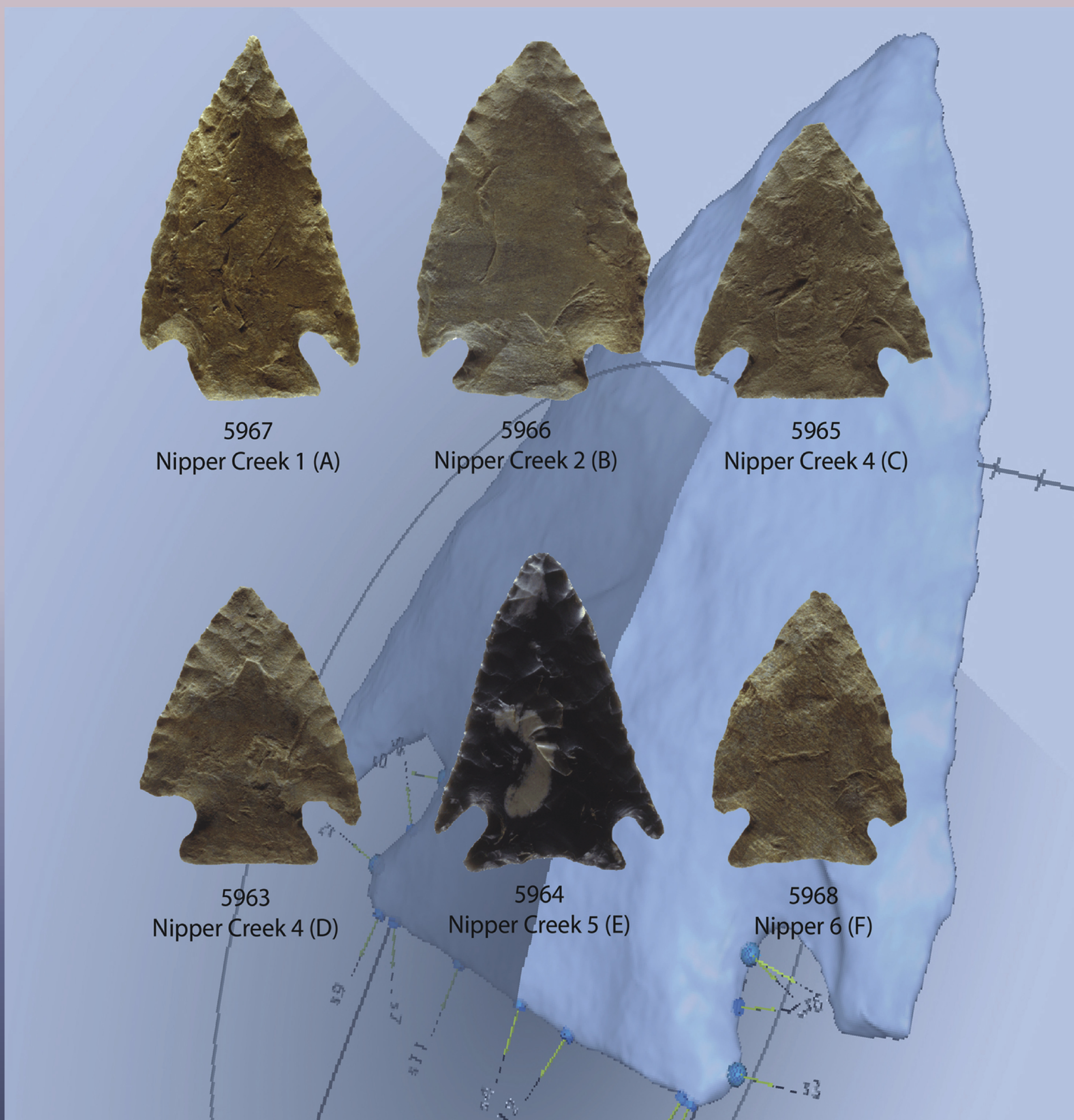
South Carolina Antiquities

The Journal of the Archaeological Society of South Carolina



Contributed Papers Concerning the Archaeology of South Carolina and Adjacent States Volume 48 • 2016

South Carolina Antiquities

INFORMATION FOR SUBSCRIBERS

South Carolina Antiquities is published annually by the Archaeological Society of South Carolina. Subscription is by membership in the Society. Annual dues are $20 for individual members, $15 for student members, $25 for family members, and $30 for institutional members. Life membership is $300. In addition to *South Carolina Antiquities*, members receive the bimonthly newsletter *Features and Profiles*. Membership requests, dues, and change of address requests should be sent via email to Savannah Hulon (archaeologysocietysc@gmail.com) or by regular mail to ASSC, PO Box 1357 Columbia, SC 29202.

INFORMATION FOR AUTHORS

The *Archaeological Society of South Carolina* publishes papers on the prehistoric and historic archaeology of South Carolina and adjacent states. Manuscripts submitted for publication are subject to peer review. The manuscript should be submitted to the Editor in electronic format using MS Word. Illustrations should consist of either high quality prints or scans with a minimum resolution of 300 dpi. Style should conform to the guidelines published in *American Antiquity* (revised 2003).

Cover image by Andrew A. White showing Kirk Corner-Notched Points from the Nipper Creek site.

South Carolina Antiquities

Volume 48

CONTENTS

ARTICLES

Archaeological Salvage at the Zachary-Tolbert Historic House (31JK414): 2004-2006 Jackson County, Western North Carolina.......1-16
Dan F. Morse and Phyllis A. Morse

Evidence of a Paleoamerican Presence from Upper Lake Marion, Clarendon County, South Carolina.......17-26
Robert C. Costello

Revisiting Colono Ware Variety in the South Carolina Lowcountry.......27-39
Ronald W. Anthony

A Preliminary Analysis of Haft Variability in South Carolina Kirk Points.......41-53
Andrew A. White

Searching for the Earliest Corn Crop in South Carolina: Radiocarbon Dating of Charred Maize Kernel and Cupule Fragments from the Johannes Kolb Site (38DA75) in Darlington County, South Carolina.......55-73
Christopher Judge

Hernando de Soto and Juan Pardo in Interior South Carolina: A Response to Val Green.......75-80
Chester B. DePratter

A Reply to Dr. Chester DePratter.......81-84
Val Green

BOOK REVIEWS

James H. Tuten. *Lowcountry Time and Tide: The Fall of the South Carolina Rice Kingdom*.......85-86
Joseph E. Wilkinson

H. Thomas Foster II, Lisa M. Paciulli, and David J. Goldstein. *Viewing the Future in the Past: Historical Ecology Applications to Environmental Issues*.......86-88
Walter A. Clifford IV

ABOUT THE CONTRIBUTORS.......89

Purchase Back Issues of *South Carolina Antiquities*.......91-92

Archaeological Salvage at the Zachary-Tolbert Historic House (31JK414): 2004-2006 Jackson County, Western North Carolina

Dan F. Morse and Phyllis A. Morse

Abstract
The Zachary-Tolbert house property is located in southern Jackson County in western North Carolina. It includes a 5.21 acre tract and is listed on the National Register of Historic Places. Excavations were conducted as emergency salvage during 2004, 2005, and 2006. A total of 144.6 square meters was excavated. Over half of the recovered artifacts have been processed and cataloged. The total artifact figure is approximately 30,000. Remains of at least seven prehistoric campsite occupations were recovered representing the period of 5000 BC to AD 1500. Artifacts representative of a strong mid-19th-century occupation were collected, as well as numerous artifacts dating from the late 19th century and the entire 20th century. There are seven buildings or remnants, at least four of which date (or probably date) to the mid-19th century. Two are suspected outhouse locations and one is the suspected original kitchen. Two springs are also present on the property.

Introduction
"The Mission of the Cashiers Historical Society is to preserve and interpret the Zachary-Tolbert House and Cashiers Valley in order to inspire discovery and to appreciate our past as guidance for the future."

This mission statement (since revised) of the Cashiers Historical Society was our introduction to the Zachary-Tolbert historic house and property of Cashiers Valley. The European origin occupation predates by 20 years the house Mordecai Zachary built in 1842 (Shaffner 2001:12). The house and property represent a typical farmstead of the 1840-1860 period of American mid-19th-century rural life. The principal preservers of this historic expression were the Tolberts who did not even hook up electricity, phone, or water to the house during almost the entire 20th century. It is indeed fitting that their name be associated with the property.

At the urging of Jan Wyatt and Martha Black, respectively President of the Cashiers Historical Society and Chair of the Archaeology Committee for the Society, we were encouraged to employ our archaeological expertise toward fulfillment of the Society's mission statement (Morse 2005, 2006; Morse and Morse 2004, 2005a, 2005b). In particular, we were asked to conduct salvage excavations on portions of the property being developed for public visitation. This was thought to be especially important since many of the Society members were not looking beyond the architectural features of the site, and it was important to demonstrate the archaeological potential of the property.

New South Associates Tests: 2004, 2005
Natalie P. Adams (2005) of New South Associates was hired by the Society to conduct an archaeological survey of the site in 2004 (Figure 1). New South completed the very complex North Carolina site sheet, and the site was given the designation of 31JK414. The New South collection is being curated by the Society. These 206 artifacts have been cataloged. We have not seen them. They were missing until May of 2007 when they were found by Arlene Hendrix during a search for other missing artifacts.

A total of 115 shovel tests was excavated, mostly at 30 foot intervals on a grid established with wire flags. A few shovel tests closer to the house were dug at 15 foot intervals or where it seemed prudent. The report states the shovel tests were dug to a depth of one foot, but our excavations did not discover any of the shovel tests. A metal detector survey was also accomplished, but the nature of the survey is not detailed. Monitoring of a ditch dug to bury utility lines was also done. Four days of testing were involved.

A total of 206 artifacts was recovered. Out of a total 23 sherds, none can be reliably dated to the mid-19th century. The "Sponged ?" sherd is not unique to the date and the "Brown Transfer Printed Whiteware" is actually part of a maker's mark which could date much later in time. The New South tests did not reveal any definite artifacts for the Zachary occupation; however, excavations did reveal a prehistoric Native American occupation with the recovery of seven stone artifacts, none of which could be dated to a specific time period.

New South concluded that the parking area and yard adjacent to the house probably did not contain significant debris. Further testing by us proved this conclusion not to be valid; in fact, this area was the richest of the entire site. The difference in testing methodology was the reason for this invalid conclusion. New South employed shovel tests, whereas we excavated 1x1 and 2x2 m tests. The report also indicated relatively sterile areas toward the road from the shed, and our salvage in this area was extremely fruitful.

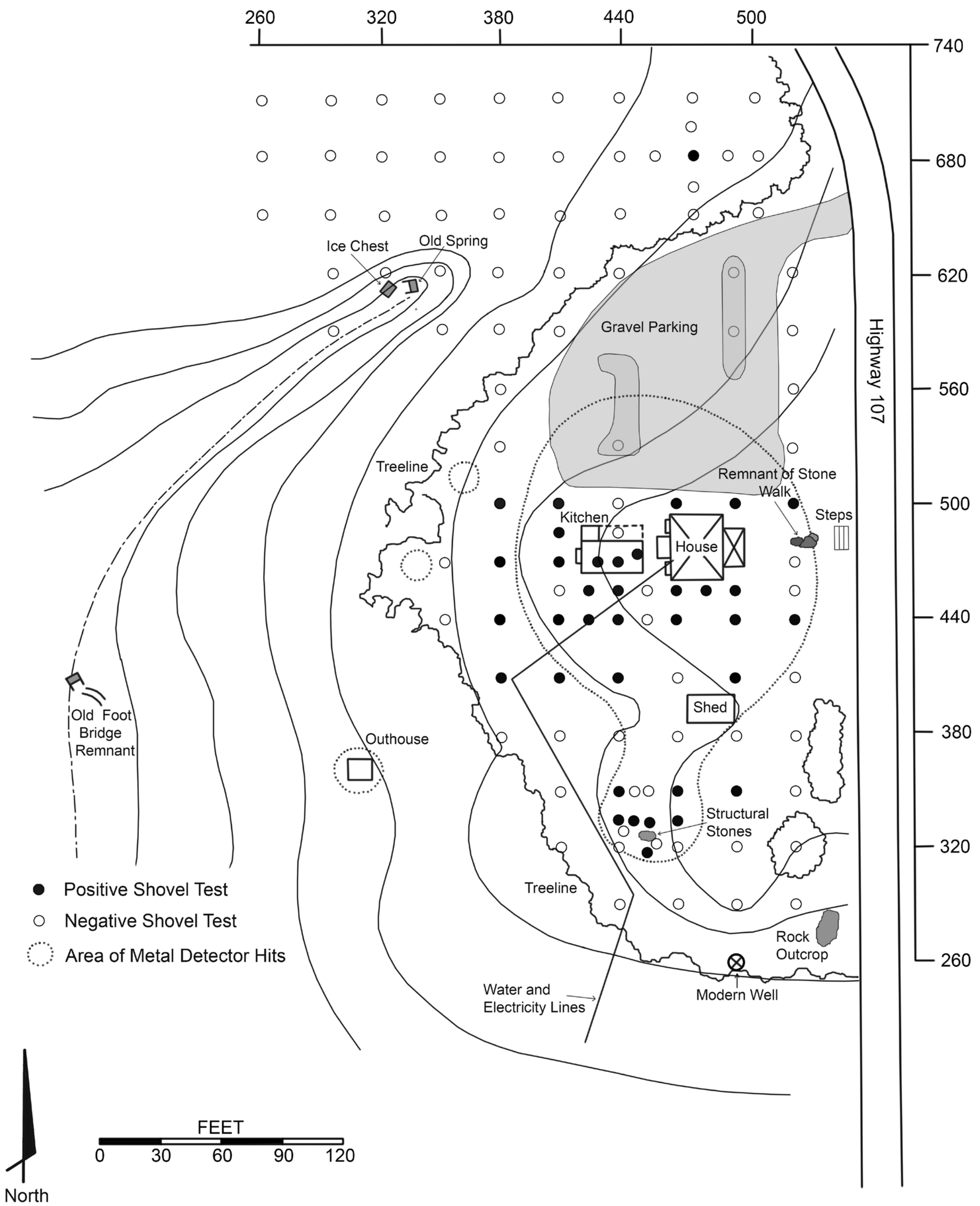


Figure 1. Map of New South Associates Excavations. Based on Figure 2 in Adams (2005).

Phone Line Ditch: 2004

On October 30, 2004, Dan Morse, Phyllis Morse, Martha Black, Myra Hunt, Charles Wyatt, Jan Wyatt, and Bubba Tolbert excavated along what they understood would be the location of a ditch dug to bury utility lines from the street to the house (Figure 2). Actually, only a phone line was put in the ditch. We dug a 26 m long trench 25 cm wide and 20-30 cm deep in 1x1 meter units. Martha Black had ¼-inch mesh screens constructed but the soil was too wet to screen, so we troweled through the spoil. A total of 267 artifacts was recovered which included some early North Carolina stoneware and a later glass shoe polish bottle marked "Whittlemore."

Dan and Phyllis Morse (2004) cleaned and sorted the artifacts and turned them over to Martha Black to be cataloged later. We took the opportunity to replace New South's main datum and another location which were marked by wire flags, with rebar stakes which we spray painted red. Both were behind bushes and therefore (we thought) protected. One of the stakes and its protective bush disappeared during reconstruction of the roof of the house in 2007, to make way for scaffolding, but as far as we can determine, the other is still in place.

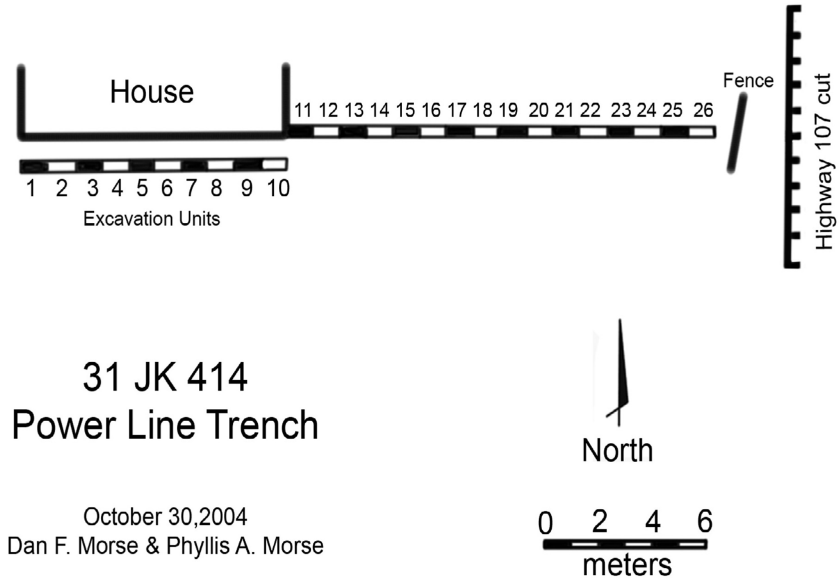


Figure 2. Power Line Trench Excavation.

Remote Sensing Test for the Original Kitchen: 2005

In 2005, Dr. Jon Leader, State Archaeologist for South Carolina, conducted a remote sensing test of the area between the 1920s kitchen and the springs as a favor for the Society. No notes were taken, and Dr. Leader's location stakes were destroyed. Dan and Phyllis Morse were not informed of the project until after it was completed. Dr. Leader's readouts were inadvertently destroyed. All we have is a sketch made by Dr. Leader for Dan and Phyllis Morse a year later (Figure 3). The sketch indicates a structure exists behind and to the north of the newer kitchen, which was built when the original kitchen burned down. The structure seems to be divided into two rooms. The width is about 4-5 m, and the length may be twice or slightly more than twice that figure.

An early to mid-19th-century kitchen often was divided into two rooms with a fireplace between them. One room would be the kitchen, and the other would be the laundry. If this is the original kitchen, it would be situated nearer the spring which is an advantage since water had to be carried to it. It also would be far enough from the house that if it were to burn down, the house would be safe. Investigations by New South Associates did not recover evidence that the newer kitchen (actually an old cabin moved to the site) was placed on the site of the original kitchen. If this anomaly found by Leader is the original kitchen, it is not far removed from the newer kitchen. Stone from the original kitchen was probably placed sparingly under the foundation and used to build the chimney in the 1920s. The large amount of burned debris recovered by our excavations indicates that the kitchen burned down near this spot.

1x1 m Tests in Vicinity of Kitchen and Springs: 2005

Martha Black met us at the site in June 2005 to survey the old parking lot which had been scraped of gravel in preparation for grading and planting grass. In addition, the location where the Pavilion was to be built was nearby, and Ms. Black had found whiteware sherds at the location. Also, these areas were adjacent to the block surveyed by Jon Leader, and landscaping could impact the suspected area of the original kitchen. On the surface of the scraped area, we found a considerable number of artifacts eventually totaling 744. The most notable one was a burned, blue, shell-edged rim sherd which had to date to about 1840-1860.

Permission was granted by Gillis MacKinnon III, Chair of the Landscaping Committee, to conduct tests at the site to determine if important archaeological deposits existed and whether they would be impacted. Two days were spent in the testing (June 22-23). The crew consisted of Dan Morse, Phyllis Morse, Amy Kittle, Martha Black, and Charley Wyatt. Dan Morse established a magnetic north grid with a transit and placed the 100R100 datum in the approximate center of the scraped area. The designation 100R100 was chosen to place the site within a single quadrant of the grid to minimize confusion in the field (Figure 4).

