused or unfused and placed into one of three categories based on the age in which fusion generally occurs (Reitz and Wing 2008:193-196). Unfused elements in the Early-fusing category are interpreted as evidence for juveniles; unfused elements in the Middle-fusing and Late-fusing categories are usually interpreted as evidence for subadults, though sometimes characteristics of the specimen may suggest a juvenile. Fused specimens in the Late-fusing group provide evidence for adults. Fused specimens in the Early-and Middle-fusing groups are indeterminate. Clearly, fusion is more informative for unfused elements that fuse early in the maturation sequence and for fused elements that complete fusion late in the maturation process than it is for other elements. An early-fusing element that is fused could be from an animal that died immediately after fusion was complete or many years later. The ambiguity inherent in age grouping is somewhat reduced by recording each element under the oldest category possible. The sex of animals is an important indication of animal use; however, there are few unambiguous indicators of sex. Males are indicated by the presence of spurs on the tarsometatarsus of chickens and turkeys, antlers on deer, large tusk-like canines on pigs, the

-18baculum in those species that have one, pelvic characteristics, and characteristics of horn cores in bovids. Male turtles are indicated by a depression on the plastron to accommodate the female during mating. Females are recognized either by the absence of these features or by different shapes in these features. Some female birds may be identified by the presence of medullary bone and some males by the presence of a spur on the tarsometatarsus (Serjeantson 2009:47-53). Another approach is to compare measurements of identified specimens for dimensions that fall into a male or female range, though rarely are there sufficient numbers of measurements to reliably indicate sex. Modifications can indicate butchering methods as well as site formation processes. Modifications are classified as hacked, cut, burned, calcined, and modified. Although NISP for specimens identified as Indeterminate vertebrate are not included in the species lists, modified Indeterminate vertebrate specimens are included in the modification tables. The modified specimen is described in more detail below. Hacked and cut specimens are the product of butchering and food preparation (Reitz and Wing 2008:127-132). Hack marks are evidence that some larger instrument, such as a cleaver, was used. Presumably, a cleaver, hatchet, or axe was used to dismember the carcass before, rather than after, the meat was cooked. Cuts are small incisions across the surface of specimens. These marks were probably made by knives as meat was removed before or after the meat was cooked. Cuts may also be left on specimens if attempts are made to disarticulate the carcass at joints. Some marks that appear to be made by human tools may actually be abrasions inflicted after the specimens were discarded, but distinguishing this source of small cuts requires access to higher powered magnification than is currently available (Shipman and Rose 1983).

-19Burned and calcined specimens are the result of exposure to fire when a cut of meat is roasted or if specimens are burned intentionally or unintentionally after discard (Reitz and Wing 2008:132-134). Burned specimens result from the carbonization of bone collagen and are identified by their charred-black coloration (Lyman 1994:384-385). Calcined specimens are usually indicated by white or blue-gray discoloration (Lyman 1994:385-386). Calcined bones are the result of two possible processes: burning at extreme temperatures ($600 EC) and leaching of calcite. Both types of calcination are believed to have occurred in this assemblage, but no attempt was made to distinguish between them. Experimental studies indicate that the color of bone is a poor indicator of the type of modification because it is difficult to precisely describe color variation and other diagenetic factors may alter bone color (Lyman 1994:385).

Results: Lord Ashley Settlement and Trading Post, 38DR83A

A total of 250 vertebrate specimens weighing 299.907 g were identified in the Lord Ashley Settlement and Trading Post analytical unit, including the remains of at least 12 individuals estimated for11 taxa, seven of which are indigenous and four of which are introduced (Table 6).

Wild resources contribute 58 percent of the individuals and 19 percent of the biomass in this collection (Table 7). The most prominent wild taxa are Other wild mammals, which contribute 17 percent of the individuals and 10 percent of the biomass, and turtles, which contribute 17 percent of individuals and 5 percent of the biomass. White-tailed deer (*Odocoileus virginianus*) contribute a small amount of biomass, though the same number of individuals as pigs (*Sus scrofa*) and cows (*Bos taurus*). The shark is represented by a fossil tooth, which is likely a curio collected from a nearby fossil bed, whereas the jack (Carangidae) probably

-20represents interaction with Charles Towne or other settlements closer to the coast. The opossum (*Didelphis virginiana*) and raccoon (*Procyon lotor*), as well as the deer, could have been part of the trading post activities, though neither is unusual in colonial southeastern faunal collections. The most exceptional identification is a limpkin (*Aramus guarauna*), identified from a distal tibiotarsus in FS# 85, Feature 10W. Domestic animals contribute 33 percent of the individuals and 80 percent of the biomass (Table 7). Domestic chickens (*Gallus gallus*) are present and more abundant than either pigs or cows in terms of MNI. Although pigs and cows contribute the same number of individuals (8 percent), beef contributes 46 percent of the estimated biomass and pork 31 percent (Table 7). A single commensal animal is present (Table 6). This is a domestic cat (*Felis catus*), which is represented by a distal, fused tibia in FS# 109, Feature 10E. Deer and domestic artiodactyls are represented by 33 specimens (Table 8). Six of these are pig specimens, four of which are from the Hindquarter and two of which are teeth (Figure 1). The deer is represented by a single metatarsal fragment. The most abundant artiodactyl species is cow, represented by 24 teeth fragments and two left skull fragments (Figure 2). The skull fragments are from FS# 85 (Feature 10W) and FS# 109 (Feature 10E). Epiphyseal fusion data indicate use of subadult and adult individuals. The pig was an adult at death (Table 9) and the deer was at least a subadult if not an adult (Table10). The cow age at death is also indeterminate, though the condition of the skull fragments suggest that it too was at least a subadult at death, if not an adult. The most common modification in the Lord Ashley Settlement and Trading Post analytical unit is calcining (Table 11). An additional 24 specimens are burned.

Other

modifications

observed in this analytical unit indicate hacking and cutting also occurred. None of the specimens from the possible fur or hide animals are modified.