We excavated 1 2x2 m square, 9 1x1 m squares, and 8 20x20 cm test units. The screens made especially for our excavations by Martha Black in 2004 and stored at the site had disappeared. Therefore, we had to trowel through the spoil piles. The artifacts were cleaned for the Society by Amy Kittle for future cataloging. They were

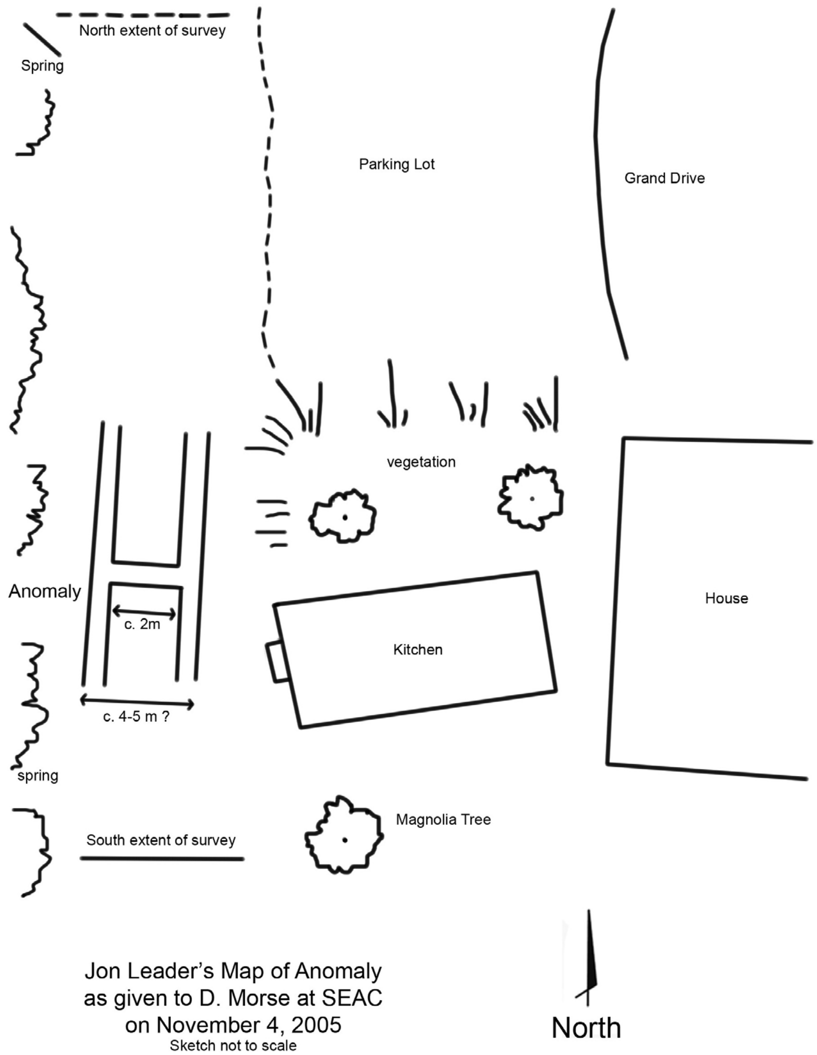


Figure 3. Jon Leader's Map of Anomaly Which May be the Original Kitchen.

sorted by Phyllis Morse after being cleaned but have not been cataloged and numbered.

We think that about 500 artifacts were found; however, only 194 artifacts can be located. From the 100R100 point south toward the new kitchen, artifacts increased in number. In two adjacent test units, we found an 1864-1873 two cent coin, a blue shell-edged sherd (now missing) which should date around 1860, a glass bead typical of 19th-century sites, and a hand-forged heavy door hinge typical of the early to mid-19th century period (Figure 5). In the same units was discovered a posthole edged with rocks which served as wedges. The posthole inspired many theories about what it meant, and it was only demonstrated in the subsequent enlargement of these tests that it represented one of the posts of a grape arbor. The exciting aspect of this excavation was that mid-19th-century artifacts were present in significant numbers. We carefully fenced off the most productive portion of the tested area, so that this location could be protected against impact from landscaping as requested by Gillis MacKinnon, and made plans to investigate further. We still did not know just how rich in artifacts and features this area may be.

Expansion of the 1x1 m Tests: 2005

The 1x1 m tests indicated that potentially important and rich archaeological deposits existed near the house, kitchen, and possibly the spring. We had to investigate this possibility. The results of the tests did verify that the area was rich and led to a special morning meeting on October 18, 2005, the morning of the Society's annual meeting, to determine whether to move the Dowden Pavilion and where should it be moved. The decision to move the Pavilion slightly north and east not only relocated it off the main archaeological site but also prevented blocking of the spring and afforded a better drainage site. Even the parking area did not have to be changed significantly. Unfortunately, landscaping associated with the construction of the Pavilion destroyed the datum points of the grid system and covered the site with fill up to a meter in depth.

So many artifacts were recovered that this report was delayed to allow them to be cleaned, sorted, and cataloged. Unfortunately, only about half of the artifacts have been processed, but this report could not be delayed anymore. The catalog only contains about half of the artifacts recovered, 1,198 catalog numbers and 16,588 artifacts. A very significant number of mid-19th-century artifacts were found, and it is now apparent that the house was lived in beginning around 1842.

Martha Black sponsored the excavation and the cataloging of the artifacts. To that end, she hired Katie Cochran for 6 months in 2005 and for all of 2006. Ms. Cochran was Dan Morse's field assistant, and she was also the cataloger. She set up the lab in her parents' living room in Highlands, North Carolina, and at her apartment in Charleston, South Carolina.

Phyllis Morse also volunteered in the field. Other volunteers were: Jacques Escalere, Charley Wyatt, Amy Kittle, Martha Black, Mimi Galet, Carol Ann Connon, and Myra Hunt. Channel 14, Northland Cable, of Highlands, North Carolina, filmed one day during the excavation, and this was broadcast to the community and during an annual meeting of the historical society.

A total of 10 1x1 m test squares and 14 2x2 m squares was excavated (Figure 6). The first part of the dig was spent moving the daylilies which had to be examined and the soil around them screened because of the richness of the deposits. Excavation began in August and ended in October. The soil was screened through ¼-inch hardware cloth. Approximately 25,000 artifacts were recovered.

The site was backfilled by hand and a new fence erected to protect the most sensitive portion of the site. Later, the fence and datum stakes were removed to make space for a picnic shelter. The main datum stakes were replaced with rebar stakes. Plans to expand the grid system over the entire site by a Cashiers surveyor were made by Martha Black. Before that could happen, the area was landscaped and the datum stakes and posthole locations were covered by considerable fill.

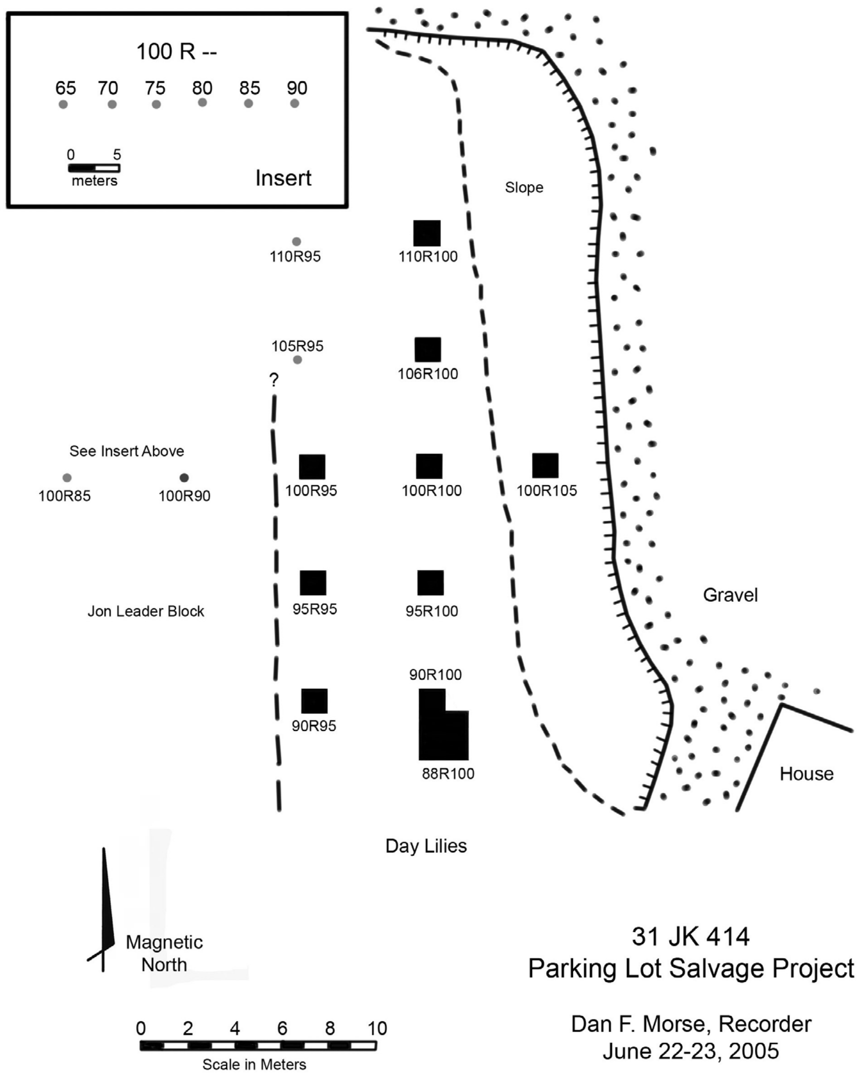


Figure 4. Parking Lot Salvage Map.

Five additional postholes were found for a total of six, which clearly indicated a grape arbor. The postholes were dug early in the history of the site and probably date to the mid-19th century. The arbor, which measured 5.5 m wide and at least 6 m long, was two sections wide and at least three sections long. Posts were spaced between two and a half and three meters apart (about 8-9 ft. apart on average). That probably is about how high it was. We think that it was five sections long, based on the grape arbor Jan Wyatt photographed at the Mordecai House in Raleigh, North Carolina (Figure 7). However, recent landscaping has prevented any chance of looking for additional postholes to verify its length.

South of the grape arbor and adjacent to the new kitchen was a former vegetable garden. We verified that by finding plow scars. Tests by New South did not indicate the garden was present beneath the new kitchen, but the area may have been leveled before the building was placed there. The very significant amount of debris, in the vegetable garden area, especially that dating to the mid-19th century, suggests heavy composting here. In addition, a lot of burned debris indicates that the original kitchen that burned was located nearby.

We found a PVC pipe which connected the spring with the kitchen. Bubba Tolbert confirmed that it was put there about 1940. The trench clearly intruded from the ground surface indicating that the midden had not been disturbed for over a half century.

Septic Drain Field Salvage: 2006

A decision was made to place the drain field for the new Pavilion's two septic tanks in the front yard of the house,

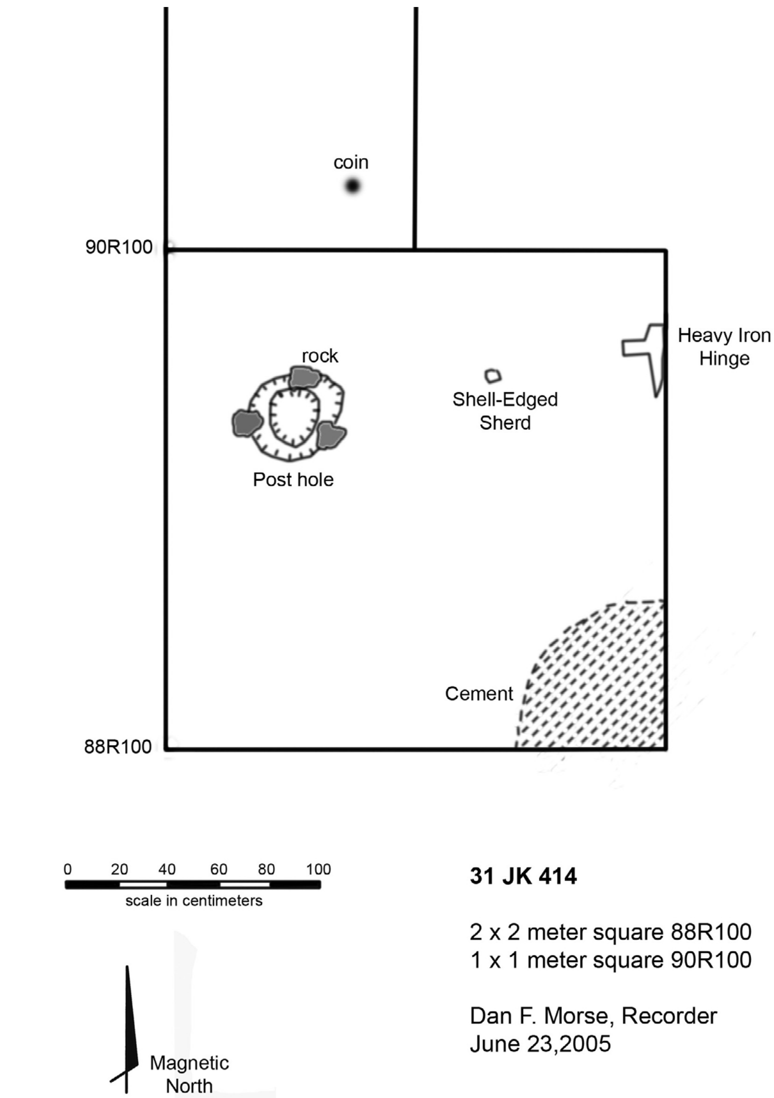


Figure 5. Map of Squares 88R100 and 90R100.

and to continue for 135 ft. to the south. Two 135 foot long trenches, three feet wide and approximately four feet deep, were to be dug. Martha Black attempted to make arrangements for Dr. Sue Moore and Dr. Steve Hale to bring the Georgia Southern University field school to the site around May 10-June 15 to do at least some of the salvage work, but the arrangements did not work out.

Katie Cochran was hired to excavate, and she called Dan Morse in Florida to get instructions on how to proceed. She was told to have the two trenches flagged and to excavate 1x1 m squares every 5 m within the proposed trenches. If it was not possible to excavate the next square 5 m away, then she was to skip that spot and place the next square at 10 m. She began excavation around the beginning of April and during May, Dan and Phyllis Morse advised her on how to proceed. On May 21, Dan and Phyllis Morse made a paced sketch map of the excavation area and backed that up with a transit survey of 19 1x1 m units tied into the grid system used the previous year. In total, 52 1/2 1x1 m test pits were excavated (Figure 8). All but eight were screened through ¼-inch mesh screen. The eight exceptions were dug on the final day of the project. A total of 1,846 artifacts were collected. Volunteers were: Carol Cannon, Mimi Galet, and Martha Black.

On June 5, we were informed by Public Health that one of the trenches was too close to the well and would have to be dug 5 m further east of the original site. The location of the trenches was shifted slightly again later; then, Public Health learned that the contour map they were using was not correct so the locations shifted once again. Essentially, we excavated a third trench in the southern portion of the drainage field where the deposits were rich in prehistoric remains. The rest of the drain field was considered adequately tested with the earlier 1x1 m tests spaced 5-10 m apart.

We had to drop everything and conduct an emergency salvage over the June 6-14 period. Then, monitor the ditching and backfill by hand the units which would not be damaged during the next two days. Fortunately, Michael Alexander was hired as a second field assistant by Martha Black during this period. Also, we had the excellent cooperation of William Owen who did the actual ditching. He even provided a crewman to help excavate during the last hectic day when the third ditch location shifted yet another time.

The crew consisted of Dan Morse, Phyllis Morse, Katie Cochran, Michael Alexander, and volunteers from the Society. The artifacts have not been cataloged or sorted, except for the 179 prehistoric items which have been sorted.

The primary goal, of course, was to mitigate the anticipated loss of archaeological remains due to the excavation of two very large and long septic drain field trenches. A square posthole found near (1.5 m away) the old circular drive is probably part of a fence row and may even represent a gate post. The circular drive continues 20 m north to the front of the house. This posthole was not destroyed during the ditching due to the trench realignment.

The shed pictured in the New South report had since collapsed and the debris piled up on the site. Many of the boards we observed were probably cut in Zachary's sawmill. We were able to map the stones used as foundation supports and could determine that the shed measured about 16 x 14 feet in extent with the central doorway toward the west. Alignment of the shed corresponds with the house. Artifacts found near the back of the shed included mid-19th century ceramics, and we think the shed dates to the mid-19th century. Since Trench 1; located immediately east, was too close to the well, the shed foundation and most of the surrounding deposits are still intact.

Two postholes were found 2.2 m apart (center to center). Alignment is essentially the same as the shed. We think that this was the remains of an 8-10 foot long hitching post located about 2 m south and 6 m east of the shed's southeast corner. Two mid-19th-century stoneware sherds were found in one of the postholes. These postholes still exist, and the hitching post can be recreated.

The remains of an outbuilding with mid-19th-century ceramics and chimney (?) bricks on the surface are present on a small knoll about 20 m south of the shed. The hitching post would have been between these two buildings. A wagon with its team tethered to the hitching post could be unloaded to both buildings. The wagon could be driven through a gate marked by the square posthole, driven in front of the shed, then turned to the hitching post. These represent working hypotheses to direct future investigation at this part of the site. It would be nice to know the function of these two buildings. One may have been Mordecai Zachary's workshop, referenced in early documents.

One of the hitching post postholes intrudes through what appears to be a prehistoric hearth which measures 50 x 40 x 20 cm deep at the top of the subsoil. We cannot date the hearth, however, prehistoric remains nearby date within a 7,000 year period. Because of the concentration of prehistoric remains in this area, hearths would be expected.

Prehistoric Artifacts

Long before any Zacharys set eyes on Cashiers Valley, Native Americans visited and/or lived here for almost 14,000 years. We do not have direct evidence of all prehistoric cultures in Cashiers, but until this excavation we had no formal evidence of any occupation. There are 204 prehistoric artifacts reported in the records. Of the total, 185 were found near the shed where the possible hearth was located. We recovered 179, which are listed in Table 1. These artifacts indicate seven different periods of occupation within the last 7,000 years. Artifacts consist of broken pottery, debris from manufacturing or resharpening stone tools, and complete and broken stone

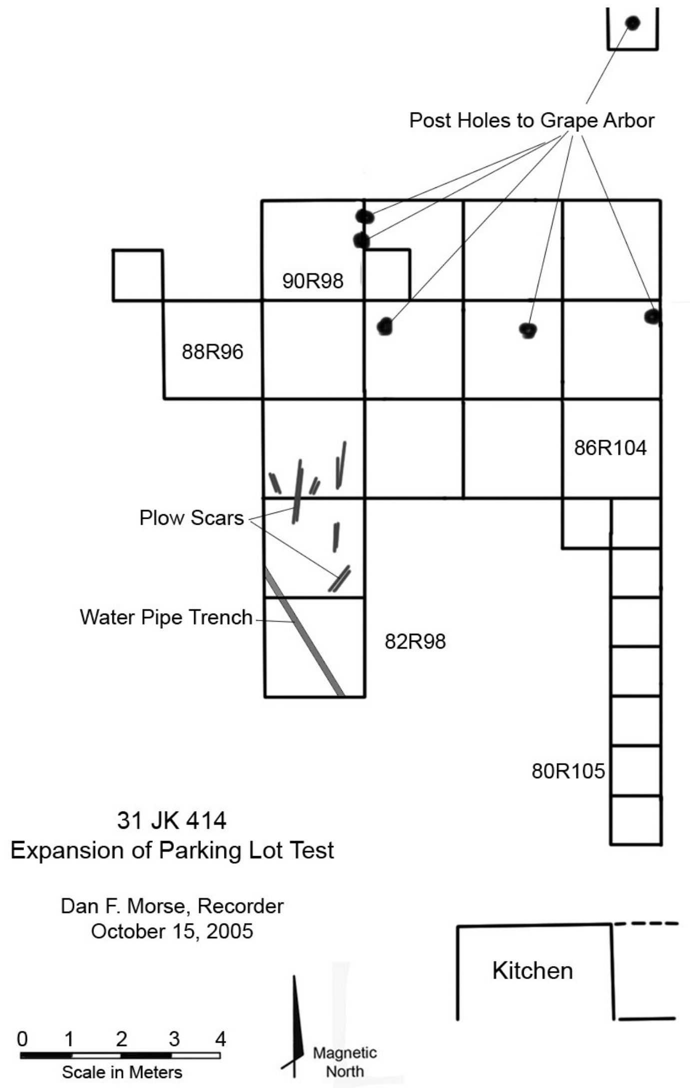


Figure 6. Expansion of Parking Lot Test.

tools that were discarded or lost (Coe 1964, Keel 1976, Mathis and Crow 1983, Ward and Davis 1999).

This discussion is very preliminary. The dating of preceramic complexes is dependent on projectile point style. These points often functioned as knives and are called "points" because many were used as spear points, and they exhibit differently-shaped hafting areas sensitive for dating purposes. Most of the points are made of locally available quartz and quartzite. They are

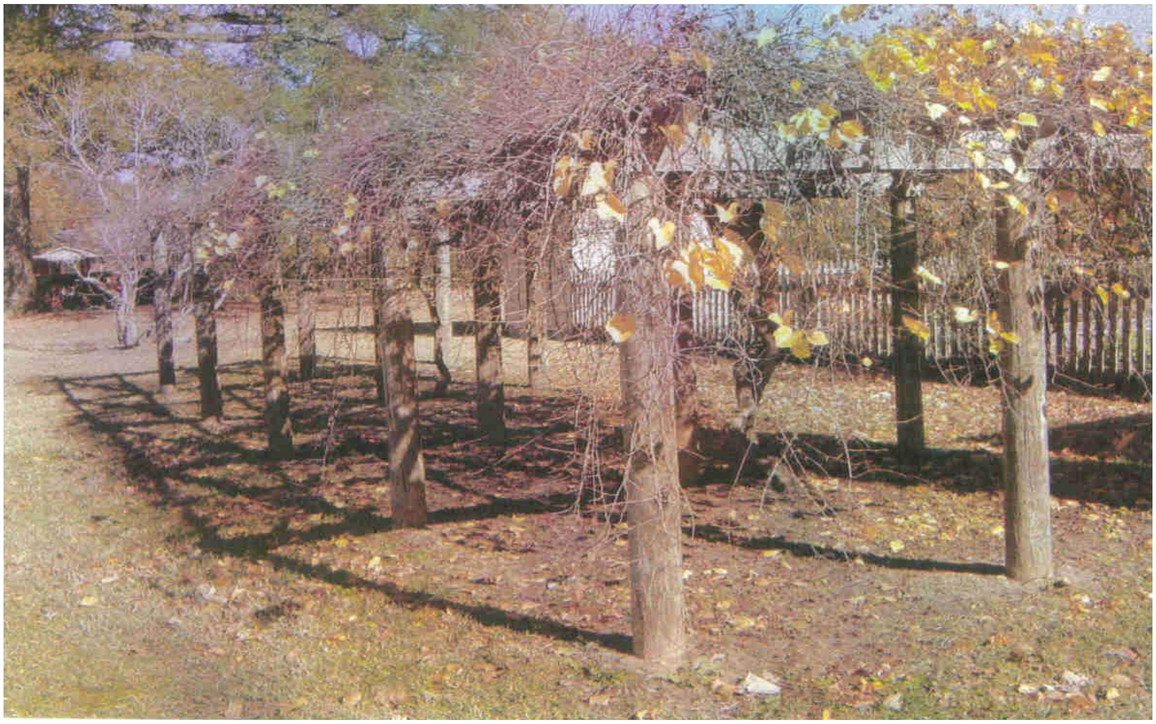


Figure 7. Grape Arbor at the Mordecai House, Raleigh, NC. Photo by Jan Wyatt.

considered to be expedient tools, made on the spot quickly and discarded before returning to the main village. A very few points were made of rhyolite which is quarried in the Uwharrie Mountains of the North Carolina Piedmont and indicates that some of these occupations may have originated from that part of North Carolina (Daniel and Butler 1996).

One point has been identified as Morrow Mountain, a style characteristic of the 4000-5000 BC period. Two points appear to be Guilford in type, which is a distinctive point of the 3000-4000 BC time period. There are 11 Savannah River points which may date as early as 2500 BC. The five Otarre points may date as late as 1000 BC, since they are essentially smaller versions of the Savannah River point and are thought to date later in time. However, other scholars think Otarre points may simply be smaller versions of the Savannah River type.

Fifteen potsherds were closely examined for potential dating information. Most were too small and eroded to date closer than "ceramic period." Six are typical of the Swannanoa Series which would date around 500 BC. One appears to be fabric-marked, one is probably cord-marked, one is possibly simple stamped, and the others are too eroded to discern. It is possible that one of the bifaces is actually a Swannanoa Stemmed point and contemporaneous with this pottery series.

Two of the sherds are typical of the Connestee Series, dating around AD 200. One appears to be curvilinear complicated stamped; however, this is a very rare type and is not expected in this region. Possibly, the combination of simple stamped, small size, and erosion is confusing us. On the other hand, this sherd may signal that this pot was carried to the site from Georgia where Complicated Stamped pottery called Swift Creek is common. The other sherd is cord-marked. No Garden City triangular points typical of this period were found.

A plain, thin, Qualla Series potsherd was also found. These sherds are typical of the prehistoric and historic Cherokee sites dating from about AD 1400-1500 up into the 19th century; although, after the introduction of European ceramics, the Cherokee only made pots for hominy. Thin sherds like these probably date nearer to AD 1500-1700. We did not see any European sherds in this preliminary analysis that would pre-date 1840; so, we doubt that there would be Cherokee remains in our collection which would date after 1600-1700. We also did not notice any early trade beads which could indicate 17th- and 18th-century Cherokee occupation. Future investigation will have to focus on this possibility.

No small arrowhead points, typical of the prehistoric and initial historic Cherokee, were recovered. One stone artifact, which probably is Cherokee is a very small blade typical of the very sophisticated Cherokee microlithic industry. It is made on an unknown chert and probably was lost, not made, on site. Another period when microliths were produced was the Late Archaic.

A very nice quartz chisel was found. This artifact could date to any period but probably is preceramic since it is side-notched for hafting as a woodworking tool. Since it is a very useful tool, it probably was lost rather

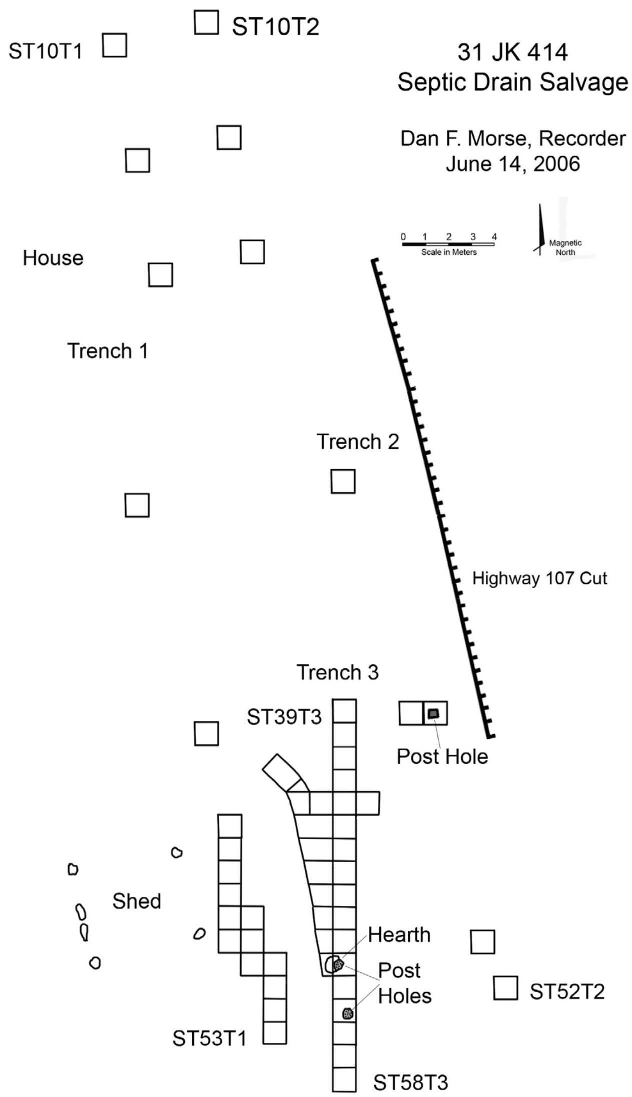


Figure 8. Septic Drain Salvage Map.

than discarded. A number of quartz bifaces appear to have been used as wedges. A quartz engraver and a scraper are also present in the collection.

A large number of Knox County dark and light grey chert flakes were found. Included are flakes of bifacial retouch which were struck from bifaces or points/knives when resharpening them. They can be recognized by the retention of the edge of the biface at the bulbular end. A number of the flakes exhibit cortex which indicates that cobbles were being made into points or chipped to produce flakes suitable for making into scrapers. Knox County chert was quarried in east Tennessee and northwest Georgia. Since we did not find any tools made of Knox County chert, the tools must have been carried off site to the main village. Knox County chert is most characteristic of ceramic complexes and is very rare in preceramic context.

Occupations such as those represented by these artifacts at the Zachary-Tolbert site are normally interpreted as campsites for local resource extraction (White 1975). Since about 3000 BC, Native Americans have been horticulturists, as well as hunters and gathers, and lived at least part of the year in villages near or within floodplains suitable for growing a variety of crops, including squash. Occupation there in the earlier periods could have been restricted to the Spring (planting) and Fall (harvesting). Older people and very young children might have stayed behind to guard fields, probably with the help of dogs, against animals intent on eating young plants. Later, less transient behavior was expected because the crops include the staples corn and beans, and a raid could have been disastrous to the tribe's economy. The presence of several tools relating to woodworking may be evidence of vision quests during which the person could have constructed a mask.

The presence of pottery, however, is usually interpreted as the result of whole kin groups (families) camping. Perhaps prehistoric peoples took camping vacations, too. After all, Cashiers Valley is a very nice place to visit.

Historic Artifacts

Archaeological excavations at the Zachary-Tolbert house have added another dimension to help interpret the lifeways of its occupants. The historic artifacts recovered date to the 1842-2000 period. Table 2 outlines the basic history of the property. Table 3 summarizes the 16,588 objects which have been processed and cataloged as of early May, 2007 (Godden 1964, Hume 1974, Zug 1986; Davidson 2006,).

Martha Black resigned her position as Chair of the Archaeology Committee in early 2007. Jane Brown of Western Carolina University was appointed to replace her. We received an email from Jane Brown to return all artifacts and records to her. Since then, Jane Brown has resigned. Phyllis Morse has volunteered to catalog the collection, but everyone she has talked to has resigned. The artifacts were delivered to us on May 4 and 7,

Table 1. Prehistoric Artifacts Found during the Septic Drain Salvage.

Material	Artifact	Count
Quartz	Flake	14
	Flake of Bifacial Retouch	23
	Biface	24
	Otarre Point	4
	Savannah River Point	9
	Guilford Point	2
	Morrow Mountain Point	1
	Chisel	1
	Hammerstone	3
	Other Tool	2
Chert	Flake	33
	Flake of Bifacial Retouch	23
	Flake with cortex	14
	Microblade	1
Rhyolite	Flake	2
	Flake of Bifacial Retouch	1
	Biface	1
	Otarre Point	1
	Savannah River Point	2
Other	Gizzard Stone chert flake	2
	Charcoal Sample	1
	Potsherds	14
Total Artifacts		**179**

2007, in cardboard boxes of varying sizes and condition, as well as in plastic pails. A few uncataloged artifacts have been washed, some of which were washed and sorted by us in 2006, and some have not been washed or sorted. We completely organized the collections between May 7 and May 11, and placed them in sturdy 4-gallon cardboard boxes. The acid-free bags were marked where necessary, and the bag contents were marked on the 20 boxes. There was no money to purchase acid-free boxes. When we turned over the collections and field notes to Jane Brown on May 11, 2007, she informed us that she was going to turn them over to the Society for storage because there was no money to wash, catalog, and number the artifacts. In addition, she understood that Western Carolina University would not accept artifacts unless they were properly cataloged and numbered.

There are identification problems with some of the cataloged artifacts. Many, such as the stoneware, will have to be reexamined to determine a more consistent description. We checked the cataloged "Native American" artifacts and other artifacts and made notations on the catalog printout. We particularly checked the cataloged "creamware" because such identification indicates an 18th-century date. The three sherds were definitely not creamware.

The phone line excavation of 267 artifacts are washed and sorted but not cataloged. Many of the artifacts found in the initial testing of the parking lot area are thought to be missing. The 194 artifacts which have been found have been washed. They were found in bags with only the square number recorded. Phyllis Morse put them in more substantial bags with more data written on the bags. She also sorted them since they were getting dirty again due to the rust. Another 744 artifacts were found on the scraped surface. They are mostly washed.

A total of 16,588 artifacts from the expansion of the parking lot area test have been cataloged. The catalog is nearly complete; however, the artifacts have not been numbered. Another 10,000 or more artifacts are uncataloged. Some of these artifacts have been washed and partially sorted.

The septic drain field salvage artifacts (1,846 specimens) are not cataloged. Most do not appear to have been washed. Some field sorting was done since most of the prehistoric artifacts were removed and given to Dan Morse for analysis. All of the prehistoric artifacts have been sorted and identified.

We visited the site in 2013. Artifacts are stored in acid-free cardboard boxes. Missing are records and artifacts which had been displayed in a special exhibit at the Pavilion. Jane Brown still has the records, since the Society did not have proper storage for records in 2007.

In 1842, Mordecai Zachary began construction of the house, building a sawmill nearby. He formally moved into the house upon his marriage in 1852. In the aftermath of the Civil War, Zachary sold his home to Armistead Burt in 1873. The house was henceforth used mainly as a summer retreat by the Burt, Parker, and finally the Tolbert families. The fortunate result of this use was that the house was not altered by renovation, and the original Zachary furniture was still present.

The original detached kitchen burned in the 1920s, and an old tenant house was moved to the property to

Table 2. Important Historic Dates for the Zachary-Tolbert House.

Date	Activity
1842	Mordecai Zachary began building the house and associated furniture. A sawmill was built nearby.
1852	Married. Family formally moved into the house.
1873	Armistead Burt purchased the house. Seasonal use.
1881	William Henry Parker purchased the house. Seasonal use.
1901	Robert "Red" Tolbert purchased the house. Seasonal use.
1920's	Original kitchen burns. New kitchen moved onto site.
1940's	Water from a spring is pumped up to the kitchen.
1997	Tom and Wendy Dowden purchased the house. Property is listed on the National Register.
1998	Property deeded to the Cashiers Historical Society. Reconstruction and improvements begin.
2004	Archaeological Investigations begin.

serve as a kitchen and dining area. Artifact discard in the form of sheet midden (where broken objects were tossed out from the area where the breakage took place) is heaviest in the area we excavated. A preponderance of burned and melted objects in this area may relate to the kitchen burning episode. We think that the original kitchen was almost immediately behind the newer kitchen.

After the mid-19th-century Zachary occupation, the late 19th-century Burt-Parker ownership equates to a definable historic period. The 20th-century Tolbert family continued to visit the house seasonally. This would theoretically cut down on the amount of objects discarded, but this would be balanced by the increase in the typical amount of material culture owned by 20th-century families.

The recovery of artifacts representative of the Zachary period is emphasized in this report. The house itself and the furniture therein are present, but the only other probable Zachary items previously owned by the historical society are some cast iron hearth cooking vessels and wash pots. The discovery of blue shell-edged pearlware in the parking lot test, dating to the mid-19th century, led to an extended excavation of the area north of the kitchen. Blue shell-edge is generally a plain white ceramic with a cobalt blue border. The glaze itself, caused by the inclusion of cobalt, was patented by Josiah Wedgwood. He was trying to emulate the color of Chinese Export porcelain. The blue in the glaze puddles and is discernable where it thickens, such as the bases of plates and around handles. Many factories in the English Staffordshire district began producing shell-edged pearlware, and they can be found on historic sites worldwide from Australia to India to the Americas. Later in the century, impressed rims gave way to plain painted rims. Both rim styles are present in the Zachary-Tolbert collection.

Transfer-printed ceramics are another type of English ceramics present at the site. Various floral and scenic overall patterns were used. Blue was the first color used, and chemical discoveries led to the use of many other colors. Blue is the most common transfer-printed color at the site, but there are also pink, red, green, black and brown sherds that have been identified. Several of these have partial maker's marks on the reverse side.

It is not known whether the Zacharys may have had numerous sets of tableware through their occupation, or as we expect, enjoyed a mixture of various colors at the same time. One red transfer-printed sherd at the site has an angular side and was probably part of a tea service.

"Sprig," or hand-painted underglaze floral decoration, was also used frequently in tea services which included a teapot, sugar bowl, creamer, small plates, and handleless cups and deep saucers. Three such painted sherds have been identified to date in the collection, and additional examples were noted during excavation.

Ironstone, a heavier type of ceramic, began to increase in use later in the century. The glaze is closer to a pure white in color, and the product is more durable. Ironstone often has subtle impressed designs, but most sherds must be categorized as simply "whiteware." Either the Zacharys or the later Burt or Parker families would

Table 3. Artifacts Found During the Expanded 2005 Excavation.

Category	Count
Cut Nails	2407
Wire Nails	1317
Unidentified Nails	1454
Unidentified Metal	1276
Other Architectural (hinges, hasps, chain, stove parts, etc.)	74
Horseshoe	1
Harness Buckle	2
Pocket Knife	1
Bullet Casings	46
Lead Shot	24
Tin Cans	99
Other Kitchen Metal (flatiron, pot rims, handles, etc.)	22
Coin	2
Brick	830
Tile	58
Window Glass	2779
Curved, Clear, Thick, Glass	1550
Curved, Clear, Thin Glass	886
Brown, Amber Glass	92
Aqua Glass	162
Green Glass	97
Milk Glass	65
Carnival Glass	23
Embossed Glass	151
Melted Glass	400
Other Glass	59
Blue Shell edge pearlware	16
Other Plain Pearlware	103
Whiteware	1362
Handpainted Floral (Sprig) Ceramics	3
Transfer Print Ceramics	51
Annular Ware	4
Flow Blue Ceramics	17
Moss Rose Ceramics	1
Porcelain	134
Japanese Phoenix Porcelain	10
Other Color Glaze Ceramics	57
Burned or Missing Glaze Ceramics	308

have owned the whitewares. Seventeen sherds of flow blue were cataloged. The blue transfer-printed design was purposely blended into the rest of the object to create a blurred effect. This series could have belonged to the Zacharys or a later family.

Utilitarian stoneware, including jars, churns, milk pans, and jugs, was an essential component in preparing and storing foodstuffs on a mid-19th-century farm. Such stoneware was usually purchased nearby since it was heavy to transport from a distance. North and South Carolina, as well as Georgia, are noted for the manufacture of alkaline (ash) and glass glazed stoneware which produced both green and mottled brown exteriors. More than 30 alkaline glazed stoneware sherds have been cataloged from the site, including bases and rims. Most are typically unglazed on the interior. Late in the 19th century, commercially produced stoneware with a brown Albany slip or a brown and white slip was used. A few earlier salt-glazed stoneware sherds were also observed. Twenty-nine sherds of turn of the century blue and dark blue kitchen pottery were probably pie pans and mixing bowls. Over 50 “Bennington” glazed sherds were also from utilitarian vessels, and the sherds examined probably date to the late 19th century. Yellowware was noted in the collections. In addition, a porcelain soap dish was recovered.

Table 3. Continued.

Category	Count
Bennington Doorknob	4
Green Glaze Stoneware	38
Albany Slip Stoneware	33
Molded Blue Salt Glazed Stoneware	29
"Bennington" Stoneware	51
Burned Stoneware	12
Other Stoneware	30
Porcelain Doll	3
Button	21
Glass Bead	1
School Slate	4
Mirror Back	1
Snap, Safety Pin	4
Animal Bone, Teeth	133
Peach Pits	90
Rocks	136
Native American	16
Other (Including Plastic)	30
TOTAL ARTIFACTS	**16,588**

The initial test in the parking lot area produced one object that firmly dates to the Zachary period, a copper two cent piece dated 1864-1873. Charley Wyatt researched this coin and found that this kind of two cent piece was first produced during the Civil War. It was the first coin to show the motto "In God We Trust." Cash money became very scarce during the war, and losing this coin would have been quite a loss.

Almost 2,500 square or cut nails have already been cataloged. Cut nails were the predominant nail type used until the last decade of the 19th century. Round or wire nails were not available until after the improved Bessemer steel process was introduced to the United States in 1879. The original house was built entirely with cut nails. The large quantities of cut nails present in the deposits may be due to the burning of the original kitchen. The over 1,300 wire nails present would have to date to later improvements.

Window glass is usually the most numerous of any category of artifact on historic sites, and the Zachary-Tolbert house is no exception. Almost 2,800 shards of flat glass have been cataloged to date. Considering the number of lively young boys living in the house, frequent window repairs would have been a likely expectation.

Whole bricks and fragments of bricks were often found in the deposits. The bricks are handmade and probably date from the chimney of the original kitchen. One other important discovery relates to the original construction of the house. Four fragments of an early Bennington mottled brown ceramic doorknob were found. These are identical to doorknobs still present in the house. These doorknobs must have been ordered from an eastern factory.

Other architectural elements, such as hinges, hasps, hooks, chain links, spikes, bolts, and staples were recovered. Many were obviously blacksmith-made. These were probably associated with various outbuildings on the site. Over 1,000 fragments of rusted iron were found which could not be readily identified. A horseshoe and several harness buckles provide additional proof that horses were indeed present. Heavy cast iron stove parts were probably in use by the Zacharys, but they could date later in time.

Other metal objects which could have belonged to the Zacharys include part of a flatiron, a long cast iron handle, and a 12-in. diameter rim of a cast iron pot or skillet. Almost 100 tin can sherds overlap all time periods ,but some could date quite early. A key to open a sardine tin is likely to be 20th century. The presence of 46 bullet casings and 22 lead shot outside the kitchen area probably indicates that butchering of game took place there. One other foodways aspect is the presence of 129 animal bone fragments. Many of these were burned. Ninety peach pits attest to the consumption of this fruit.