Results: Miller Site, 38CH1-MS

A total of 332 specimens weighing 288.061 g were identified in the Miller Site analytical unit, including the remains of at least 17 individuals estimated for 17 taxa, 12 of which are indigenous and four of which are introduced (Table 12). A human tooth is also present.

Wild resources contribute 50 percent of the individuals and 13 percent of the biomass in this collection (Table 13). The most prominent group of wild taxa are in the Other wild mammal category, which contributes 19 percent of the individuals and 8 percent of the biomass. White-tailed deer (*Odocoileus virginianus*) are notable by their absence. The stingray (*Dasyatis sabina*), represented by a spine of a small individual, the hardhead catfish (*Ariopsis felis*), and the gar (*Lepisosteus* spp.) are probably local. The opossum (*Didelphis virginiana*), woodrat (*Neotoma floridana*), and raccoon (*Procyon lotor*), as well as the deer, could have been part of a commodities trade, though none is unusual in colonial southeastern sites.

Domestic animals contribute 25 percent of the individuals and 86 percent of the biomass (Table 13). Domestic mammals include pig (*Sus scrofa*), cow (*Bos taurus*), and sheep or goat (Caprinae). Each taxon is represented by a single individual. In terms of biomass, beef is far more abundant (74 percent of the biomass) compared to pork (8 percent of the biomass), and mutton or goat (4 percent of the biomass). Chickens (*Gallus gallus*) are represented by a single specimen.

Commensal animals contribute 25 percent of the individuals and 1 percent of the biomass (Table 13). These include frog (*Anaxyrus* spp.), Indeterminate snake (Serpentes), mole (*Scalopus*

-22*aquaticus*), and

a mouse or rat (Sigmodontidae). This high percentage could indicate that stored foods were available or that these local animals sheltered in quiet areas of the site. Some of these commensal taxa, such as snakes, would have been attracted to the location if large numbers of favored prey such as frogs and mice were abundant. Deer and domestic artiodactyls are represented by 19 specimens (Table 14). Pigs are represented by three specimens, all of which are teeth (Figure 3). Nine of the cow specimens are teeth; but the other two Head specimens are a left and right bulla in FS# 1405 (Unit 303, Level 3) and FS# 2253 (Unit 317, Level 1; Figure 4). Caprines are represented by two teeth and an innominate fragment (Figure 5). It is not possible to interpret age at death for any of these individuals, though all appear to be at least subadults if not adults. The most common modification in the Miller Site analytical unit is burning (NISP = 32; Table 15). An additional specimen is calcined. The other modification observed in this analytical unit is hacking. None of the possible fur-bearing animals have butchering or skinning marks. The human tooth in FS# 1203 (Unit 300, Level 3) is an incisor that has been significantly modified. It may originally have been a shovel-shaped incisor that was filed into a point. This specimen should be examined by a biological anthropologist familiar with Native American teeth and characteristic dental modifications.

Discussion

More needs to be known about these two sites and the archaeological contexts from which the materials were recovered in order to interpret them appropriately, and larger samples are required. Nonetheless, these data conform to the expectation that local wild vertebrates would be combined with domestic sources of meat into a colonial strategy emphasizing animals either locally indigenous or introduced animals able to flourish in the colonial environment (Tables 7 and 13). Indigenous animals contribute 68 percent of the individuals and 17 percent of the biomass in the merged early English data from these two sites (Table 16). Wild vertebrates other than commensal taxa contribute 54 percent of the individuals and 17 percent of the biomass (Table 16). The lower contribution of biomass from wild animals reflects the dominance of pork (22 percent of the biomass) and particularly beef (57 percent of the biomass) in this early English assemblage. The dominance of beef in the early days of the South Carolina colony is a characteristic that persisted throughout its colonial history (Colaninno-Meeks and Reitz 2010; Zierden and Reitz 2009). The two collections, however, are not as similar as Table 16 suggests. Given the proximity of Charles Towne to the coast, it is not surprising that the Miller Site collection contains a higher percentage of fish individuals and biomass than does the collection from the Lord Ashley Settlement. The absence of deer in the Miller collection is less easily explained. Although this could be an artifact of the small sample size and specific contexts excavated, it might also indicate that access to local wild resources was more limited at locations that were closer to the coast than it was further inland at plantations, where there was a more active trade with native peoples. The more striking difference between the two collections, however, is in the different roles apparently played by livestock, specifically pigs and cows. Although people at the Ashley Settlement had access to a large cattle herd, only 46 percent of the biomass in that collection is beef. This is a substantive amount of beef compared to that estimated for early deposits from Spanish and French colonies; but a smaller amount compared to that estimated for the contemporaneous Miller Site collection. Beef contributed an estimated 74 percent of the biomass in the Miller Site collection. Pork contributed a much higher percentage of the biomass in the Ashley Settlement collection (31 percent) compared to the Miller collection (8 percent). That most of the cattle specimens recovered from both sites are teeth and skull fragments may indicate that taphonomic processes are largely responsible for these observed differences. Perhaps cattle were slaughtered and their remains discarded outside the boundaries of the excavation area at the Ashley Settlement. Alternatively, this difference may reflect aspects of the distribution system within the colony that could be explored further (e.g., Orr and Lucas 2007). Further work at these two early sites may resolve some of these issues, particularly the possibility that sample sizes are responsible for some of them. It seems likely, however, that site function may also be relevant. The role of cattle ranching and trade with Native Americans at Lord Ashley's settlement contrasts with the role of animal products at what may have been a tavern associated with Charles Towne itself.

Conclusion

This study strongly suggests that early colonists in South Carolina followed the broad pattern found at other colonial sites in the Southeast: heavy use of wild resources combined with pigs and cattle. In doing this, colonists followed a long-standing practice characteristic of other colonial populations in the American Southeast. The early English collections distinguish themselves from the Spanish and French collections in the evidence they offer for a much higher use of biomass from introduced domestic animals, specifically for a much higher use of beef. Within that broad, overall pattern, however, differences between the two collections suggest that differences in animal use did exist within the early South Carolina colony. These characteristics

-25persist throughout the long Charleston archaeological record., an aspect of early colonial animal use that could be explored further in the future.