Glass shards have not been analyzed in detail. Over 1,500 thick, curved, clear, glass shards date to all relevant time periods. Many of these were milk bottles and canning jars. One hundred and fifty glass shards had various impressions of letters and numbers on them, advertising their contents. For instance, one early Tabasco bottle was found. Rod Rodriguez, who is married to Elizabeth McIlhenny, informed Jan Wyatt that it is a mold blown bottle dating to the period of 1920-1927.

Most of the bottles were incomplete. Several bottle necks were manufactured before the twist-off top was invented and are probably early medicine bottles that had cork stoppers. Curved thin glass was also present in quantity. Much of this is probably tableware. One identifiable pressed glass pattern, the daisy and button, would date to the late 19th century. Brown and aqua glass was most likely from bottles. Milk glass was used for both tableware and utilitarian cold cream jars. Two pieces of a child's tea set in milk glass is probably late 19th century in date.

Three parts of a porcelain doll were discovered. A portion of the head (including half the face), one separate ear, and one foot are present. Porcelain dolls often had cloth bodies. Such dolls were made in Germany and France and were dressed in very fashionable attire. One other personal possession, a folding pocket knife, was lost by someone near the kitchen. Extensive conservation and cleaning would have to be done to determine the date of manufacture.

Twenty-one buttons of ceramic, glass, and metal are clues as to the clothing worn by the inhabitants of the site. Two safety pins and two snaps are also clothing related. Two blue glass beads were the only items of personal adornment found. Part of a mid-20th-century ring and an undated mirror back were found.

Four pieces of slate were recovered. These were probably school slates, for practicing writing and calculating sums. The presence of children is obviously indicated by these objects.

The Burt-Parker time period (Table 2) is represented by a sherd of Haviland Moss Rose china. This popular pattern was often used in tea services. Seventeen fragments of Carnival glass also date to this time. Much of the whiteware and plain porcelain are also probably turn of the century in date. Not a single sherd of Willow Ware was noticed during the entire excavation. We expected to find some evidence of this pattern because the main exhibit in the house features Willow Ware.

Much of the glass probably dates to the Tolbert occupation. Shards of dark green glass appear to be orange juice bottles. Much of the amber or brown glass probably represents Lysol disinfectant, which came in brown pint bottles. One hand-painted sherd was marked "Blue Ridge," a factory in Tennessee that existed from 1938 to 1957. Several complete Blue Ridge plates are in the Zachary-Tolbert house collection.

A similar farmstead site in Illinois (the Holding site) has been reported and is dated tightly from 1846 to 1873 (Meinkoth 1989). Such an assemblage helps to differentiate those objects owned by the Zacharys from those owned by later occupants. The materials reported from the Holding site are very similar to those we found and include shell-edged, transfer-printed, hand-painted, and flow blue ceramics, as well as cut nails, window glass, and blown glass bottles. This helps reaffirm our conclusion that such objects belonged to the Zachary family.

This report can provide ideas for future exhibits and guide new acquisitions. Complete specimens that match the broken examples could be acquired by gift or purchase. Possible donations can even be rejected if they are not confirmed by archaeological discovery at the site. The Zachary store account book, recently acquired by the Cashiers Historical Society, can be studied to discern which of the objects sold are similar to those found in the ground near the Zachary-Tolbert house. Both future historical and archaeological work will reveal even more about the inhabitants.

Summary

In 2004, Jan Wyatt and Martha Black, who have had many years experience in professional historic preservation agencies, recommended to the Cashiers Historical Society that it should have conducted an archaeological reconnaissance of the property before initiating large-scale landscaping. New South Associates was hired to do a preliminary survey and concluded that besides more work needing to be done, that many tested areas did not seem to contain significant deposits. They noted the presence of outbuildings, both intact and in ruins.

In 2005, the Society began landscaping operations north and west of the house. Martha Black asked Dan and Phyllis Morse to accompany her to the site, and we observed numerous historic artifacts in the bulldozed area. We did an emergency two-day inspection of the area by excavating 1x1 m squares according to a grid system we established. So many artifacts were recovered, including substantial mid-19th-century remains, that we expanded the tests as a block excavation closer to the kitchen. We uncovered thousands of artifacts. A fence was erected to protect the most sensitive portions of the site. In addition, a decision was made by the Society to move the proposed Dowden Pavilion to another area off -site.

In 2006, two 135 foot long large trenches were excavated as a septic drain in front of the house and to the south past one of the outbuildings. Before that took place, we salvaged and tested portions of the area to be impacted. As we approached the shed, prehistoric artifacts began to appear in relatively large numbers, which added a whole new dimension to the property. Up until then, only a very few stone and pottery artifacts had been found.

Acknowledgements

In 1997, Tom and Wendy Dowden purchased the house and grounds, began the process of the National Register listing, and financed the donation of the property, which included a remarkable collection of plain pine furniture made by Mordecai Zachary, to the Cashiers Historical Society. They continued to be the principal financial backers for the development of the house in support of the Society's mission statement. Martha Black, through the George E. Crouch Foundation, supported the archaeological investigations at the site and the processing and cataloging of half of the collections. Katie Cochran was hired as a field assistant and to process and catalog the collected artifacts during six months of 2005 and all of 2006. Michael Alexander was hired as a second assistant for a short period in 2006. Numerous volunteers, who were mainly Society members, worked in the field. Dr. Bennie Keel, National Park Service, examined some of the diagnostic prehistoric artifacts and gave us his opinions. Dr. "Skip" Stewart-Abernathy, Arkansas State Historic Archaeologist, commented on possible reasons for postholes to be present on a mid-19th -century site. Dr. Marvin Jeter, retired from the Arkansas Archaeological Survey, edited the manuscript in 2014.

References Cited

Adams, Natalie P.
2005 *Archaeological Survey of the Zachary Tolbert House and Adjacent Proposed Parking Lot, Jackson County, North Carolina.* Report to the Cashiers Historical Society.

Coe, Joffre L.
1964 *The Formative Cultures of the Carolina Piedmont.* Transactions of the American Philosophical Society, 54 (5), Philadelphia.

Daniel, I. Randolph, Jr., and J. Robert Butler
1996 An Archaeological Survey and Petrographic Description of Rhyolite Sources in the Uwharrie Mountains, North Carolina. *Southern Indian Studies*, Vol.45:1-37.

Davidson, James M.
2006 Chapter Six: Material Culture, Chronology, and Socioeconomics. In Two Historic Cemeteries in Crawford County, Arkansas, Robert C. Mainfort, Jr., and James M. Davidson, editors. *Arkansas Archeological Survey Research Series* No. 62:97-218.

Godden, Geoffrey A.
1964 *Encyclopaedia of British Pottery and Porcelain Marks.* Crown Publishers, NY.

Hume, Ivor N.
1974 Creamware to Pearlware: A Williamsburg Perspective. Ceramics in America, editor Ian M. G. Quimby. *Winterthur Conference Report*: 1972, pp. 217-254, The University Press of Virginia.

Keel, Bennie C.
1976 *Cherokee Archaeology: A Study of the Appalachian Summit.* The University of Tennessee Press.

Mathis, Mark A., and Jeffrey J. Crow (eds.)
1983 The Prehistory of North Carolina: An Archaeological Symposium. North Carolina Division of Archives and History, Division of Cultural Resources.

Meinkoth, Michael C.
1989 Chapter 12: Historic Occupation. In The Holding Site: A Hopewell Community in the American Bottom (Fortier, Andrew C., ed.). A*merican Bottom Archaeology* FAI-270 Site Reports, Vol. 19:489-554, University of Illinois Press.

Morse, Dan F.
2005 Excavations at the site known as 31JK414. Memo to Eleanor Welling, October 9, 2005.

2006 Future Work at the Z-T House. Memo to Jan Wyatt, August 9, 2006.

Morse, Dan F., and Phyllis A. Morse
2004 *Power Line Trench Archaeological Investigation at the Zachary-Tolbert House (31JK414).* Report to the Cashiers Historical Society.

2005a Zachary-Tolbert House Site (31JK414) Former Parking Lot Salvage. Report to the Cashiers Historical Society.

2005b Recent Archaeological Discoveries at the Zachary-Tolbert Site. Talk to the Cashiers Historical Society 2005 Annual Meeting, October 18, 2005.

Shaffner, Randolph P.
2001 *Heart of the Blue Ridge: Highlands, North Carolina.* Faraway Publishing, Highlands, NC.

Ward, H. Trawick, and R. P. Stephen Davis, Jr.

1999 *Time Before History: The Archaeology of North Carolina.* The University of North Carolina Press.

White, Max E.
1975 Evans Gap Site. *Southeastern Archaeological Conference*, Bulletin No. 15:56-61.

Zug, Charles G., III
1986 *Turners and Burners: The Folk Potters of North Carolina.* The University of North Carolina Press.

Evidence of a Paleoamerican Presence from Upper Lake Marion, Clarendon County, South Carolina

Robert C. Costello

Introduction

Surface archaeological collecting in deflated areas along the shoreline of upper Lake Marion has provided evidence establishing a human cultural presence throughout the Early, Middle, and Late Paleoindian eras extending from the Late Pleistocene into the Early Holocene. Diagnostic artifacts recovered include Early Paleoindian Clovis projectile points and preforms, a single Middle Paleoindian Redstone projectile point, and several Late Paleoindian Dalton projectile points.

Materials utilized in Paleoindian projectile point manufacture comprise both local orthoquartzite and non-local materials, including Allendale/Brier Creek Chert and rhyolite. Evidence regarding possible Paleoamerican use of local Black Mingo Chert also is explored in this study. In addition to diagnostic projectile points, tool types often associated with paleo technology are found in this area. This paper was preceded by a preliminary report presented at the 2013 Annual Conference on South Carolina Archaeology (Costello and Steffy 2013a). Several artifacts discussed herein were included in a broad study of lithic utilization in the COWASEE Basin (Goodyear, 2014), and many are recorded in the South Carolina Lanceolate Point Database.

The area of study consists of selected regions of the Clarendon County shoreline of upper Lake Marion from southern Persanti Island on the south to the railroad bridge just south of Sumter County Landing on the north (Costello 2007), which are separated by a linear distance of approximately 7.7 miles. The description "upper Lake Marion" is used in this report, as it eliminates some geographical ambiguity of the phrase "Northeastern Lake Marion" applied by the author to this area in previous reports. It is located within the broader area defined as the COWASEE Basin, which comprises the Congaree, Wateree, and Santee River drainages. The entire search area is encompassed by the Hickory Top Wildlife Management Area, which is well known to and frequented by hunters and fishermen as well as recreational boaters. As such, this shoreline has been subject to surface collecting by numerous individuals for decades. It has yielded artifacts ranging from paleo to historic times. The author has observed a continuous presence and emergence of artifacts on the shore and in adjacent shallow water on the lake bed which he attributes to progression of soil erosion and deflation along the edge of the lake. Shifting sand distributions along the shore periodically reveal and rebury artifacts of potential interest. Variations in lake level produce radical changes in the extent of accessible search areas onshore and in shallow water, from narrow strips at high lake levels to large areas at low lake levels.

Methods and Procedures

Access to search areas by the author has been primarily by kayak, but also has included hiking for extended distances along the shoreline and lake bed at times of extremely low lake levels induced by drought, most notably that of Fall-Winter 2007-2008. Search methodology has included delineation of collection zones and collection of artifacts grouped by zone on each expedition. Precise GPS coordinates were recorded at the locations of artifacts immediately recognized as being of special interest, including many of the artifacts described in this paper. Photographic documentation of search areas and occasionally of artifacts *in situ* was performed. Data on search zone locations as well as numerous specific artifact GPS location data are on file with the Maritime Research Division of SCIAA in conjunction with Hobby Diver licensing and quarterly reporting which is required of anyone engaged in surface collecting along South Carolina waterways. Specific location data are not included in this paper, as they potentially could facilitate targeting of archaeological resources by looters.

All artifacts described in this study were surface-collected in deflated shoreline areas. Paleo association of these artifacts thus is based upon comparison of their morphological and technological features with those of paleo artifacts reported from well-documented, stratified sites. Specific indicators of paleo technology include fluted projectile points, paleo projectile point preforms, overshot flake scars, and fluting flakes. Also included are prismatic blades and trapezoidal blades similar to examples associated with Clovis technology at sites such as Gault (Bradley et al., 2010a, 2010b) and Topper (Sain 2012; Sain and Goodyear 2012). It also must be noted that selective collection of artifacts in this area by others may have produced bias in these data; for example, diminished frequencies both of artifacts made from more colorful lithic materials which contrast with the sand and clay of the shore and of projectile points relative to lithic tools which are less coveted by collectors.

Descriptions of Artifacts

Clovis and Redstone fluted points and reworked fragments thereof provide convincing evidence of an Early to Middle Paleoamerican presence in the study area (Figure 1). Each of these artifacts has been recorded in the South Carolina Lanceolate Point Database and assigned a SC number. Metric data for these artifacts are summarized in Table 1.

SC 349 is an orthoquartzite Clovis projectile point proximal portion, fluted on both sides. It is among the orthoquartzite Clovis points included in the Goodyear (2014) study of the Paleoindian presence in the COWASEE Basin. (Goodyear's Table 4, p. 12).

SC 477 is a rhyolite Clovis point listed among the metavolcanic Clovis points in Table 4 of Goodyear (2014). It exhibits scars from overshot flaking and edge retouch, indicating that its crude appearance notwithstanding, it is a finished point rather than a preform.

SC 513 is an orthoquartzite Clovis point proximal with fluting on both sides, listed by Goodyear (2014) in Table 4, and depicted in his Figure 4 (artifact i).

SC 601 is an orthoquartzite Redstone fluted point, fluted on both sides, somewhat eroded, and with minor tip damage. It is the only orthoquartzite Redstone point among the nine listed by Goodyear (2014) Table 5, and is depicted in his Figure 7 (artifact c).

SC 594 is a basal fragment of an orthoquartzite Clovis point. It is listed in Table 4 of Goodyear (2014).

SC 595 is a complete small orthoquartzite Clovis point. It is listed in Table 4 of Goodyear (2014).

SC 656 was identified as a reworked Allendale/Brier Creek Chert Clovis distal end by Joe Wilkinson and Al Goodyear among artifacts borrowed from the author for Wilkinson's Master's Thesis research (Wilkinson, 2016). It was recorded in the South Carolina Lanceolate Point Database by Al Goodyear on 7/30/16. Its inclusion in this study is predicated upon these examiners' observations.

SC 660 was identified as a reworked Allendale/Brier Creek Chert Clovis proximal end by Joe Wilkinson and Al Goodyear among artifacts recently loaned by the author to Wilkinson for his Master's Thesis research (Wilkinson 2016). It was recorded in the South Carolina Lanceolate Point Database by Al Goodyear on 8/26/16. Its inclusion in this study is predicated upon these examiners' observations.

Late Paleoindian Dalton points from the study area are illustrated in Figure 2, and metric data are shown in Table 2. Their S-numbered designations are study number listings from Dalton Point Data Sheets recorded by Joe Wilkinson during the summer of 2016; portions of these point descriptions are from his data (Wilkinson, 2016).

Figure 1. Clovis and Redstone projectile points.

S22 is an Allendale/Brier Creek Dalton point. It was described by Joe Wilkinson as exhibiting moderate grinding of its base and basal margins. An ancient break of the tip also was noted.

S23 is a quartz Dalton point basal ear recently identified by Joe Wilkinson, who described it as exhibiting heavy basal ear and margin grinding.

S24 is an orthoquartzite Dalton projectile point missing its tip and one basal ear due to old breaks. Wilkinson noted heavy grinding of base, ears, and margins.

S25 is a highly resharpened quartz Dalton projectile

Table 1. Clovis and Redstone projectile points from upper Lake Marion. Abbreviations: L = length, W = width, T = thickness, OQ = orthoquartzite, A/BCC = Allendale/Brier Creek Chert. SC numbers refer to artifacts recorded in the South Carolina Lanceolate Point Database.

specimen	material	L, mm	W, mm	T, mm	mass, g	location: zone/GPS	type
SC 349	OQ	50.40	33.94	8.97	17.21	L5/109	Clovis
SC 477	rhyolite	71.44	34.50	7.23	19.80	L5/499	Clovis
SC 513	OQ	49.08	38.86	9.49	17.45	L5/644	Clovis
SC 594	OQ	17.10	30.39	7.89	4.11	D3/a234	Clovis
SC 595	OQ	19.54	19.55	6.46	3.28	H3/a206	Clovis
SC 601	OQ	44.92	36.10	6.88	6.01	H2/219	Redstone
SC 656	A/BCC	49.74	26.55	7.64	9.73	L2/357	Clovis, reworked distal
SC 660	A/BCC	7.48	21.28	7.65	5.13	L4/-	Clovis, reworked proximal

point. Wilkinson noted heavy grinding of base, ears, and margins.

S26 is a petrified palmetto Dalton point with missing tip and ears as a result of old breaks. The material originally was identified by Professor John Logue, USC Sumter botanist. No GPS coordinate was recorded at the specific location of this find. Wilkinson noted heavy grinding of the base and margin.

S27 is an Allendale/Brier Creek Chert Dalton projectile point missing both the distal end and one ear due to ancient breaks. Wilkinson noted heavy grinding of the base and basal margin. It is depicted as item e, Figure 8 of Goodyear (2014).

S28 is a rhyolite Dalton projectile point with a small portion of one ear missing due to an ancient break. Wilkinson noted moderate grinding of the base and basal margins. It is depicted as item c, Figure 8 of Goodyear (2014).

S29 is a highly resharpened orthoquartzite Dalton projectile point. Wilkinson noted heavy grinding of the base and margins and a fresh small break in one basal ear. It is depicted as item k, Figure 8 of Goodyear (2014).

S30 is a complete orthoquartzite Dalton projectile point. Wilkinson noted heavy basal and basal margin grinding.

S31 is a complete orthoquartzite Dalton projectile point. It is the most skillfully made and best preserved orthoquartzite Dalton point in the author's

Figure 2. Dalton projectile points.

Table 2. Dalton projectile points and preforms. Abbreviations: L = length, W = width, T = thickness, A/BCC = Allendale/Brier Creek Chert, OQ = orthoquartzite, PP = petrified palmetto.

specimen	material	L, mm	W, mm	T, mm	mass, g	location: zone/GPS	type
S22	A/BCC	41.58	31.33	6.12	5.30	L4/a455	Dalton point
S23	quartz	-------	-------	6.42	1.73	L2/-	Dalton basal ear
S24	OQ	45.14	8.40	9.05	9.70	H4/87	Dalton point
S25	quartz	20.91	24.40	5.98	2.55	L4/198	Dalton point
S26	PP	34.31	26.60	6.00	4.80	H2/-	Dalton point, broken
S27	A/BCC	30.95	26.84	7.33	6.42	L3/691	Dalton point proximal
S28	rhyolite	47.50	48.16	6.15	8.14	P4/600	Dalton point
S29	OQ	46.68	26.35	8.29	6.16	L2/617	Dalton point
S30	OQ	47.29	35.26	7.38	9.01	C1/839	Dalton point
S31	OQ	44.30	26.80	7.32	7.35	L2/714	Dalton point
S40	OQ	45.19	40.30	10.60	18.52	L2/a115	early stage Dalton proximal
S41	rhyolite	22.70	26.55	6.80	3.89	L2/568	Dalton proximal half
S42	OQ	31.33	40.40	6.43	8.24	L3/a7	early stage Dalton proximal
L2101710	OQ	27.23	16.93	4.80	1.64	L2/a188	small Dalton point

collection. Wilkinson noted heavy basal and basal margin grinding. It is individually illustrated in Figure 3 of this study. It is depicted as item i, Figure 8 of Goodyear (2014).

S40 is an orthoquartzite early stage Dalton point proximal portion. Wilkinson noted that it exhibits no grinding. This may suggest that it was broken during manufacture prior to preparation for hafting.

S41 is a rhyolite or other metavolcanic Dalton projectile point basal portion. Wilkinson noted heavy basal and basal margin grinding.

S42 is an orthoquartzite early stage Dalton point proximal portion. As for the early stage Dalton preform proximal S40, no grinding was noted by Wilkinson.

L2101710 is a small orthoquartzite Dalton projectile point. It was identified as a Dalton point by Kenn Steffy and added to the Dalton database by Al Goodyear in October 2010.

Blades, flakes, and tools which the author submits as likely to be Paleoindian are shown in Figure 4. Metric data for these artifacts are provided in Table 3.

L511203 is an Allendale/Brier Creek Chert blade medial segment with prismatic cross-section, a large pot lid thermal fracture on one dorsal facet, and two smaller ones on its ventral surface (Figure 5). Joe Wilkinson's analysis of artifact BC-36 concluded: "fire damaged prismatic blade medial, one lateral edge shows use wear retouch, probably Clovis macroblade" (Wilkinson 2016). Its width (27.02 mm) is close to the average width (28.4 mm) for Gault Clovis blades (Bradley et al. 2010a)

L522707 is an Allendale/Brier Creek Chert blade medial segment with prismatic

Figure 3. A very well-made and well-preserved orthoquartzite Dalton point.

Figure 4. Probable Paleoindian blades, flakes, and tools.

the same chert may weather differently in different environments. Costello (2008) reported occurrences of similar high quality non-weathered amber translucent chert along upper Lake Marion.

P281511 is an Allendale/Brier Creek Chert blade segment with roughly trapezoidal cross section and slightly concave dorsal surface resulting from a prior blade removal scar. A roll-out termination on one end (top) suggests that this may be the distal portion of a blade. Its size and technological features are consistent with Clovis blade technology observed among blades recovered from Clovis strata at the Gault site. Its thickness (5.13 mm) is close to the average value (5.0 mm) for Clovis bladelets and small tools, but its width (23.09 mm) is much closer to the average value (28.4 mm) for Clovis blades at Gault (Bradley et al. 2010a, 2010b)

D61510P is an Allendale/Brier Creek Chert blade tool segment with trapezial (quadrilateral plane figure with no two sides parallel) cross section and unimarginal retouch on both edges. Its size and technological features are consistent with Clovis blade technology observed among blades recovered from Clovis strata at the Gault site. Its thickness (5.23) mm) is close to the average value (5.0 mm) for Clovis bladelets and small tools, but its width (23.87 mm) is much closer to the average value (28.4 mm) for Clovis blades at Gault (Bradley, et al., 2010a, 2010b).

L241604 is a beautiful Allendale/Brier Creek Chert blade or fluting/channel flake tool with fine serrations

cross-section. Joe Wilkinson's analysis as artifact BC-30: "medial section of a large prismatic blade which is likely a Clovis" (Wilkinson 2016). Its width (40.48 mm) is near the upper end of observed widths and significantly greater than the average width (28.4 mm) for Gault Clovis blades (Bradley, et al. 2010a).

H1103110 is identified as an Allendale/Brier Creek Chert Clovis second fluting flake based upon its technological analysis by Kenn Steffy. It exhibits a

Table 3. Paleoindian blades, flakes, and tools. Abbreviations: L = length, W = width, T = thickness, A/BCC = Allendale/Brier Creek Chert.

specimen	material	L, mm	W, mm	T, mm	mass, g	location: zone/GPS	type
L511203	A/BCC	27.02	25.38	4.63	3.23	L5/-	prismatic blade medial
L522707	A/BCC	35.46	40.48	7.89	11.35	L5/-	prismatic blade medial
H1103110	A/BCC	33.21	36.60	2.51	3.51	H1/a207	Clovis 2nd fluting flake
P281511	A/BCC	22.65	23.09	5.13	2.68	P2/-	trapezoidal blade segment
D61510P	A/BCC	25.21	23.87	5.23	4.28	L5/-	trapezial blade segment
L241604	A/BCC	49.17	18.23	3.90	4.51	L2/362	serrated channel flake/blade

prominent prior flake scar on its dorsal surface and a well-formed platform on its proximal end (Figure 6). Its lack of surface weathering or patination is not taken to be indicative of non-antiquity, as these processes have a significant environmental rather than exclusively temporal basis. Luedtke (1992) noted that different cherts may weather differently in the same environment, and

(approximately 6 per cm) on one edge and coarse serrations (approximately 3 per cm) on the other (Figure 7). Joe Wilkinson's analysis of artifact BC-39 concluded: "flake appears to be an end-thin flake off of a biface possibly a flute-flake…"

Other artifacts providing evidence of Paleoindian technology are illustrated in Figure 8. Metric data for

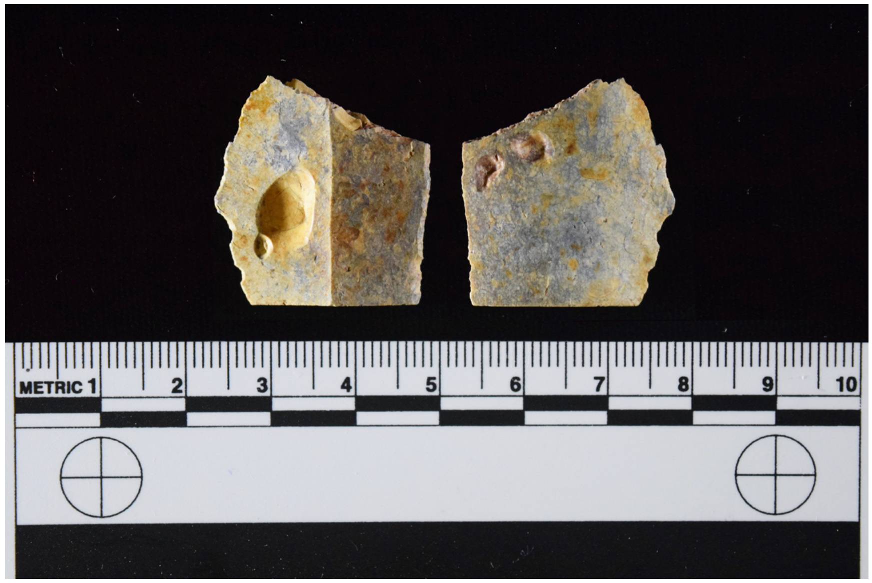


Figure 5. Allendale/Brier Creek Chert prismatic blade medial segment.

these artifacts are provided in Table 4. Each is identified as to collection zone location, but was not recognized by the author at the time of its recovery as meriting GPS location measurement. The first three are orthoquartzite Clovis projectile point preform proximal portions which are registered in the South Carolina Lanceolate Point Database. Three other superficially similar orthoquartzite projectile point preform proximal portions which were deemed to be too early stage preforms to definitively attribute to Clovis technology were omitted from this study.

SC 604 is an orthoquartzite Clovis projectile point preform proximal portion. It was entered in the South Carolina Lanceolate Point Database by Al Goodyear on 3/23/13 and is listed among the orthoquartzite Clovis points in his Table 4 (Goodyear, 2014).

SC 661 is an orthoquartzite Clovis projectile point preform proximal portion. It was recorded in the South Carolina Lanceolate Point Database by Al Goodyear on 8/26/16.

SC 662 is an orthoquartzite Clovis projectile point preform proximal portion. It was recorded in the SC lanceolate point database by Al Goodyear on 8/26/16.

L26604 is identified as a failed Black Mingo Chert Clovis projectile point preform based upon a detailed technological analysis conducted in collaboration with Kenn Steffy. It exhibits failed attempts at end thinning as well as failed attempts at overshot flaking, most of which ended in step terminations. Overshot flake scars are most evident on the ventral surface (Figure 9). Subsequent to its failure as a Clovis projectile point preform this artifact may have been modified as a tool (scraper/graver) but no definitive evidence of use wear is observed.

P151605 is a Black Mingo Chert Dalton adze, identified by Joe Wilkinson (Wilkinson 2016). Its inclusion in this study is predicated upon the examiner's observations.

L211101 is a quartz Dalton adze, identified by Joe Wilkinson (Wilkinson 2016). Its inclusion in this study is predicated upon the examiner's observations.

L3112101 is a metavolcanic egg stone with one end ground flat (Figure 10). Goodyear et al. (1990) illustrated one such artifact in their Figure 7, along with Suwanee, Simpson, and Dalton points and fluted preforms from South Carolina. They suggested a temporal association of egg stones with either Paleoindian or Early Archaic points, hence its inclusion in this report.

Figure 6. Allendale/Brier Creek Chert Clovis second fluting flake.

Figure 7. Allendale/Brier Creek Chert blade or fluting/channel flake tool.

Figure 8. Artifacts providing evidence of Paleoindian technology.

Table 4. Other Artifacts providing evidence of Paleoindian technology. Abbreviations: L = length, W = width, T = thickness, OQ = orthoquartzite, BMC = Black Mingo chert, MV = metavolcanic.

specimen	material	L, mm	W, mm	T, mm	mass, g	location: zone/GPS	type
SC 604	OQ	50.82	47.05	14.00	35.25	L3/-	Clovis preform proximal
SC 661	OQ	37.64	38.81	8.15	12.80	L2/-	Clovis preform proximal
SC 662	OQ	37.00	50.68	11.24	18.63	L2/-	Clovis preform proximal
L26604	BMC	78.89	46.75	19.20	69.36	L2/-	Clovis tool from preform
P151605	BMC	64.04	35.64	22.49	57.88	P1/-	Dalton adze
L211101	quartz	43.01	27.23	15.15	21.61	L2/-	Dalton adze
L3112101	MV	33.15	28.85	26.99	40.44	L3/-	"egg stone" w/flat top

Discussion and Conclusions

Evidence of Early, Middle, and Late Paleoindian presence in the study area is established by the recovery of diagnostic Clovis projectile points and point preforms, a single Redstone projectile point, and several Dalton projectile points. The primary lithic material employed for these projectile points is orthoquartzite, which is indigenous to the area. Anderson et al. (1982) identified orthoquartzite outcrops along the edges of the Santee River flood plain, and the presence of this lithic material also has been reported (Goodyear and Wilkinson 2015) from upstream locations along Big Beaver Creek in Calhoun County, which drains into the Congaree River. The predominance of orthoquartzite, both in debitage and in artifacts of all ages from the search area, suggests that as yet undiscovered sources of this ubiquitous lithic material likely exist in the immediate area, (Costello and Steffy 2012).

Presumed Paleoindian blades, flakes, and tools (Table 3, Figure 4) reported in this study are made exclusively of Allendale/Brier Creek Chert, likely originating from the Savannah River quarry area in Allendale County, SC and nearby Burke County, GA, approximately 70 miles distant from the upper Lake Marion study area. Although these artifacts alone might be challenged as providing insufficient evidence to prove a Paleoindian presence in the area, the recovery of diagnostic Paleoindian projectile points enhances the credibility of interpreting the morphological and technological features of members of this group as being Paleoindian.

Black Mingo Chert is an indigenous lithic

Figure 9. Ventral surface of failed Black Mingo Chert Clovis projectile point preform showing overshot flaking attempts.

Figure 10. Metavolcanic egg stone/bola stone.

material, one source being 38SU42, the ancient quarry on the hillside above Sparkleberry Landing in Sumter County. It ranges in quality from poorly indurated coquina to nearly gem quality agate (Costello & Steffy 2011). Goodyear (2014) reported two Paleoindian points manufactured from Black Mingo Chert among collections from the COWASEE Basin, one Redstone and one Dalton. Joe Wilkinson (personal communication, 9/29/16) recorded a single Black Mingo Chert Dalton point in a private collection from the shore of Wyboo Creek in Clarendon County, which drains into lower Lake Marion. Black Mingo Chert artifacts reported in this study include one Dalton adze and one failed Clovis projectile point preform. The latter indicates that individuals familiar with Clovis projectile point technology experimented with indigenous materials other than orthoquartzite. A previously reported (Costello and Steffy 2013b) possible fluted point segment manufactured of Wyboo Chert was omitted from this study in consideration of the possibility of alternative non-paleo explanations of its technological features. One can conclude that Paleoindians employed indigenous orthoquartzite and Black Mingo Chert as lithic materials, while the search for definitive evidence of their use of Wyboo Chert remains ongoing.

All artifacts reported in this study were recovered from recorded locations. The validity of these locational data is reinforced by the author's numerous observations of localized concentrations of related artifacts, such as specific debitage assemblages and pot sherds, which would suggest settling rather than relocation of artifacts resulting from the ongoing shoreline erosion processes which yield soil deflation. All but 3of the 22 diagnostic Paleoindian projectile points listed in Tables 1 and 2 were recovered from locations recorded both by zone and by specific GPS coordinates. It is especially interesting to note that two orthoquartzite Clovis points (SC 349 and SC 513) were recovered from the same zone (L5) five years apart at recorded GPS locations that differed only by zero degrees, 0.005 minutes. Such observations suggest that precise surface collection data possibly could be employed to locate non-deflated or partially deflated paleo sites for future systematic research by professional archaeologists.

No positively identified projectile points currently recognized as being of pre-Clovis age have yet been identified from this search area. The Lake Marion Chert tool assemblage reported previously (Costello, 2011) includes one large Allendale/Brier Creek Chert bend-break burin, a technological type comprising a significant component of the presumed pre-Clovis strata at the Topper site, 38AL23 (Goodyear 2005). As our understanding of pre-Clovis technology advances, it may be worthwhile to search for evidence of its presence along the shore of upper Lake Marion.

Acknowledgements

The author wishes to express his special thanks to the professional archaeological community of South Carolina for developing and maintaining a close mutually supportive relationship with avocational archaeologists including himself. Tom Charles and Al Goodyear of SCIAA have been most helpful and encouraging over the years and have provided valuable feedback regarding the artifacts shown them both in person and via electronic communications. The staff of the Hobby Diver program of SCIAA also has facilitated and encouraged his thorough documentation of each zone on each visit to the shore of Lake Marion. The Archaeological Society of South Carolina has been most supportive in sponsoring the Annual Conferences on South Carolina Archaeology which provide a venue both for learning and for presentations by avocational and professional archaeologists. Joe Wilkinson has shown great interest in the author's archaeological endeavors and has provided valuable perspectives and documentation of many of the artifacts included in this study. Very special thanks are due to the author's friend, colleague, and mentor, Kenn Steffy, for the hundreds of hours he has spent working and collaborating over what now is nearly a decade. Others who merit recognition for their support, encouragement, and inspiration of the author's activities as an avocational archaeologist include Jodi Barnes, Chris Judge, John Logue, Chris Moore, Nena Rice, Allen Turner, David Wielicki, Matt Varn, his wife Liz Costello, and his father Donald Paul Costello.

References cited

Anderson, David G., Charles E. Cantley, and A. Lee Novick
1982 The Mattassee Lakes Sites: Archaeological Investigations along the Lower Santee River in the Coastal Plain of South Carolina. *Special Publication 1982*. Atlanta: Interagency Archaeological Services, USDI National Park Service.

Bradley, Bruce A., Michael B. Collins, and Andrew Hemmings
2010a *Clovis Technology, Chapter 2: Clovis Blade-Making Technology*. International Monographs in Prehistory Archaeological Series 17, Ann Arbor Michigan.

2010b *Clovis Technology, Chapter 4: Clovis Small Tools at Gault*. International Monographs in Prehistory Archaeological Series 17, Ann Arbor Michigan.

Costello, Robert C.
2007 Collection and Documentation of Lithic Artifacts from the Hickory Top Area of Lake Marion. Paper presented at the Annual Conference on South Carolina Archaeology, Archaeological Society of South Carolina, Columbia.

2008 High Quality Chert from Northeastern Lake Marion. Paper presented at the Annual Conference on South Carolina Archaeology, Archaeological Society of South Carolina, Columbia.

2011 Macroscopic Analysis of an Allendale Chert Flake Tool Assemblage from Northeastern Lake Marion. *South Carolina Antiquities* 43:47-58.

Costello, Robert C. and Kenneth E. Steffy
2011 Insights into Lithic Raw Materials in the Hickory Top Area of Northeastern Lake Marion. Paper presented at the Annual Conference on South Carolina Archaeology, Archaeological Society of South Carolina, Columbia.

2013a Paleoamerican Lithic Technology along NE Lake Marion. Paper presented at the Annual Conference on South Carolina Archaeology, Archaeological Society of South Carolina, Columbia.

2013b Wyboo Chert and its Prehistoric Utilization *South Carolina Antiquities* 45:84-86.

Goodyear, Albert C.
2005 Evidence of Pre-Clovis Sites in the Eastern United States. In *Paleoamerican Origins: Beyond Clovis*, edited by Robson Bonnichsen, Bradley T. Lepper, Dennis Stanford, and Michael R. Waters.

2014 Paleoindian in COWASEE: Time, Typology, and Raw Material Selection. *South Carolina Antiquities* 46: 3-20.

Goodyear, Albert C. and Joseph E. Wilkinson
2015 Documenting Orthoquartzite Tool Stone in the Beaver Creek Locality in Calhoun County, South Carolina. Paper presented at the Annual Conference on South Carolina Archaeology, Columbia, South Carolina.

Luedtke, Barbara E.
1992 *An Archaeologist's Guide to Chert and Flint*. Archaeological Research Tools 7, Institute of Archaeology, University of California, Los Angeles.

Sain, Douglas A.
2012 Clovis Blade Technology at the Topper Site (38AL23), Assessing Lithic Attribute Variation and Regional Patterns of Technological Organization. *Occasional Papers 2*, Southeastern Paleoamerican Survey, South Carolina Institute of Archaeology and Anthropology, University of South Carolina.

Sain, Douglas and Albert C. Goodyear III
2012 A Comparison of Clovis Blade Technologies at the Topper and Big Pine Tree Sites, Allendale County, South Carolina. In *Contemporary Lithic Analysis in the Southeast Problems, Solutions, and Interpretations*, edited by Philip J. Carr, Andrew P. Bradbury, and Sarah E. Price, pp. 42-54. The University of Alabama Press, Tuscaloosa.

Wilkinson, Joseph E.
2016 Unpublished data from analysis of portions of the author's collection which Mr. Wilkinson kindly shared with the author.

Revisiting Colono Ware Variety in the South Carolina Lowcountry

Ronald W. Anthony

Sustained interest in colono ware in South Carolina can be traced to the early 1970s, as reflected by several investigations. For example, in 1972 Steven Baker excavated an early 19th-century "cellar ruin" in the town of Cambridge, South Carolina, recovering evidence of at least 12 individual colono ware vessels (Baker 1972). Baker (1972), noting Noël Hume's (1962) use and meaning of the term Colono-Indian ware, attributed these burnished vessels with micaceous pastes to the Catawba. In his report, he references the work performed by Harrington (1908), Holmes (1903), and Fewkes (1944) concerning Catawba pottery and Speck (1928) regarding Pamunkey material (Baker 1972). Also, he notes South's (1976) earlier work regarding Brunswick Burnished wares from Brunswick Town near Wilmington, North Carolina. Fresh ideas regarding the makers of colono ware arose by the mid-1970s via Richard Polhemus and Stan South (Ferguson 1978, 1992). Polhemus, during a visit to Ghana, observed a high degree of similarity between certain Ghanaian vessels and what had been called Colono-Indian pottery from Lowcountry plantations (Ferguson 1978, 1992; Hamby and Joseph 2004). He mentioned this insightful observation to Stan South. South (1974), during his investigation of Fort Moultrie in the Charleston harbor, encountered substantial amounts of what he called Colono-Indian pottery – almost 40% of the pottery recovered. Following the interpretations of the time, he believed that the material was likely Catawba pottery; however, he stated (1974:186), "A suggestion to be considered in studies of Colono-Indian pottery is the high degree of similarity between it and the pottery being made today in West Africa. The correspondence is so great that a consideration of African relationships is suggested." As noted, "Leland Ferguson took this consideration to heart …" (Hamby and Joseph 2004:252). Ferguson's landmark work, "Looking for the 'Afro' in Colono-Indian Pottery, "arrived on the scene in the late 1970s (Ferguson 1978).

It was also in the late 1970s that, under the umbrella of CRM archaeology, fortuitously, I was involved in the archaeological investigation of a late 18th- early 19th-century African-American slave site on the south shore of Lake Marion in Berkeley County, South Carolina, called Spiers Landing (Drucker and Anthony 1979). Spiers Landing, located on land formerly known as Fountainhead Plantation, yielded a high frequency – 56% of the site's ceramic assemblage – of colono ware (Anthony 1979; Drucker and Anthony 1979). During the field work at the site, I noticed fairly quickly that the vast majority of this pottery varied notably, morphologically, from extant descriptions provided by Baker (1972) for example, as well as from much of the described Virginia Colono-Indian ware (Noël Hume 1962). Most of the Spiers Landing colono ware was crudely made and finished (Anthony 1979). Most vessels, albeit subjectively, seemed to have been utilitarian and expediently made (Figure 1). Less than a dozen sherds appeared similar to the burnished micaceous paste pottery most attribute to the

Figure 1. Colono Ware From the Spiers Landing Site.