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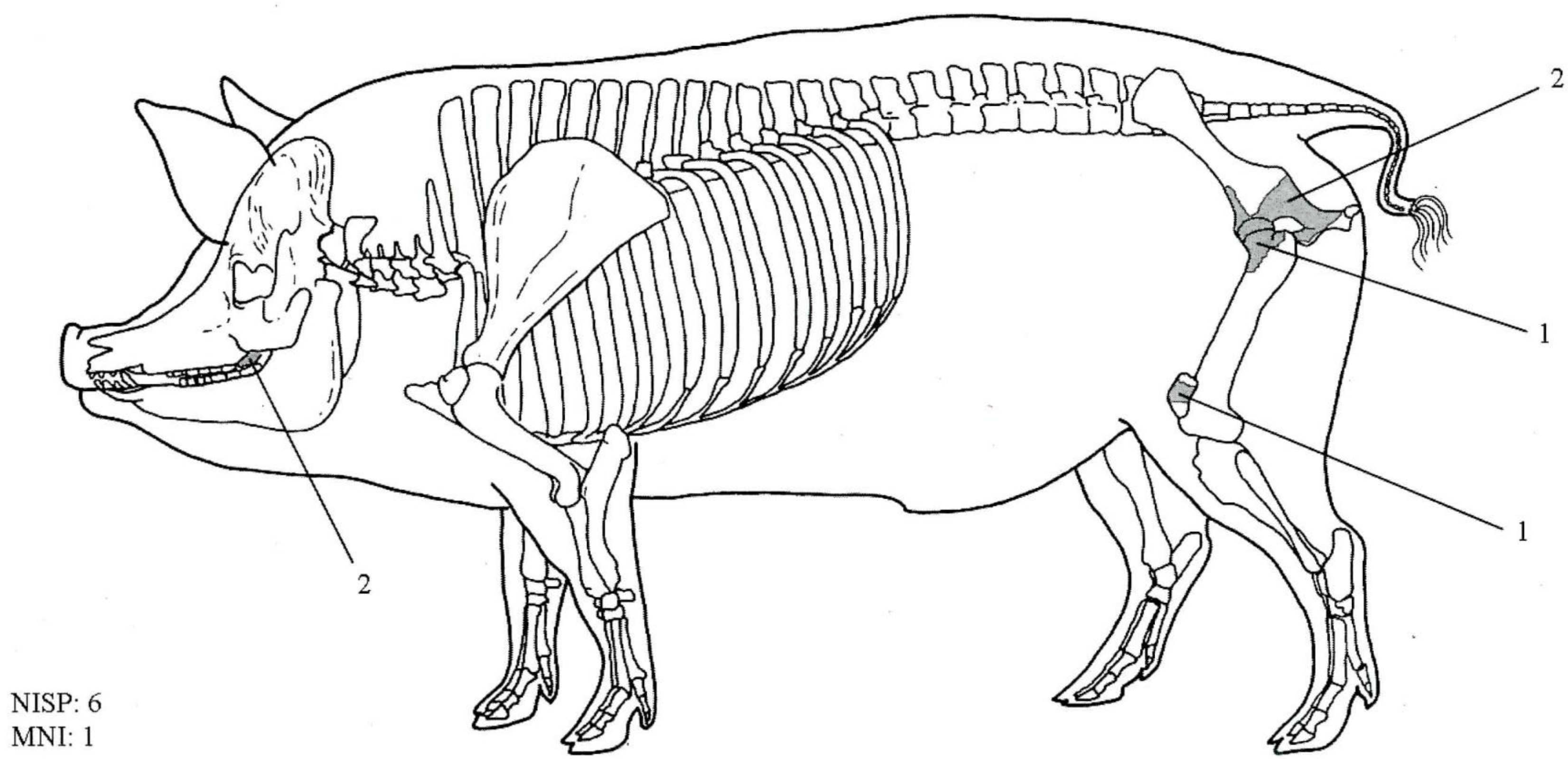


Figure 1. Lord Ashley Settlement, 38DR83A: Pig Elements Identified. NISP = 6.