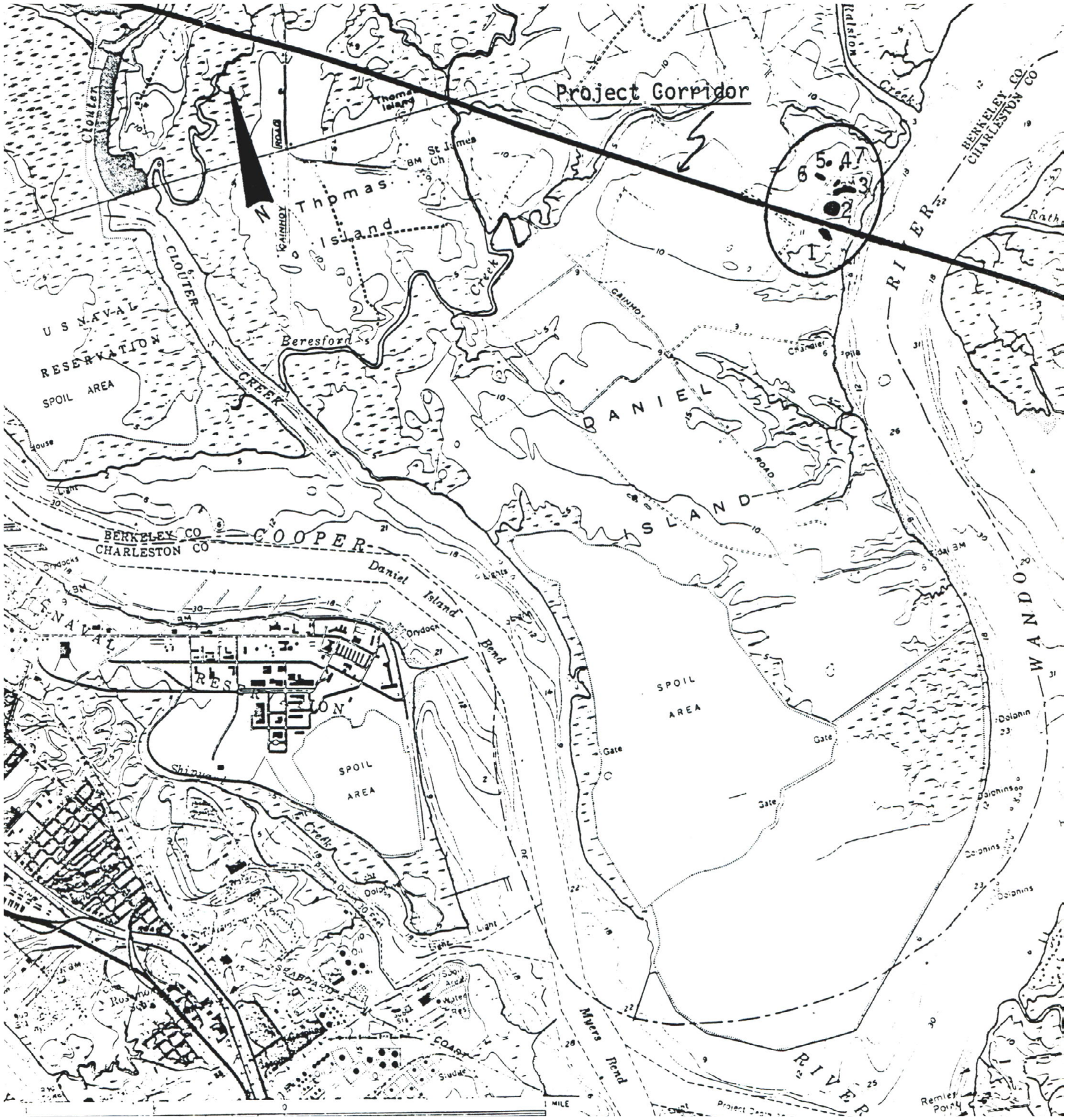


Figure 2. Lesesne and Fairbanks Plantations.

Catawba today. I concluded then that variety likely existed in colono ware assemblages of the region, and I have continued to see morphological variability and diversity in collections. What does this variability mean? Ferguson presented his "Looking for the 'Afro' …" paper during the field phase of the Spiers Landing project (Ferguson 1978; Drucker and Anthony 1979). This site proved to be one of the first, if not the first, rural slave occupation excavated in Lowcountry South Carolina and one of the earliest to support Ferguson's (1978) new hypothesis concerning the makers and users of this class of pottery.

In the 1980s, research referred to today as *Plantation Archaeology*, encompassing the investigation of colono ware, accelerated. In fact, interest in the two subjects, plantations and colono ware, almost seemed to increase "hand in hand," so to speak. During this time, the breath of several CRM studies of 18th- and early 19th-century occupations in the South Carolina Lowcountry provided substantial new data concerning plantation sites. This new data placed the region along the forefront of *African-American Archaeology* for a time. For example, the investigation(s) of Yaughan and Curriboo Plantations provided data regarding what the site researchers believed to be 18th-century plantation slave architecture, settlement patterning, acculturation, diet, that is, general lifeways (Wheaton et al. 1983). The authors believed that part of the daily life of the enslaved at Yaughan and Curriboo included the manufacture and use of colono ware. They discussed two groups of this pottery.

Using data from Spiers Landing and other sites, these researchers offered the first formal variety names for Lowcountry colono ware, *Yaughan* and *Catawba* (Wheaton and Garrow 1989). *Yaughan*, initially called *Colono*, referred to the cruder utilitarian ware believed by several investigators to have been made and used by enslaved plantation occupants (Wheaton et al. 1983). The pottery called *Catawba*, was felt to have been a market ware produced by the Catawba, who were a late 18th-century amalgam of aboriginal groups formed in response to European and European-American contact and associated activities such as Indian slavery (Anthony 2002, 2009; Bowne 2005; Ferguson 1989; Wheaton and Garrow 1989; Wheaton et al. 1983).

A few years after the Yaughan and Curriboo study, SCDOT awarded its largest archaeological CRM contract, at the time, for the study of Lesesne and Fairbanks Plantations on the Wando River (Figure 2). Lesesne Plantation was slated to be directly impacted by the construction of the Mark Clark Expressway (I-526) on Daniel Island, northwest of downtown Charleston. Fortunately, I was able to study the relatively large colono ware assemblage from this project. As the analysis proceeded, it quickly became apparent that using the two Lowcountry colono ware varieties provided in the literature, at the time, to classify the colono ware from Lesesne and Fairbanks Plantations would be inadequate. This assemblage was the most diverse and variable that I had seen up to that time. The variability was expressed primarily in vessel form, vessel thickness and uniformity, decoration, and paste characteristics (Anthony 1986). With the exception of paste characteristics, substantial amounts of the colono ware from Lesesne Plantation seemed to range morphologically between the physical attributes expressed by the crudest named variety, *Yaughan*, and the best made variety, *Catawba*, subsequently referred to by some, as *River Burnished* (Wheaten and Garrow 1989; Ferguson 1989). In short, to account for the morphological variability that I saw and to facilitate a behaviorally oriented study of the sites diverse colono ware assemblage, I classified and placed a substantial amount of the Lesesne and Fairbanks Plantation colono ware into two additional categories – *Lesesne Smoothed* and *Lesesne Lustered* (Anthony 1986). As it turned out, after several years observing Lowcountry colono ware from a variety of contexts, I decided that *Lesesne Smoothed* was not valid, that is, not a culturally meaningful classification; however, the *Lesesne Lustered* variety or simply *Lesesne* colono ware, is still viable (Anthony 1986, 2002).

The distribution of colono ware at Lesesne Plantation demonstrated that the *Yaughan* variety was associated with the documented slave occupation, while *Lesesne Lustered* colono ware was clearly associated with the planter occupation of the site (Anthony 1986). The association of *Lesesne* colono ware with higher socio-economic 18th-century occupations has been supported by numerous Lowcountry investigations subsequently (e.g., Agha 2012; Anthony 2012; Zierden and Anthony 2006). Additionally, regarding the colono wares found in downtown Charleston contexts, which is generally 6-8% of the total amount of ceramics recovered, most have been classified as *Lesesne* colono ware (Hamby and Joseph 2004; Isenbarger 2005, 2006; Zierden 2005). I believe *Lesesne* colono ware was used routinely in many, if not most, Lowcountry planter and urban households. As inferred in the mid-1980s Daniel Island study, *Lesesne* colono ware was likely a market ware (Anthony 1986). Interestingly, observations since that time have increasingly suggested that other largely contemporary market wares likely existed in the Charleston area, that is, other than *Lesesne* or *Catawba* pottery. One example, largely contemporary with *Lesesne* colono ware and probably earlier than Catawba market wares, was first observed at Stobo Plantation, about 35 miles south of Charleston (Figure 3). It is, for the most part, morphologically similar to *Lesesne* colono ware and, importantly, is present in both rural and urban settings. This similarity motivated me to relook at much of the *Lesesne* colono ware from 38BK202 (Lesesne and Fairbanks Plantations) that I analyzed

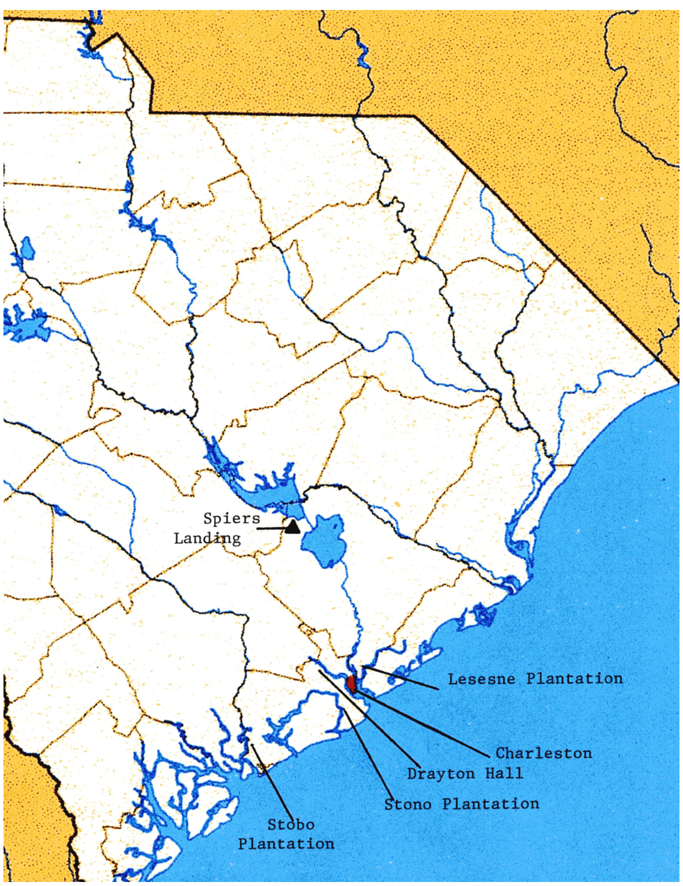


Figure 3. Selected South Carolina Lowcountry Plantations With Colono Ware.

years ago (cf. Anthony 1986).

At 38BK202, most of the *Lesesne* and *Lesesne-like* pottery was recovered from deposits (Feature 115) excavated inside the remnant(s) of a late 17th-/early 18th-century brick structure at Lesesne Plantation, which ultimately was believed to have been an early trading

Figure 4. Feature 115 at Lesesne Plantation.

post (Figure 4) (Zierden et al. 1986). Feature 115, the most complex feature encountered at the site, contained four primary depositional zones (Zierden et al. 1986). Excavation of most of this feature proceeded by zone and levels within zones, when prudent. Zones 2 – 4, based on TPQs and ceramic profiles, dated to the late 17th/early18th-century, while Zone 1 was deposited after the destruction of the building (Zierden et al. 1986). Most cultural materials, by far, were contained within Zone 1 soils – most of the *Lesesne* colono ware that I re-examined (Figure 5).

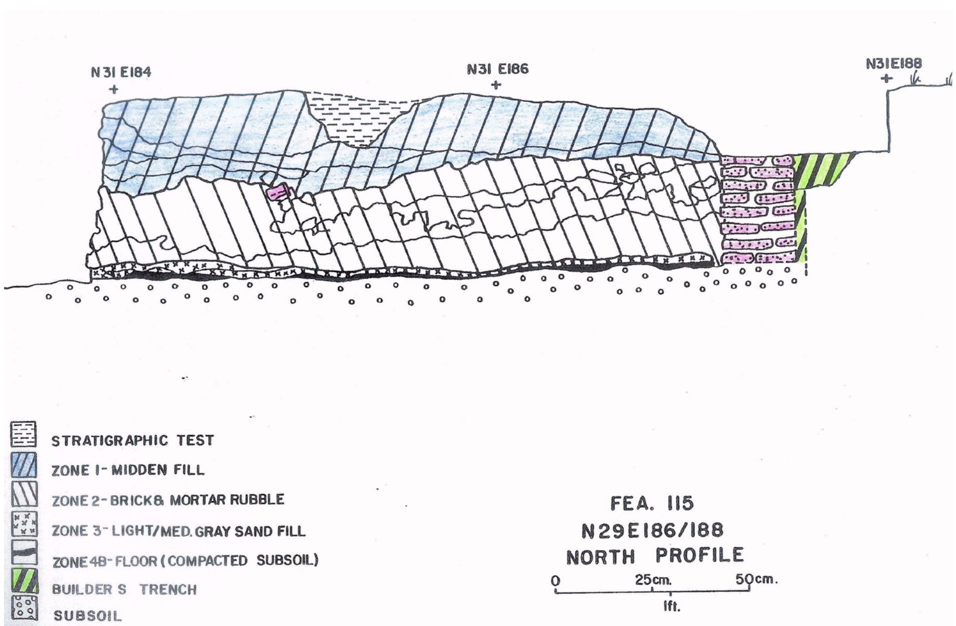


Figure 5. Feature 115 Zones.

Like other varieties of colono ware, most *Lesesne* vessels are bowls or pans. Many of these vessels are straight sided bowls, while some are slightly convex sided with slightly rounded to almost flat bases. Unlike *Yaughan* bowls, a relatively high proportion of Lesesne bowls/pans exhibit large vessel orifices – up to 14 inches in diameter, likely evidencing a serving function (Anthony 1986). Other vessel forms include necked and neckless jars with everted rims. These tend to be globular shaped. Also, bottles, cups, and multi-podal and handled vessels have been observed at quite a few sites (Anthony 1986, 2009). *Lesesne* colono ware is characterized by well smoothed and/or burnished surfaces. They are not as completely or as well burnished, thin, or as well fired as Catawba pottery (Anthony 1986). However, like Catawba wares, *Lesesne* vessel walls are generally uniform in thickness. *Lesesne* vessels are virtually temperless with a fine to medium paste which may be slightly laminar (Figure 6) (Anthony 1986, 2009). These vessels are not painted, although some evidence exists for occasional red filming. *Lesesne* colono ware, a colonial market ware, can display decorative and functional characteristics, if you will, or vessel forms which tangibly demonstrate syncretism, such as: scalloped and coggled rims, European vessel-like ring bases, strap and less common loop handles, and multi-podal supports (Figure 7) (Anthony 2002). Other vessel forms include chamber pots, teapots, soup plates, and Dutch oven-like vessels, among others (Anthony 2002, 2009; Hamby and Joseph 2004; Trinkley et al. 1995). Based on the findings at Lesesne and Fairbanks Plantations (38BK202), and most recently at the Lord Ashley Site (38DR83) near Summerville, South Carolina, as well as at Stobo Plantation (38CH1659), *Lesesne* colono ware currently appears to have been produced earlier than *Yaughan* colono ware or *Catawba* market wares, yet they became contemporaries by the late 18th century in the Lowcountry (Anthony 2002; Agha 2012).

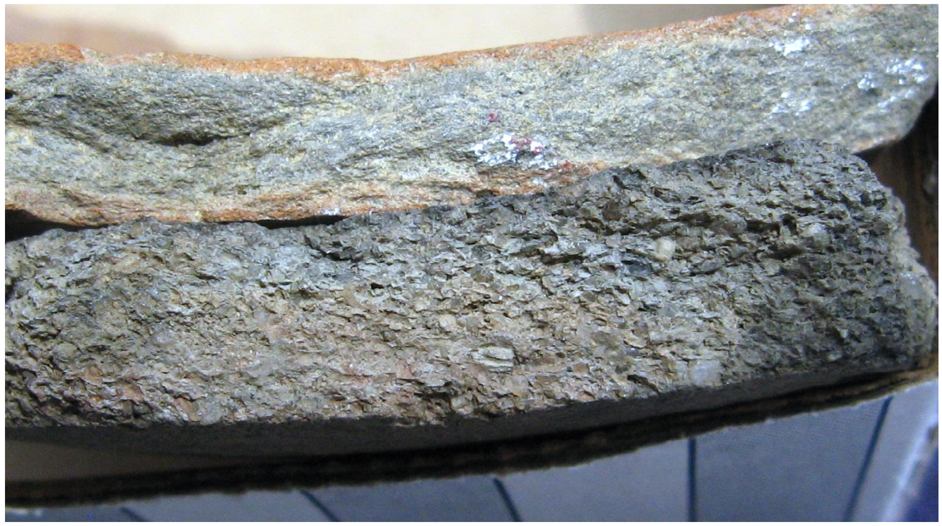


Figure 6. Lesesne Colono Ware (top) and Historic Aboriginal Ware.

Stobo Plantation, situated about a mile inland from the late 17th-century colonial town of Willtown on the Edisto River, provided the initial evidence, to yours truly, of another probable colonial market ware. Excavation(s) at Stobo Plantation focused on the remnants of what was apparently a quickly abandoned compound-like residence occupied ca. 1710 – 1780 (Figure 8) (Zierden et al. 1999). Field investigations at Stobo Plantation yielded 2,816 colono ware sherds, 36% of which were classified as *Yaughan*, while the remaining 1,800 plus sherds were residuals as well as virtually equal numbers, 570 and 579 sherds respectively, of *Lesesne* colono ware and a new category of pottery I simply called Historic Aboriginal, at the time. Although all of these varieties were observed in every excavated provenience, *Lesesne* and Historic Aboriginal colono wares were most prevalent in early to mid-18th-century contexts while *Yaughan* colono ware was much more frequently encountered in proveniences containing later ceramics such as pearlware (Zierden et al. 1999; Anthony 2002).

Figure 7. Lesesne Colono Ware Podes.

Ninety seven (97) fragments of the Historic Aboriginal pottery exhibited both curvilinear and rectilinear complicated stamped surfaces. Stamped motifs were generally large, bold, and poorly applied. It is probable that these fragments were examples of *Altamaha* and *Ashley Series* pottery. However, importantly, most of the colono ware classified as Historic Aboriginal pottery (n = 482) from Stobo Plantation was not complicated stamped and exhibited well smoothed, at times, burnished surfaces (Zierden et al. 1999; Anthony 2002). This relatively thin-walled (6 -7 mm) generally reduced pottery,

Figure 8. Stobo Plantation Excavations.

other than being characterized by a coarse sand temper (0.5 – 1 mm) and a coarse to very coarse paste, was morphologically similar to *Lesesne* colono wares (Anthony 2002). The paste characteristics varied somewhat from the observed complicated stamped material on-site, particularly regarding paste coarseness, quality of firing, and vessel thickness.

As stated, the physical similarity of the *Stobo* variety of colono ware to *Lesesne* colono ware and its presence at several sites encouraged me to relook at the original material that I used to define the *Lesesne Lustered* variety in the mid-1980s (cf. Anthony 1986). A re-examination of the *Lesesne* colono ware from Feature 115 at Lesesne Plantation revealed that *Stobo* colono ware was clearly present within this deposit(s). Its presence provided further information concerning this variety's physical attributes. Over 100 sherds of *Stobo* colono ware from Feature 115 as well as from selected plowzone contexts at 38Bk202 were delineated during the re-examination of *Lesesne* material. Not recognizing this variety (*Stobo*) during the original analysis of Lesesne Plantation colono wares, I had assumed that the notable range of temper sizes, as well as the varying amounts of temper observed in what I categorized as *Lesesne Lustered* colono ware, were simply physical characteristics of this (*Lesesne*) variety.

The *Stobo* colono ware at Lesesne Plantation, like other colono ware assemblages, is characterized by a higher percentage of bowls relative to jar forms. Many, if not most of these vessels are reduced dark colored, while some are incompletely oxidized and some are oxidized to the degree that they are yellow/red in color. A MNIV of 65 *Stobo* vessels was observed from Lesesne Plantation, 45 vessels, or 70% were bowls. Quite a few of these bowls exhibited bulbous shaped lips - characteristic of *Lesesne* colono ware. *Stobo* bowls at Lesesne Plantation were straight sided while some were slightly convex sided. Both rounded and flattened lips were observed. The orifice diameter of *Stobo* bowls averaged about 8 inches – somewhat smaller than many *Lesesne* variety bowls. Vessel walls, like *Lesesne* colono ware, exhibited uniform thickness – averaging 6.3 mm thick. *Stobo* jars exhibit everted rims primarily and are likely globular shaped. Interestingly, the examples of *Stobo* jars from Lesesne Plantation are characterized by rather large vessel orifices averaging almost 7 inches in diameter – perhaps wide-mouthed storage containers. These well-made jars average 6.7 mm thick. Like the *Lesesne* variety, many *Stobo* vessels are burnished, while some are well-smoothed, particularly vessel interiors. Often, interior vessel surfaces seem to have been "floated" – to the degree that the characteristic coarse temper of this variety is obscured – that is, smoothed over (Figure 9). *Stobo* colono ware from Lesesne Plantation exhibits a characteristic subangular coarse sand temper (0.5 – 1.5 mm) and coarse to very coarse paste. One can easily view this temper

Figure 9. Stobo Colono Ware With Smoothed Interior.

without the aid of magnification. One can actually feel the size and, to a degree, the amount of temper present in this pottery by feeling a broken edge of a *Stobo* sherd with one's finger (Figure 10).

As depicted in Figure 3, several other Lowcountry

Figure 10. Stobo Colono Ware Temper.

South Carolina sites in the general vicinity of Charleston have yielded *Stobo* colono ware**.** For example: the Parsonage Site, approximately 4 miles north of Stobo Plantation; Drayton Hall, on the Ashley River about 12 miles northwest of downtown Charleston; and Stono Plantation located on James Island a few miles south of the Charleston peninsula, among others (cf. Zierden et al. 1999; Anthony 2002, 2012; Zierden and Anthony 2006a,b). Analysis following field investigations performed at these sites from 2003 – 2007 revealed that from 8 – 9% of the colono ware recovered from these sites was *Stobo* colono ware.

This variety of colono ware has also been observed at a number of locations in downtown Charleston (Figure 11). Urban sites reviewed for this article whose colono ware assemblages contain *Stobo* colono ware include:

1) Colonial Beef Market site (NE corner of Broad and Meeting Streets – beneath City Hall);
2) Heyward-Washington House (87 Church St.);
3) 86 Church St. (residence across the street from the Heyward-Washington House);
4) Miles Brewton House (27 King St.);
5) Nathaniel Russell House (51 Meeting St.);
6) South Adger's Wharf site (Tradd and Bay Streets – site of Tradd Street Redan) and;
7) 91-93 King St. (residence(s) north of the Miles Brewton House). (cf. Zierden and Reitz 2007, 2016; Zierden 1996, 2001, 2005; Butler et al. 2012)

Of these sites, the Nathaniel Russell House currently provides the earliest context for *Stobo* colono ware (cf. Zierden 1996). This early 18th-century provenience, Zone #7 in Unit N130 E328, exhibits a date of deposition in the 1730s (Zierden 1996).

Furthermore, Hamby and Joseph (2004) report that their excavations at the Charleston County Judicial Center (northwest of Broad and Meeting Streets) yielded a good number of burnished wares with coarse sand temper. They state (2004:256) that "… approximately two thirds *Lesesne Lustered* to one third Burnished." Joseph (2004) called this pottery Colonial Burnished, but not all *Stobo* colono ware is burnished. Hamby and Joseph (2004:257) believe that all varieties of colono ware from the Judicial Center site "… were obviously made for trade at market." Brian Crane's earlier research regarding Charleston colono ware supports this interpretation as well (cf. Crane 1993).

Unlike *Lesesne* and several other Lowcountry colono ware varieties, all examples of *Stobo* colono ware from

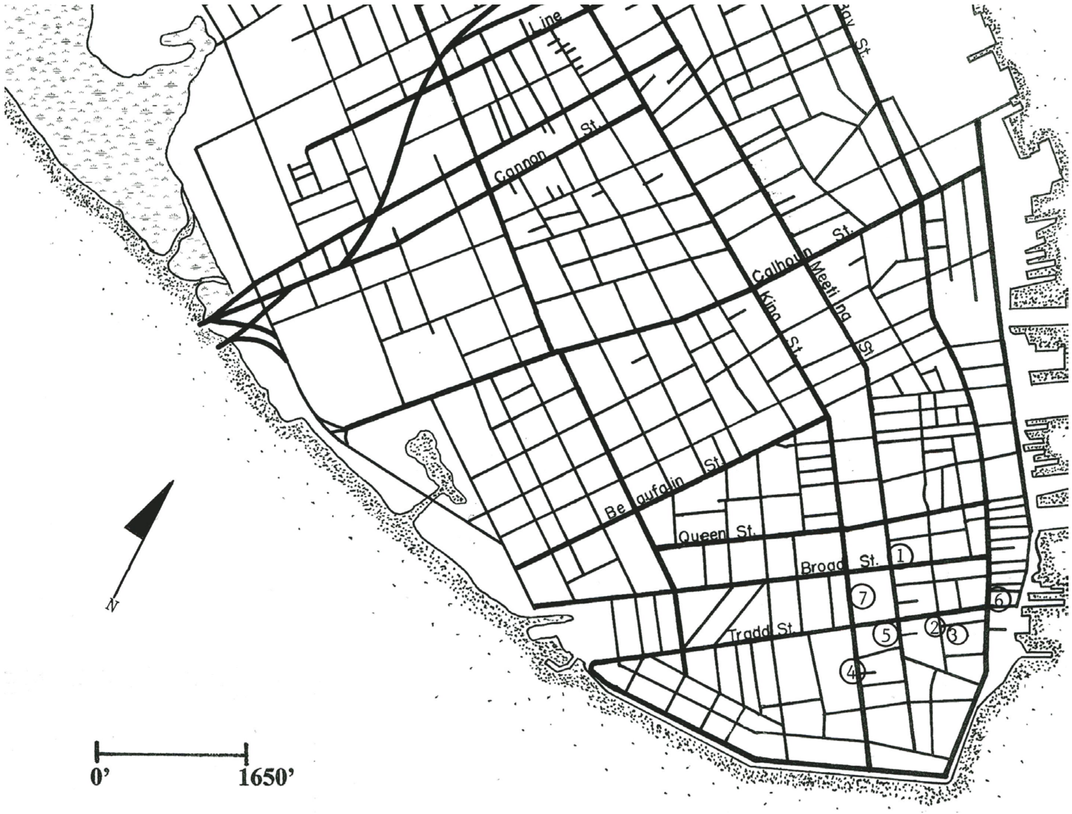


Figure 11. Charleston Sites With Stobo Colono Ware.

downtown Charleston sites exhibit this variety's characteristically pronounced coarse, at times, very coarse subangular sand temper (0.5 – 1.5 mm) and coarse (sometimes slightly contorted) paste (Figure 12). *Stobo* colono ware comprises about 8% – 12% of most downtown Charleston colono ware assemblages to date, although a higher frequency percentage may be present within the assemblage from the Charleston County Judicial Center Site (cf. Hamby and Joseph 2004). *Stobo* colono ware assemblages recovered from several Charleston sites include bowls, jars, and loop handled containers (Table 1).

Vessel walls on *Stobo* bowls and jars from downtown Charleston are relatively thin, averaging about 6 mm thick and ranging from 2.5 mm to 8 mm. Additionally, vessel walls are normally uniform in thickness. At times, a slight laminar paste is evident, but it certainly is not pronounced. Most of the vessels from these assemblages were fired in a reducing atmosphere - although occasionally, some examples appear incompletely oxidized. *Stobo* vessel surfaces are usually well smoothed and/or burnished, particularly interior surfaces. Although in minority, other surface treatments observed include impressing, notching and nicking of vessel lips, incising on vessel bodies (perhaps with a fork), and red filming (Figure 13) (Butler et al. 2012). Red filmed pottery has been observed in the immediate Charleston area – in urban and rural contexts. For example, Kasita Red Filmed has been observed at several plantations near Charleston, including

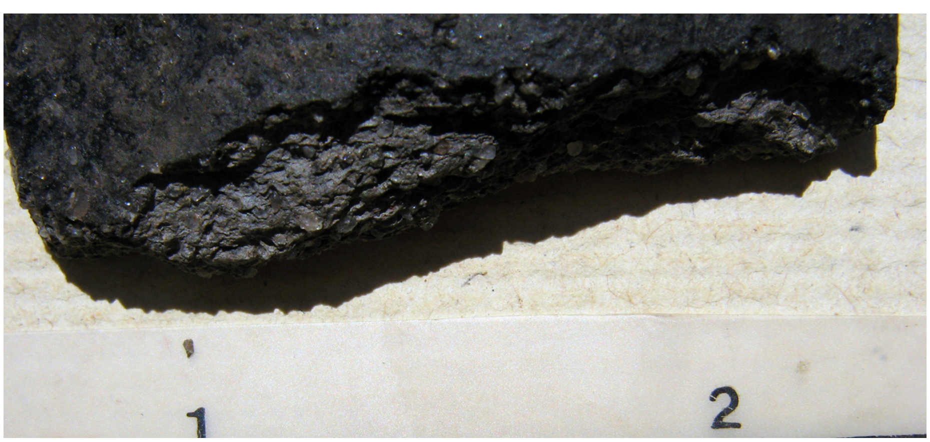


Figure 12. Coarse Sand Tempered Stobo Colono Ware From Downtown Charleston.

Table 1. Stobo Colono Ware From Five Downtown Charleston Sites

	# of Stobo Sherds	Stobo Red Filmed	Bowl	Jar
Colonial Beef Market	19	4	2	2
86 Church Street	24	1	4	2
Miles Brewton House	46*	8	2	3
Nathanial Russell House	56	9	5	3
South Adger's Wharf	44**	3	2	7

*includes rimsherd with handle attachment from lip to body

** includes 3 loop handle fragments

Figure 13. Incised and Red Filmed Stobo Colono Ware.

Figure 14. Kasita Red Filmed Pottery from Stono Plantation.

Figure 15. Altamaha Brimmed Vessel from the Heyward-Washington House.

Lesesne and Stono Plantations and Altamaha broad brimmed vessels are known from downtown Charleston contexts (Figures 14 and 15) (Anthony 1986, 2012; Zierden et al. 1986; Zierden and Reitz 2007). However, vessel shape and paste characteristics of these two wares, *Kasita* and *Altamaha*, are different from those characterizing *Stobo* colono ware.

It is likely that *Stobo* colono ware is just one of several colono ware varieties present in the South Carolina Lowcountry. With the exception of coarse sand temper and coarse paste as well as a relatively high percentage of reduced vessels, several *Stobo* colono ware physical attributes virtually mirror some of the *Lesesne* variety physical characteristics, particularly those regarding general vessel shape(s), surface treatment(s), and uniformity in vessel wall thickness. The shared physical similarities no doubt reflect the tastes or appetites of the colonial clientele. Coarse temper and pastes, as well as surface treatments such as red filming, are usually associated with Native American wares in the South Carolina Lowcountry. Like *Lesesne* colono ware, I believe that *Stobo* colono ware was primarily an 18th-century market ware whose popularity may have peaked after the Yamasee War – probably subsequent to the apex of Ashley Ware Series pottery manufacture and use by indigenous populations in the South Carolina Lowcountry.

Considering the contexts that have yielded this pottery as well as its physical attributes, I feel that it is likely that many of the makers and purveyors of *Stobo* colono ware, called "Neighbor Indians" before the Yamasee War, were remnant groups of aboriginals referred to in numerous primary accounts as "Cusabo" or "Settlement Indians" (Nyman 2011; Steen 2012). Baker (1972) notes that one of the earliest references to Aboriginal Market Wares in Colonial America can be found in "Bacon's Laws" of June 1676. It was mentioned by Stern (1951:44):

*P*rovided also that such neighbor Indians friends who have occasion for corne to relieve their wives and children,it shall and may be lawfull for any English to employ in fishing; or deale with fish, canies, bowls, matts or baskets, and to pay said Indians for the same in Indian corne, but noe with othercommodities … (Hening 1809-23: [2]: 305).

Baker (1972:9) states that "Bacon's law indicates … the early importance of trade pottery and other items in the livelihood of the peaceful remnant Indian populations." Stern (1951) believed that "market wares," along with utilitarian pottery, were being produced by mid-Atlantic Native Americans as early as the late 17th century. Interestingly, he (Stern 1951:45) refers to a late 17th-century statement from the journal of a man named Durand, who upon visiting Portobago village on the Rappahannock River reflected, "They make also pots and vases fill them up with Indian Corn and that is the price …" (Bushnell 1937:39-42).

Steen and Barnes (2010) have suggested that some Lowcountry colono wares may have been produced by "Settlement Indians." These populations were small enclaves of Native Americans, perhaps in several cases, extended families living on remote isolated farmsteads or living near or on 18th-century plantation lands while providing services such as hunting, fishing, and retrieval of runaway slaves for planters, among other activities (Anthony 2002; Nyman 2011; Steen 2012). Other activities likely included participation in nascent trade networks or established market systems between rural and urban areas or among plantations, or perhaps with trading posts/stores. Of course, enslaved Native Americans may have furnished some of this pottery and participated in these markets as well. Nyman (2011) and Steen (2012) successfully dispel the traditional notion of the absence of aboriginals in the South Carolina Lowcountry following the Yamasee War by convincingly arguing for a notable presence of aboriginals at this time. Carl Steen (2012) has encouraged the development of "Settlement Indian" archaeology. *Stobo* colono ware may be a vehicle for identifying "Settlement Indian" occupations in the South Carolina Lowcountry.

Conclusions

It has been clear for some time that colono ware variability exists interregionally as well as intraregionally. *Stobo* colono ware is viewed as one example of a regional constellation of Lowcountry colono ware varieties produced and utilized from the late 17th century into the 19th century. Like the makers of *Ashley Series* pottery, the producers of *Stobo* colono ware were probably originally associated with a number of autonomous Lowcountry Native American groups who survived European colonialism during the early historic period and continued to adapt to and reside in the Lowcountry.

If we view colono ware diachronically as a product of multi-culture contact during the colonial period – material culture primarily the result of syncretism – then we should not be surprised when encountering diverse sets of physical attributes and revelations of its numerous functions (cf. Steen 1999; Anthony 2002, 2009). I suspect that future colono ware research will furnish a much more complex picture and set of questions to address than we are currently seeing. This vista should reflect a myriad of cultural encounters—short term and long term—that took place among the many players in this area's colonial cultural and physical landscape. To understand these behaviors as well as to identify and understand the cultural processes that were operative, I feel it is critical to first be sensitive to intraregional variability (cf. Anthony 1989). Cooper and Steen (1998) have cogently presented the pitfalls associated with excessively broad-scaled studies. Importantly, they warn of decontextualizing colono ware by not appreciating intra-regional variability (Cooper and Steen 1998).

Finally, some researchers have stated that a focus on ethnicity may obscure research avenues that can address critical questions about social and economic networks (e.g., Bollwerk and Cooper 2016). I believe that these research domains should not be mutually exclusive – that research concerning these subjects, ethnicity and social and economic networks, should proceed "hand in hand," if plausible. The investigation of *Stobo* colono ware is a case in point.

References Cited

Agha, Andrew
2012 St. Giles Kussoe and "The Character of a Loyal States-Man": Historical Archaeology at Lord Anthony Ashley Cooper's Carolina Plantation. Manuscript on file, Historic Charleston Foundation, Charleston.

Anthony, Ronald W.
1979 Descriptive Analysis and Replication of Historic Earthenware: Colono Wares from the Spiers Landing Site, Berkeley County, South Carolina. In *The Conference on Historic Site Archaeology Papers* 13:258-263. South Carolina Institute of Archaeology and Anthropology, University of South Carolina, Columbia.

1986 Colono Wares. In *Home Upriver: Rural Life on Daniel's Island.* By Martha Zierden, Lesley Drucker, and Jeanne Calhoun, pp. 7-22-7-51. Manuscript on file, South Carolina Department of Highways and Public

Transportation, Columbia.

1989 Cultural Diversity at Mid to Late 18th Century Lowcountry Plantation Slave Settlements. Master's thesis, Department of Anthropology, University of South Carolina, Columbia.

2002 Tangible Interaction: Evidence From Stobo Plantation. In *Another's Country: Archaeological and Historical Perspectives on Colonial Interactions in the Southern Colonies*, editors, J. W. Joseph and Martha Zierden, pp. 45-64. The University of Alabama Press, Tuscaloosa.

2009 South Carolina Colono Ware: A New World Innovation. *South Carolina Antiquities* 41:84-93.

2012 *Dill Sanctuary Archaeology: A Descriptive Summary.* Archaeological Contributions 46, The Charleston Museum, Charleston, South Carolina.

Baker, Steven G.
1972 Colono-Indian Pottery From Cambridge, South Carolina with Comments on the Historic Catawba Pottery Trade. *The Notebook* 4(1):3-30. South Carolina Institute of Archaeology and Anthropology, University of South Carolina, Columbia.

Bollwerk, Elizabeth and Lesie Cooper
2016 Revisiting Variation in Colonoware Manufacture and Use. Paper presented at the 81st Annual Meeting of the Society For American Archaeology, Orlando.

Bowne, Eric E.
2005 *The Westo Indians: Slave Traders of the Early Colonial South.* University of Alabama Press, Tuscaloosa.

Bushnell, David I., Jr.
1937 Indian Sites Below the Falls of the Rappahannock, Virginia. *Smithsonian Miscellaneous Collections*, 96(4), Washington.

Butler, Nicholas, Eric Poplin, Katherine Saunders, and Martha Zierden
2012 *Archaeology at South Adger's Wharf: A Study of the Redan at Tradd Street.* Archaeological Contributions 45, The Charleston Museum, Charleston, South Carolina.

Cooper, Margaret and Carl Steen
1998 Potters of the South Carolina Lowcountry: A Material Culture Study of Creolization. Paper presented at the Annual Meeting of the Society for Historical Archaeology, Atlanta.

Crane, Brian
1993 Colono Wares and Criollo Ware Pottery from Charleston, South Carolina and San Juan, Puerto Rico in Comparative Perspective. Ph.D. dissertation, Department of American Civilization, University of Pennsylvania, Philadelphia.

Drucker, Lesley M. and Ronald W. Anthony
1979 *The Spiers Landing Site: Archaeological Investigations in Berkeley County, South Carolina.* Resource Studies Series 10, Carolina Archaeological Services, Columbia.

Ferguson, Leland G.
1978 Looking for the "Afro" in Colono-Indian Pottery. Paper presented at the 19th Conference on Historic Site Archaeology, Winston-Salem, North Carolina.

1989 Lowcountry Plantations, the Catawba Nation, and River Burnished Pottery. In *Studies In South Carolina Archaeology, Essays in Honor of Robert L. Stephenson*, editors, Albert C. Goodyear and Glen T. Hanson, pp. 185-192. Anthropological Studies 9. South Carolina Institute of Archaeology and Anthropology, University of South Carolina, Columbia.

1992 *Uncommon Ground: Archaeology and Early African America, 1650 – 1800.* Smithsonian Institution Press, Washington, D. C.

Fewkes, Vladimir J.
1944 Catawba-Pottery Making, with Notes on Pamunkey Pottery-Making, Cherokee Pottery-Making, and Coiling. *Proceedings of the American Philosophical Society* 8(2).

Hamby, Theresa M. and J. W. Joseph
2004 *A New Look at the Old City: Archaeological Excavations of the Charleston County Judicial Center Site (38Ch1708).* Report on file, County of Charleston, Charleston, South Carolina. New South Associates Technical Report 1192, Stone Mountain, Georgia.

Harrington, M. R.
1908 Catawba Potters and Their Work. *American Anthropologist* 10(3):399-407.

Hening, W. W.
1809-23 *The Statutes At Large: Being a Collection of All the Laws of Virginia*, Richmond.

Holmes, W. H.
1903 Aboriginal Pottery of the Eastern United States. *Bureau of American Ethnology, 20th Annual Report for 1898-99*, Washington.

Isenbarger, Nicole
2005 Analysis of the Beef Market Colonoware. In *Archaeology at City Hall: Charleston's Colonial Beef Market* by Martha Zierden pp. 84-90, Archaeological Contributions 35, The Charleston Museum, Charleston, South Carolina.

2006 Potters, Hucksters, and Consumers: Placing Colonoware within the Internal Slave Economy Framework. Master's thesis, Department of Anthropology, University of South Carolina, Columbia.

Joseph, J. W.
2004 Colonoware for the Village – Colonoware for the Market: Observations from the Charleston Judicial Center Site (38Ch1708) on Colonoware Production and Typology. *South Carolina Antiquities* 36(1 and 2): 72-86.

Noel Hume, Ivor
1962 An Indian Ware of the Colonial Period. *Quarterly Bulletin*, Archaeological Society of Virginia 17(1).