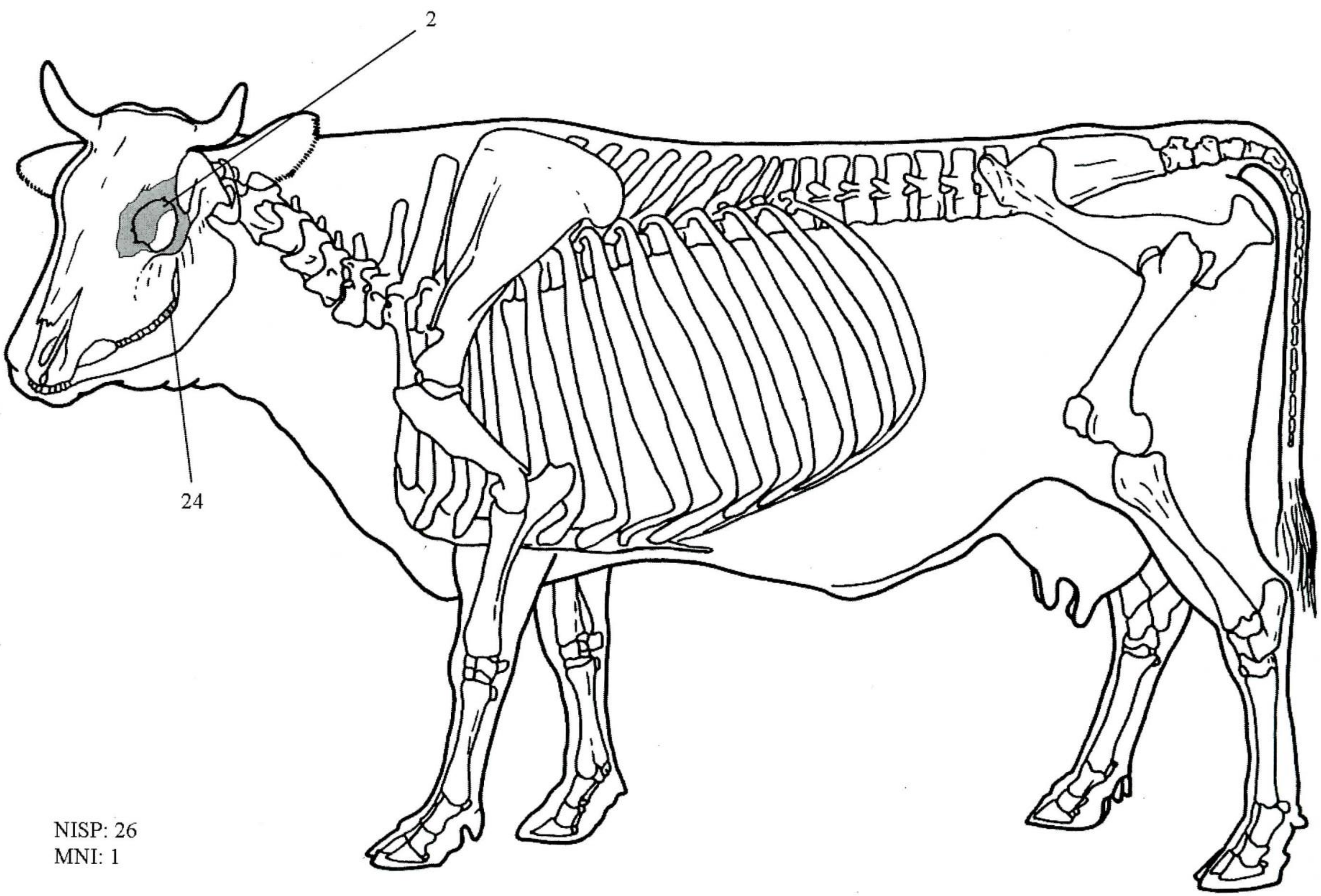
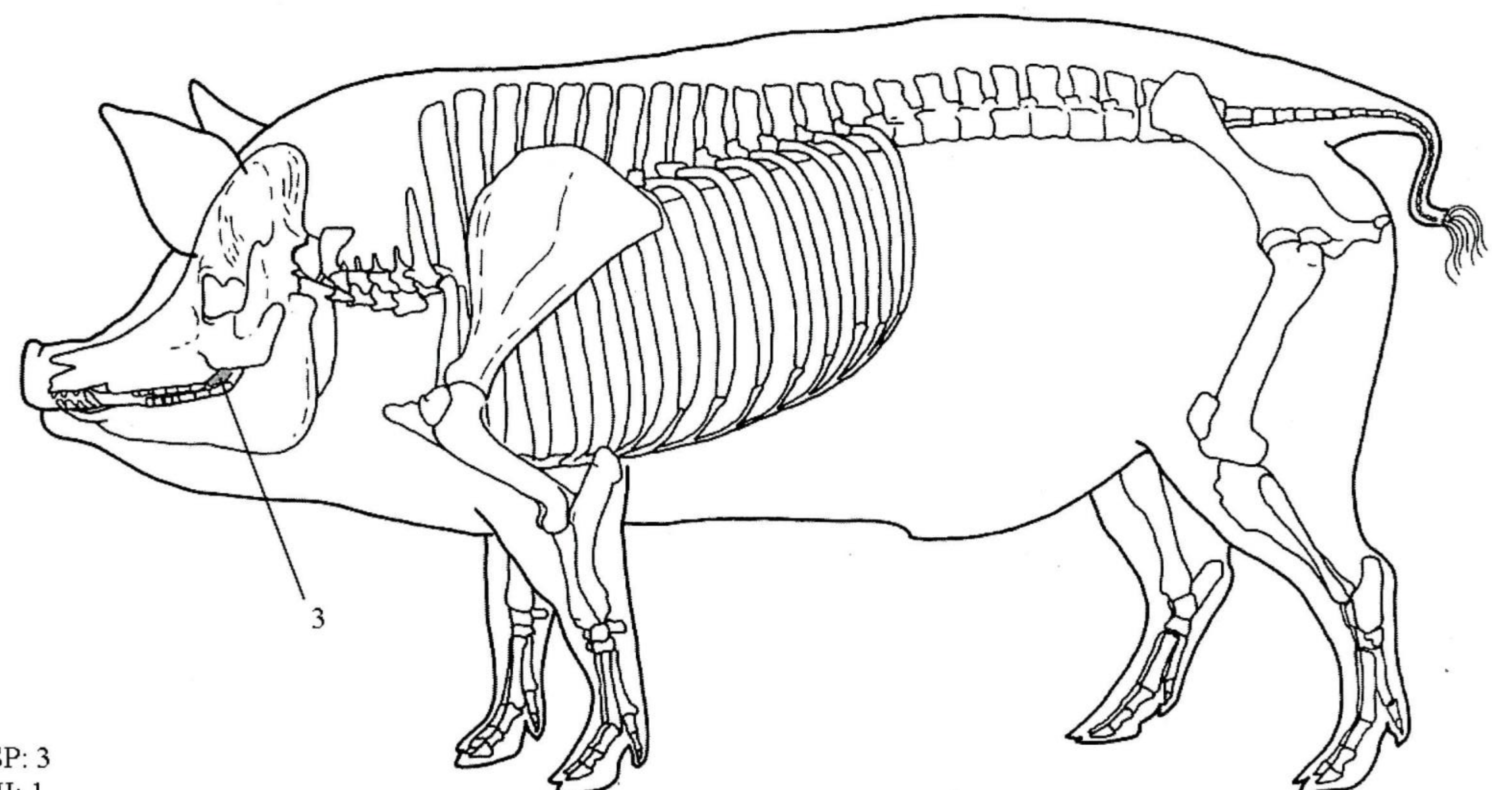


Figure 2. Lord Ashley Settlement, 38DR83A: Cow Elements Identified. NISP = 26.



NISP: 3
MNI: 1

Figure 3. Miller Site, 38CH-1MS: Pig Elements Identified. NISP = 3.

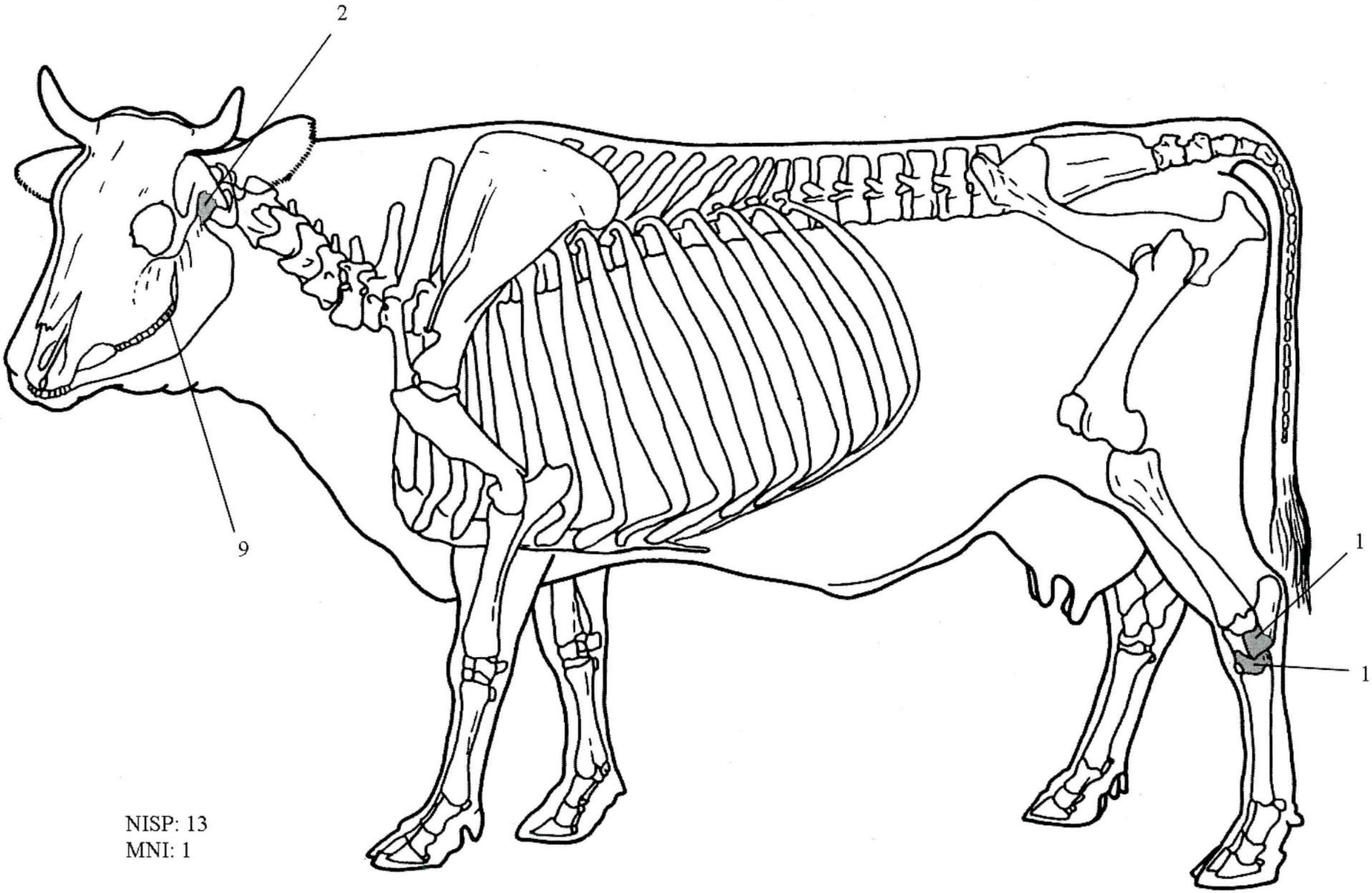
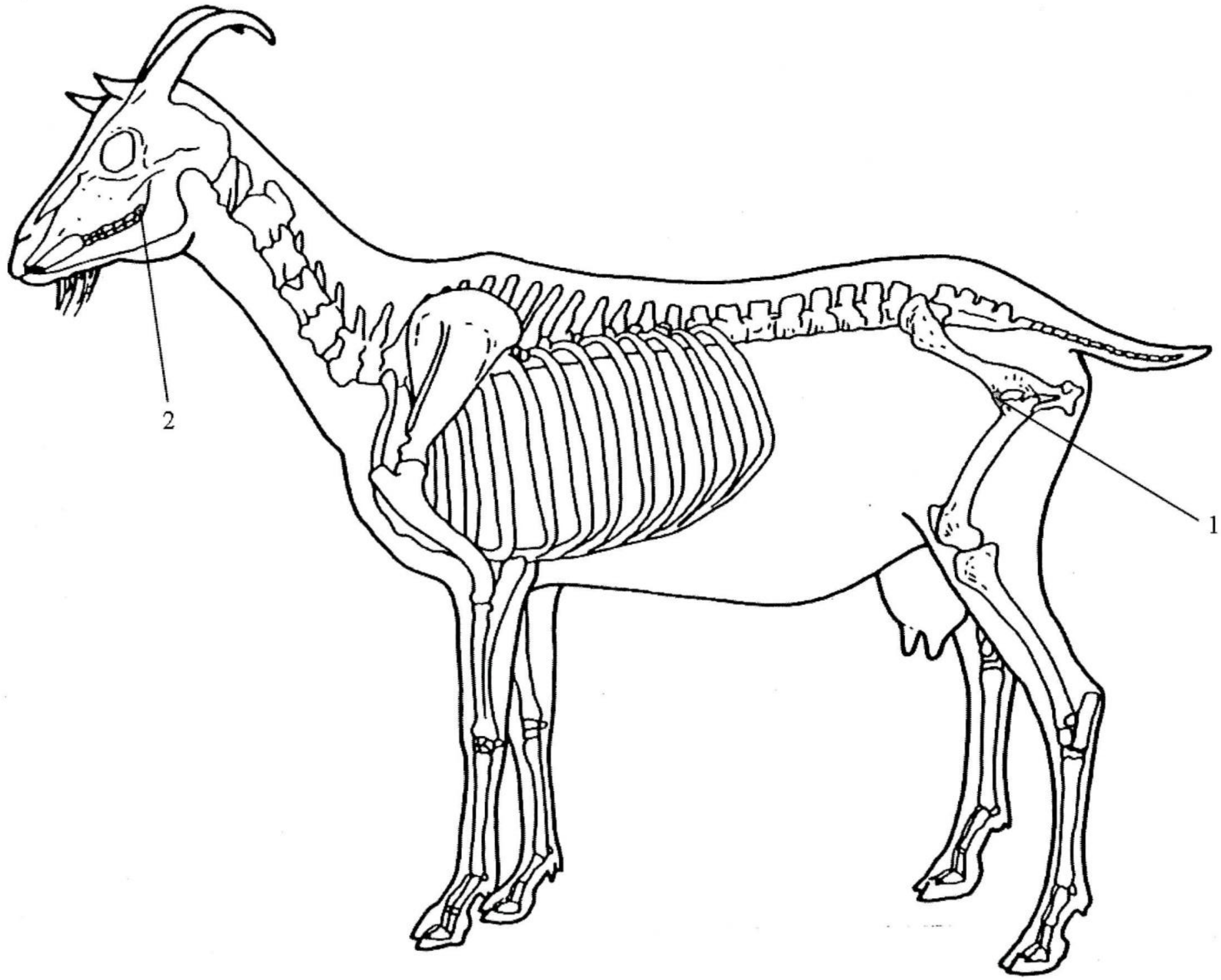


Figure 4. Miller Site, 38CH-1MS: Cow Elements Identified. NISP = 13.



NISP: 3
MNI: 1

Figure 5. Miller Site, 38CH-1MS: Caprine Elements Identified. NISP = 3.

Table 1. Fountain of Youth, Menéndez Era: Summary Table.

	MNI		Biomass	
	#	**%**	**kg**	**%**
Sharks, rays, and bony fishes	119	83.8	3.806	48.9
Alligator and turtles	5	3.5	0.358	4.6
Wild birds	2	1.4	0.028	0.4
Domestic birds				
Deer	2	1.4	1.703	21.9
Other wild mammals	4	2.8	0.225	2.9
Domestic mammals	1	0.7	1.245	16.0
Commensals	9	6.3	0.416	5.3
Total	142		7.781	

Note: Anurans are included in the MNI calculation in summary tables, but are not included in the biomass calculation because allometric values are not currently available for this taxon. Data from Orr and Colaninno (2008).

Table 2. Old Mobile (1702-1711): Summary Table.

	MNI		**Biomass**	
	#	**%**	**kg**	**%**
Sharks, rays, and bony fishes	1	3.8	0.0002	0.01
Turtles				
Wild birds	5	19.2	0.05	2.3
Domestic birds	1	3.8	0.02	0.9
Deer	7	26.9	1.48	67.0
Other wild mammals	7	26.9	0.26	11.8
Domestic mammals	3	11.5	0.35	15.8
Commensal taxa	2	7.7	0.05	2.3
Total	26		2.2102	

Note: Data from Clute and Waselkov (2002).

Table 3. La Pointe-Krebs (22JA526), Feature 90: Summary Table. MNI Biomass #% kg%

Sharks, rays, and bony fishes 7 46.7 1.809 31.3 Alligator and turtles 2 13.3 0.488 8.4 Wild birds 1 6.7 0.028 0.5 Domestic birds 1 6.7 0.054 0.9 Deer 2 13.3 2.187 37.8 Other wild mammals Domestic mammals 2 13.3 1.221 21.1 Commensals

Total 15 5.787

Note: Anurans are included in the MNI calculation, but are not included in the biomass calculation because allometric values are not currently available for this taxon. Data from Reitz et al. (2012).

Table 4. Dog River: Summary Table.

	MNI		Biomass	
	#	%	gm	%
Sharks, rays, and bony fishes	25	29.1	208.4	0.6
Turtles	13	15.1	204.5	0.6
Wild birds	4	4.7	235.7	0.7
Domestic birds	4	4.7	204.6	0.6
Deer	11	12.8	2443.6	7.6
Other wild mammals	4	4.7	437.6	1.4
Domestic mammals	18	20.9	28274.6	87.8
Commensal taxa	7	8.1	183.5	0.6
Total	86		32192.5	

Note: Data from Waselkov and Gums (2000).

Table 5. Regression Formulae Used.

Taxon	N	Slope (b)	Y-intercept (a)	r^2
Actinopterygii	393	0.81	0.90	0.80
Lepisosteidae	26	0.87	1.13	0.96
Siluriformes	36	0.95	1.15	0.87
Carangidae	17	0.88	1.23	0.86
Testudines	26	0.67	0.51	0.55
Serpentes	26	1.01	1.17	0.97
Aves	307	0.91	1.04	0.97
Mammalia	97	0.90	1.12	0.94

Note: $Y = aX^b$ where *Y* is biomass or meat weight; *x* is specimen weight; *a* is the Y-intercept; and *b* is the slope. N is the number of observations (Pavao-Zuckerman 2001:183; Reitz and Wing 2008:234-242).

Table 6. Lord Ashley Settlement, 38DR83A: Species List.

Taxa	**NISP**	**MNI #**	**MNI %**	**Weight, g**	**Biomass, kg**
Carcharhiniformes Ground sharks (fossil)	1			9.534	
Carangidae Jacks and pompanos	1	1	8.3	0.034	0.002
Testudines Indeterminate turtle	22			5.544	0.100
Kinosternon sp. Mud turtles	1	1	8.3	0.471	0.019
Emydidae Pond turtles	1			1.169	0.035
Terrapene carolina Box turtle	9	1	8.3	5.757	0.102
Aves Indeterminate bird	1			0.478	0.010
Aramus guarauna Limpkin	1	1	8.3	0.941	0.019
Gallus gallus Chicken	6	2	16.7	4.450	0.079
Mammalia Indeterminate mammal	135			74.597	1.275
Didelphis virginiana Opossum	5	1	8.3	3.550	0.082
Procyon lotor Raccoon	4	1	8.3	7.709	0.165
Felis catus Domestic cat	1	1	8.3	0.796	0.021
Artiodacyla Even-toed ungulate	29			37.330	0.684
Sus scrofa Pig	6	1	8.3	42.271	0.765
Odocoileus virginianus White-tailed deer	1	1	8.3	3.809	0.088
Bos taurus Cow	26	1	8.3	66.380	1.148
Vertebrata Indeterminate vertebrate				35.087	
Total	250	12		299.907	4.594

Table 7. Lord Ashley Settlement, 38DR83A: Summary Table.

	MNI #	MNI %	Biomass kg	Biomass %
Sharks, rays, and bony fishes	1	8.3	0.002	0.1
Turtles	2	16.7	0.121	4.9
Wild birds	1	8.3	0.019	0.8
Domestic birds	2	16.7	0.079	3.2
Deer	1	8.3	0.088	3.5
Other wild mammals	2	16.7	0.247	9.9
Domestic mammals	2	16.7	1.913	76.8
Commensal taxa	1	8.3	0.021	0.8
Total	12		2.49	

Note: Anurans are included in the MNI calculation in summary tables, but are not included in the biomass calculation because allometric values are not currently available for this taxon.

Table 8. Lord Ashley Settlement, 38DR83A: Element Distribution.

Pig		Deer	Cow
Head	2		26
Axial			
Forequarter			
Hindquarter	4		
Forefoot			
Hindfoot		1	
Foot			
Total	6	1	26

Table 9. Lord Ashley Settlement, 38DR83A: Epiphyseal Fusion for Pig (*Sus scrofa*).

	Unfused	Fused	Total
Early Fusing:			
Humerus, distal			
Scapula, distal			
Radius, proximal			
Acetabulum		1	1
Metapodials, proximal			
1st/2nd phalanx, proximal			
Middle Fusing:			
Tibia, distal			
Calcaneus, proximal			
Metapodials, distal			
Late Fusing:			
Humerus, proximal			
Radius, distal			
Ulna, proximal			
Ulna, distal			
Femur, proximal		1	1
Femur, distal			
Tibia, proximal			
Total		2	2

Table 10. Lord Ashley Settlement, 38DR83A: Epiphyseal Fusion for Deer (*Odocoileus virginianus*). Unfused Fused Total

Early Fusing:		
Humerus, distal		
Scapula, distal		
Radius, proximal		
Acetabulum		
Metapodials, proximal	1	1
1st/2nd phalanx, proximal		
Middle Fusing:		
Tibia, distal		
Calcaneus, proximal		
Metapodials, distal		
Late Fusing:		
Humerus, proximal		
Radius, distal		
Ulna, proximal		
Ulna, distal		
Femur, proximal		
Femur, distal		
Tibia, proximal		
Total	1	1

Table 11. Lord Ashley Settlement, 38DR83A: Modifications. Taxon Hacked Cut Burned Calcined

Indeterminate turtle 2 Chicken 1 Indeterminate mammal 1 1 2 31 Even-toed ungulate 1 3 4 Pig 21 Cow 1 Indeterminate vertebrate 1 20 45

Total 5 724 80

Table 12. Miller Site, 38CH1-MS: Species List.

		MNI			
Taxon	**NISP**	**#**	**%**	**Weight, g**	**Biomass, kg**
Dasyatis sabina Atlantic stingray	1	1	5.9	0.095	0.017
Lepisosteus spp. Gars	4	1	5.9	0.273	0.011
Ariopsis felis Hardhead catfish	2	1	5.9	0.406	0.002
Anaxyrus spp. North American toads	2	1	5.9	0.124	
Testudines Indeterminate turtle	10			2.256	0.055
Kinosternidae Mud and musk turtles	4			0.899	0.029
Kinosternon spp. Mud turtles	2	1	5.9	0.664	0.024
Terrapene carolina Eastern box turtle	1	1	5.9	0.479	0.019
Serpentes Indeterminate snake	1	1	5.9	0.076	0.001
Gallus gallus Chicken	1	1	5.9	0.296	0.007
Mammalia Indeterminate mammal	259			175.432	2.752
Didelphis virginiana Opossum	3	1	5.9	5.295	0.118
Scalopus aquaticus Eastern mole	6	1	5.9	0.476	0.013
Sigmodontidae Mice and rats	3	1	5.9	0.179	0.006
Neotoma floridana Eastern woodrat	2	1	5.9	0.051	0.002
Procyon lotor Raccoon	1	1	5.9	0.076	0.003
Artiodactyl Even-toed ungulate	10			4.268	0.097
Sus scrofa Pig	3	1	5.9	5.148	0.115
Bos taurus Cow	13	1	5.9	64.91	1.125
Caprinae Sheep and goats	3	1	5.9	2.409	0.058

Table 12. Miller Site, 38CH1-MS: Species List (cont.). MNI Taxon NISP # % Weight, g Biomass, kg

Homo sapiens 1 1 5.9 0.442 Human

Vertebrata 23.807 Indeterminate vertebrate

Total 332 17 288.061 4.454

Table 13. Miller Site, 38CH1-MS: Summary Table.

	MNI #	%	Biomass kg	%
Sharks, rays, and bony fishes	3	18.8	0.03	2.0
Turtles	2	12.5	0.043	2.8
Wild birds				
Domestic birds	1	6.3	0.007	0.5
Deer				
Other wild mammals	3	18.8	0.123	8.1
Domestic mammals	3	18.8	1.298	85.3
Commensal taxa	4	25.0	0.02	1.3
Total	16		1.521	

Note: Anurans are included in the MNI calculation in summary tables, but are not included in the biomass calculation because allometric values are not currently available for this taxon. The human individual is omitted from this table.

Table 14. Miller Site, 38CH1-MS: Element Distribution.

Pig		**Cow**	**Sheep/Goat**
Head	3	11	2
Axial			
Forequarter			
Hindquarter			1
Forefoot			
Hindfoot		2	
Foot			
Total	3	13	3

Table 15. Miller Site, 38CH1-MS: Modifications.

Taxon	Hacked	Burned	Calcined	Modified
Indeterminate mammal	1	21	1	
Human				1
Indeterminate vertebrate		11		
Total	1	32	1	1

Table 16. Early South Carolina: Summary Table.

	MNI		Biomass	
	#	**%**	**kg**	**%**
Sharks, rays, and bony fishes	4	14.3	0.032	0.8
Turtles	4	14.3	0.164	4.1
Wild birds	1	3.6	0.019	0.5
Domestic birds	3	10.7	0.086	2.1
Deer	1	3.6	0.088	2.2
Other wild mammals	5	17.9	0.37	9.2
Domestic mammals	5	17.9	3.211	80.1
Commensal taxa	5	17.9	0.041	1.0
Total	28		4.011	

Note: Data combined from Tables 7 and 13 in this report.

Appendix A. Lord Ashley Site, 38DR83A: Samples Studied.

Site	FS #	Unit	Feature	Zone	Bags	Note
38DR83A	5					A; not bone
38DR83A	6					A
38DR83A	8				3	A
38DR83A	9					A
38DR83A	10					A
38DR83A	18					A
38DR83A	19					A
38DR83A	22				3	A
38DR83A	26				2	A
38DR83A	27					A
38DR83A	29					A
38DR83A	33					A
38DR83A	36					A
38DR83A	39					A; LA
38DR83A	46					A
38DR83A	55					A
38DR83A	58					A; not bone
38DR83A	59					A
38DR83A	64					A; not bone
38DR83A	65					A
38DR83A	68					A
38DR83A	71					A
38DR83A	79	N950E855		2		A
38DR83A	85		10 west			A
38DR83A	85				2	
38DR83A	85	N1045E775	10 W1/2			edge sliced by trowel
38DR83A	100					A
38DR83A	109	N1045E775	10 east			
38DR83A	109	N1045E775	10 E1/2			edge sliced by trowel

Appendix A. Lord Ashley Site, 38Dr.83a: Samples Studied.

Site	FS #	Unit	Feature	Zone	Bags	Note
38DR83 A		213. 2: 16				2009
38DR83 A		217.1: 3				2009
38DR83						

Appendix B. Miller Site, Charles Towne Landing, 38CH1-MS: Samples Studied.

Site FS # Unit Feature Cat # Note

38CH1-MS 300 2 1026

38CH1-MS 300 2 1027

38CH1-MS 300 2 1059

38CH1-MS 300 2 1064

38CH1-MS 300 2 1107

38CH1-MS 300 2 1123

38CH1-MS 300 2 1124

38CH1-MS 300 3 1153

38CH1-MS 300 3 1154

38CH1-MS 300 3 1202

38CH1-MS 300 3 1203

38CH1-MS 300 3 1229

38CH1-MS 300 3 1230

38CH1-MS 300 3 1244

38CH1-MS 300 3 1252

38CH1-MS 300 3 1264 SW CORNER 38CHI-MS 301 2 1310

38CH1-MS 301 2 1341

38CH1-MS 301 2 1353

38CH1-MS 301 2 1373

38CH1-MS 301 3 1393

38CH1-MS 301 3 1405

38CH1-MS 301 1445 WALL CLEANING

38CH1-MS 301 3 1451

38CH1-MS 302 2 1484

38CH1-MS 302 2 1486

38CH1-MS 303 2 1523

38CH1-MS 303 1 1599

38CH1-MS 303 2 1609

38CH1-MS 303 2 1646

38CH1-MS 303 2 1647

38CH1-MS 303 2 1673

38CH1-MS 303 2 1692

38CH1-MS 306 2 1814

38CH1-MS 309 1 1851

38CH1-MS 309 2 1866

38CH1-MS 310 1 1898

38CH1-MS 314 1 2032

38CH1-MS 314 1 2048 CLEANUP

38CH1-MS 306 2 2049

Appendix B. Miller Site, Charles Towne Landing, 38CH1-MS: Samples Studied.

Site FS # Unit Feature Cat # Note

38CH1-MS 316 1 2071 38CH1-MS 318 1 2187 38CH1-MS 315 1 2209 38CH1-MS 315 1 2235 38CH1-MS 317 1 2253 38CH1-MS 317 1 2289 38CH1-MS 315 1 2316 38CH1-MS 317 1 2318 38CH1-MS 316 1 2376 CLEANUP 38CH1-MS 317 1 2511 38CH1-MS 320 1 2517 38CH1-MS 318 1 2527 38CH1-MS 319 1 2539 38CH1-MS 318 1 2569 38CH1-MS 319 1 2587 38CH1-MS 319 1 2588 38CH1-MS 318 1 2615 38CH1-MS 318 1 2616 38CH1-MS 319 1 2643 38CH1-MS 318 1 2684 38CH1-MS 318 1 2697 38CH1-MS 320 1 2735 38CH1-MS 319 1 2753

Appendix C: Measurements.

Taxon	FS#	Element	Side	Dimension	Measurement, mm
Lord Ashley Settlement					
Aramus guarauna	85	Tibiotarsus	Left	Bd	11.29
Gallus gallus	85	Femur	Left	Bd	14.61
				Dd	11.87
Didelphis virginiana	85	Scapula	Left	HS	45.47
		Humerus	Left	Dp	13.08
				Bp	11.11
Procyon lotor	85	Humerus	Right	Bd	18.51
				BT	12.04
		Ulna	Right	LO	11.23
				BPC	8.0
		Radius	Right	Bp	8.88
Sus scrofa	46	M2	Left	L	21.08
				B	14.81
Sus scrofa	85	Femur	Right	DC	27.74
The Miller Site					
Didelphis virginiana	1353	Scapula	Right	GLP	15.61
				BG	8.05