Nyman, James A.
2011 The Ashley Series as Native American Persistence: Lowcountry Indians in the Period of European Expansion. Master's thesis, Department of Anthropology, University of South Carolina, Columbia.

Riggs, Brett H., R. P. Stephen Davis, Jr., and Mark R. Plane
2006 Catawba Pottery in the Post-Revolutionary Era: A View From the Source. *North Carolina Archaeology* 55.

South, Stanley
1974 Palmetto Parapets. *Anthropological Studies 1. Occasional Papers of the South Carolina Institute of Archaeology and Anthropology*, University of South Carolina, Columbia.

1976 An Archaeological Survey of Southeastern Coastal North Carolina. *The Notebook* 8. South Carolina Institute of Archaeology and Anthropology, University of South Carolina.

Speck, Frank G.
1928 Chapters on the Ethnology of the Powhattan Tribes of Virginia. *Indian Notes and Monographs* 1(5), Heye Foundation, New York.

Stern, Theodore
1951 Pamunkey Pottery Making. *Southern Indian Studies* III, Chapel Hill.

Steen, Carl and Jodi A. Barnes
2010 Okra Soup and Earthenware Pots: The Archaeology of Gullah Communities. *December 2010 Newsletter*, The Africa Diaspora Archaeology Network. Electronic Document http://www.diaspora.uiuc.edu/news1210.html

Steen, Carl
1999 Stirring the Ethnic Stew in the South Carolina Backcountry: John de la Howe and Lethe Farm. In *Historical Archaeology, Identity Formation, and the Interpretation of Ethnicity*, editors, Maria Franklin and Garrett Fesler, pp. 93-120. Colonial Williamsburg Research Publications, Williamsburg, Virginia.

2012 An Archaeology of the Settlement Indians of the South Carolina Lowcountry. *South Carolina Antiquities* 44:19-34.

Trinkley, Michael, Debi Hacker, and Natalie Adams
1995 *Broom Hall Plantation: "A Good One and in a Pleasant Neighborhood."* Research Series 44, Chicora Foundation Inc., Columbia, South Carolina.

Wheaton, Thomas R., Amy Friedlander, and Patrick H. Garrow
1983 *Yaughan and Curriboo Plantations: Studies in Afro-American Archaeology.* Soil Systems, Inc., Marietta, Georgia. Report on file with the National Park Service, Atlanta, Georgia.

Wheaton, Thomas R. and Patrick H. Garrow
1989 Colonoware Ceramics: Evidence From Yaughan and Curriboo Plantations. In *Studies in South Carolina Archaeology: Essays in Honor of Robert L. Stephenson*, editors, Albert C. Goodyear III and Glen T. Hanson, Anthropological Studies 9, Occasional Papers of the South Carolina Institute of Archaeology and Anthropology, University of South Carolina, Columbia.

Zierden, Martha, Lesley Drucker, and Jeanne Calhoun
1986 *Home Upriver: Rural Life on Daniel's Island, Berkeley County, South Carolina.* Report prepared for the South Carolina Department of Transportation. Carolina Archaeological Services/The Charleston Museum, Columbia.

Zierden, Martha, Suzanne Linder, and Ronald Anthony
1999 *Willtown: An Archaeological and Historical Perspective.* The Charleston Museum Archaeological Contributions 27, South Carolina Department of Archives and History, Columbia.

Zierden, Martha A. and Ronald W. Anthony
2006a *Unearthing the Past, Learning for the Future: Archaeology at Drayton Hall, 2005.* Archaeological Contributions 37, The Charleston Museum, Charleston, South Carolina.

2006b *Archaeological Investigations of the Parsonage Site (38Ch1660): 2005 Season.* Archaeological Contributions 38, The Charleston Museum, Charleston, South Carolina.

Zierden, Martha A. and Elizabeth J. Reitz
2007 *Charleston Through the Eighteenth Century: Archaeology at the Heyward-Washington House Stable.* Archaeological Contributions 39, The Charleston Museum, Charleston, South Carolina.

2016 *Charleston: An Archaeology of Life in a Coastal Community.* University Press of Florida, Gainesville.
Zierden, Martha
1996 *Big House/Back Lot: An Archaeological Study of the Nathaniel Russell House.* Archaeological Contributions 25, The Charleston Museum, Charleston, South Carolina.

2001 Archaeology at the Miles Brewton House, 27 King Street. *Archaeological Contributions 29*, The Charleston Museum, Charleston, South Carolina.

2005 *Archaeology at City Hall: Charleston's Colonial Beef Market.* Archaeological Contributions 35, The Charleston Museum, Charleston, South Carolina.

A Preliminary Analysis of Haft Variability in South Carolina Kirk Points

Andrew A. White

Introduction

The Kirk Corner-Notched cluster, as defined by Justice (1987:71-82), contains a variety of technologically and stylistically similar point forms dating to the Early Archaic period of the Eastern Woodlands. Generally, these points have trianguloid blades with haft regions formed by corner-notching (see Justice 1987; Stafford and Cantin 2009). Ground basal edges, blade serration, and alternate beveling of the blade occur in varying frequency. Named varieties such as Kirk Corner-Notched, Stilwell, Palmer, Charleston, Decatur, and Pine Tree are generally distinguished from one another based on criteria related to haft and blade morphology, basal finishing techniques, and blade resharpening (see discussions in Brookes 1985; Cable 1996; DeRegnaucourt 1992; Justice 1987; Nolan and Fishel 2009; Stafford and Cantin 2009). For the purposes of this paper, the simple term "Kirk" will be applied to all the varieties in this larger family of point forms.

Kirk points are geographically widespread, occurring across an immense area extending north-south from the southern Great Lakes to the Florida Peninsula and east-west from the Mississippi Corridor to the Atlantic Coast. While there is certainly enough similarity in these points across their wide geographic distribution to recognize general inter-relationships (e.g., Ellis et al. 1998:162), there is also significant variability in size, shape, and attributes related to patterns of use and rejuvenation. Radiocarbon dates indicate that the Kirk phenomenon is focused in the period ca. 9500-8800 radiocarbon years before present (RCYBP) (see Cantin 2000; Chapman 1976; Nolan and Fishel 2009; Stafford and Cantin 2009). The widespread occurrence of Kirk points during that period is often referred to as the "Kirk Horizon" (see Tuck 1974; see also Coe 1964:122).

The emergence of the Kirk Horizon remains unexplained, and what it actually represents remains largely unexplored. Relationships among the different varieties of Kirk points and between Kirk and the varieties of side-notched points that appear to immediately pre-date Kirk (e.g., Big Sandy/Taylor/Bolen in the Southeast and Thebes cluster points in the Midcontinent) are not well understood. Even in areas with stratified sequences, the "ancestor-descendent" relationships between various Early Archaic point technologies are not clear. Tuck (1974:77), for example, identifies Big Sandy as the ancestor of Kirk (see also Stothers et al. 2001), while other researchers have speculated on links between Thebes and Kirk (e.g., Kimball 1996:158), and Dalton and Kirk (Cantin 2000:100). Brookes (1985) places Decatur points outside the Kirk cluster altogether and recognizes a Plains affinity for Lost Lake, which some researchers group with Kirk and others (e.g., Justice 1987:58-59) place within the Thebes cluster. While Kirk is clearly a pan-eastern phenomenon, regional chronologies and technological relationships appear inconsistent and are not easy to reconcile.

The characteristics of Kirk societies, likewise, remain poorly understood. Generally, Early Archaic societies are thought to have been organized into small, highly mobile bands that practiced a forest foraging economy. It is apparent that Kirk points were often lost/discarded across the interior of the Eastern Woodlands in a wide variety of topographic settings, suggesting these groups were making regular use of almost all parts of the landscape (e.g., Cantin 2000; Munson 1986; Stafford 1994). The transport distances of lithic raw materials in the Midcontinent are consistent with the idea that Kirk groups were making annual movements of several hundred kilometers (Adovasio and Carr 2009; Cantin 2000; White 2014). Scales of mobility may have been somewhat smaller in the Southeast (Ellis et al. 1998:162), but lithic raw materials were still being transported significant distances through mechanisms of mobility and/or exchange (Anderson and Hanson 1988:280; Meredith 2011). Various models of Kirk mobility and subsistence have been proposed for the Carolinas (e.g., Anderson and Hanson 1988; Daniel 2001; Gillam 2015). Increases in population during the Early Archaic period are inferred from increases in the number of sites, as well as lost/discarded hafted bifaces dating to the Early Archaic period relative to the Paleoindian period.

Because Kirk sites with intact cultural deposits are so rare, the points themselves are one of our main sources of information about these Early Archaic groups. Understanding variability in Kirk points is key to unlocking the potential of these points to tell us something about how those societies were structured and what mechanisms were used to knit those highly mobile, highly dispersed groups into an apparently continuous social fabric that extended across such an immense and diverse geographic area. Different facets of variability in projectile points are potentially linked to different aspects of how the tools were created and used, however, and were potentially sensitive to everything from the way a tool was designed to do a specific task to the multi-level social networks that structured human interaction and social learning. Because of this, careful analysis of variability in Kirk points is an important step toward using information about variability to address larger questions about the societies that produced them and the behaviors of the people, families, and groups that comprised those societies.

In this paper, I present a preliminary analysis of haft variation focused on a sample (*n* = 46 total) of Kirk points from the Larry Strong Collection (*n* = 41) and the Nipper Creek cache (*n* = 5) from Allendale and Richland counties, respectively. The assemblage from the Larry Strong Collection contains points made from a single raw material (Coastal Plain chert) and found in the same area (Allendale County), allowing us to hold those two variables constant. Given the large size of the Larry Strong Collection, it is a "long time" assemblage that certainly contains Kirk points from the full range of time those points were produced in the region. The Nipper Creek cache, in contrast, is a "short time" assemblage that was produced during a small window of time. Comparison of these assemblages can be used to explore which aspects of haft morphology may be carrying useful stylistic information that is sensitive to change through time and, potentially, patterned in ways that can eventually tell us something meaningful about Kirk societies.

Potential Sources of Variability

Style and function can be regarded as "the fundamental sources of variability in archaeological materials" (Meltzer 1981:313). *Functional variability* is defined here as formal variability related to the operation of an artifact in the material realm: it is what an artifact does and is designed to do (Kamminga 1982; Sackett 1982). Variability created by use during the life of a stone tool (e.g., changes in form caused by resharpening and/or repair) can be considered functional.

Following Sackett (1982), *stylistic variability* is defined here as that portion of formal variability that is not functional in the material realm: function and style together can be assumed to exhaust the majority of formal variability. Less constrained by functional considerations, stylistic choices are free to vary and are sensitive to patterns of social learning and social interaction. Sackett (1985, 1986, 1990) argued that much of what we perceive as "style" occurs because the choices artisans make among the range of options potentially available to them tend to be quite specific and consistent, and that these are dictated largely by the craft traditions within which the artisans have been enculturated as members of social groups (Sackett 1985:157).

The qualities of the raw materials that were utilized to craft points is also a potential source of variability (not all raw materials were available in the sizes necessary to create large points, for example, and the knapping characteristics of lithic raw materials vary widely), as is copying error that is intrinsic to hand-crafted material culture (e.g., see Eerkens 2000; Eerkens and Lipo 2005).

All of these potential sources of variability – function, style, raw material constraints, and copying error – are blended into the crafting of a stone tool. Not all are equally useful for addressing questions about prehistoric societies, however. The parsing out of stylistic variability in Kirk points is important because it is that component of variability that (in conjunction with other forms of analysis) has the potential to tell us the most about Kirk societies. Understanding the patterning of stylistic variability through time and across space is the component of the archaeological data needed to explain the emergence of the Kirk Horizon and address questions about the characteristics of Kirk societies.

Partitioning stylistic and functional variability generally involves isolating functional variability and then assuming that the remaining variability is non-functional (i.e, stylistic). I have argued elsewhere (White 2012, 2013) that variability related to haft dimensions (e.g., haft width and thickness) is essentially functional in that it is closely constrained by the dimensions of the shaft in which the point was hafted. Variability related to subtle differences in features such as basal edge shape and notch morphology, however, is likely to be much less constrained by basic functional considerations. Such aspects of shape can be regarded as potentially good carriers of stylistic information.

Sample

The sample considered in this paper comprises 46 Kirk points, summarized in Table 1. The majority (*n* = 41) are from the Larry Strong Collection; the remainder (*n* = 5) are from the Nipper Creek cache.

The Larry Strong Collection was collected by Dr. Larry Strong, a mathematics professor at the University of South Carolina Salkehatchie campus, over the course of four decades from the surfaces of numerous sites in Allendale County, South Carolina. Strong donated an estimated 17,000 artifacts from his collection to the South Carolina Institute of Archaeology and Anthropology in the 1990s. Inventorying of that collection is ongoing, supported by a grant from the Archaeological Research Trust (White 2016). Approximately 450 of the points inventoried so far fall within the Kirk Corner-Notched cluster as defined by Justice (1987:71-81). From that assemblage, points were chosen for this analysis based on the presence of an intact haft region that did not appear to have been extensively modified from its original form. Analysis of the Kirk points in the Larry Strong Collection is ongoing.

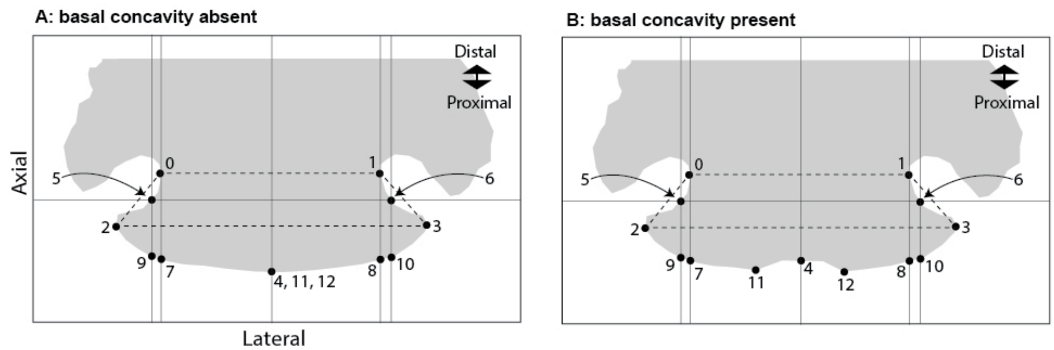
The Nipper Creek cache is comprised of six Kirk points that were exposed during a 1986 archaeological field school at the Nipper Creek site (38RD18) in Richland County, South Carolina. According to

Table 1. Summary of sample used in analysis. CPC: Coastal Plains Chert; LHB: left-hand bevel (beveled edge is on the left side of the point when the point is held with the tip up); LHT: left-hand twist (the blade is resharpened on alternate edges but there is no distinct line separating the resharpened portion from the rest of the blade face).

ID No.	Collection	Inventory No.	County	Raw Material	Neck Width (mm)	Maximum Thickness (mm)	Basal Grinding	Beveling
5927	Larry Strong	LS-1	Allendale, SC	CPC	17.03	7.9	Present	Absent
5928	Larry Strong	LS-2	Allendale, SC	CPC	15.51	8.3	Present	Absent
5929	Larry Strong	LS-3	Allendale, SC	CPC	20.77	9.2	Present	Absent
5930	Larry Strong	LS-4	Allendale, SC	CPC	19.12	8.4	Present	Absent
5931	Larry Strong	LS-5	Allendale, SC	CPC	17.66	6.9	Present	Absent
5933	Larry Strong	LS-7	Allendale, SC	CPC	15.8	6.8	Present	Absent
5935	Larry Strong	LS-9	Allendale, SC	CPC	14.07	7.9	Present	Absent
5937	Larry Strong	LS-11	Allendale, SC	CPC	17.14	9.1	Present	Absent
5938	Larry Strong	LS-12	Allendale, SC	CPC	15.58	10.9	Present	Absent
5940	Larry Strong	LS-14	Allendale, SC	CPC	17.19	8.8	Present	LHB
5941	Larry Strong	LS-15	Allendale, SC	CPC	22.61	6.5	Present	Absent
5942	Larry Strong	LS-16	Allendale, SC	CPC	12.23	5.1	Absent	LHB
5945	Larry Strong	LS-19	Allendale, SC	CPC	16.38	8.1	Present	Absent
5946	Larry Strong	LS-20	Allendale, SC	CPC	20.54	7.5	Present	Absent
5947	Larry Strong	LS-21	Allendale, SC	CPC	17.05	7.6	Present	LHB
5948	Larry Strong	LS-22	Allendale, SC	CPC	16.13	7.2	Present	Absent
5949	Larry Strong	LS-23	Allendale, SC	CPC	16.96	7.7	Present	LHB
5950	Larry Strong	LS-24	Allendale, SC	CPC	16.48	8.1	Present	Absent
5951	Larry Strong	LS-25	Allendale, SC	CPC	17.08	7.8	Present	Absent
5952	Larry Strong	LS-26	Allendale, SC	CPC	15.29	7.9	Present	Absent
5953	Larry Strong	LS-27	Allendale, SC	CPC	18.09	8.8	Present	LHT
5955	Larry Strong	LS-29	Allendale, SC	CPC	13.61	9.2	Present	Absent
5958	Larry Strong	LS-32	Allendale, SC	CPC	20.51	8.4	Present	Absent
5960	Larry Strong	LS-34	Allendale, SC	CPC	15.24	7.4	Present	LHB
5961	Larry Strong	LS-35	Allendale, SC	CPC	14.11	7.9	Present	Absent
5962	Larry Strong	LS-36	Allendale, SC	CPC	15.03	6.3	Present	LHB
5978	Larry Strong	LS-37	Allendale, SC	CPC	20.01	6.9	Present	Absent
5980	Larry Strong	LS-39	Allendale, SC	CPC	19.29	8.8	Present	Absent
5981	Larry Strong	LS-40	Allendale, SC	CPC	25.32	8.7	Present	Absent
5982	Larry Strong	LS-41	Allendale, SC	CPC	13.9	6.0	Present	LHB
5983	Larry Strong	LS-42	Allendale, SC	CPC	14.74	5.6	Present	LHB
5984	Larry Strong	LS-43	Allendale, SC	CPC	16.46	6.6	Present	Absent
5985	Larry Strong	LS-44	Allendale, SC	CPC	14.45	7.1	Absent	LHB
5986	Larry Strong	LS-45	Allendale, SC	CPC	13.36	6.0	Absent	LHB
5987	Larry Strong	LS-46	Allendale, SC	CPC	18.39	7.8	Present	Absent
5988	Larry Strong	LS-47	Allendale, SC	CPC	17.77	5.9	Absent	LHB
5989	Larry Strong	LS-48	Allendale, SC	CPC	12.62	5.6	Present	Absent
5990	Larry Strong	LS-49	Allendale, SC	CPC	17.42	7.1	Present	LHB
5991	Larry Strong	LS-50	Allendale, SC	CPC	13.77	6.1	Present	Absent
5993	Larry Strong	LS-52	Allendale, SC	CPC	17.58	7.1	Present	LHB
5998	Larry Strong	LS-57	Allendale, SC	CPC	15.31	-	Present	Absent
5963	Nipper Creek	NC-4 (D)	Richland, SC	Rhyolite	15.42	6.0	Present	Absent
5964	Nipper Creek	NC-5 (E)	Richland, SC	Ridge and Valley	18.48	8.1	Present	Absent
5965	Nipper Creek	NC-3 (C)	Richland, SC	Rhyolite	18.89	6.9	Present	Absent
5966	Nipper Creek	NC-2 (B)	Richland, SC	Rhyolite	16.71	7.4	Present	Absent
5968	Nipper Creek	NC-6 (F)	Richland, SC	Rhyolite	17.53	7.2	Present	Absent

Goodyear et al. (2004), the six points were found within a small horizontal area (about 264 cm^2) and within about 5-10 cm vertically. It is likely that the points were originally placed in a pit (no outline of a pit was discerned) or on a common surface. One of the points (Figure 1A as shown by Goodyear et al. 2004) has a fractured ear and was excluded from the study.

The points from the Larry Strong Collection are made from Coastal Plain chert, a Tertiary marine chert that outcrops in western South Carolina and central Georgia (Bridgman Sweeney 2013:Figure 3-5; Goodyear 2014; Goodyear and Charles 1984). The most likely source of the raw material used to make the points in the Larry Strong Collection is the vicinity of Allendale County itself, which contains outcrops of Coastal Plain chert known locally as "Allendale" and "Brier Creek" (Goodyear and Charles 1984). Five of the points from the Nipper Creek cache were made from metavolcanic rhyolite (typical of the Uwharrie Mountains of North Carolina), and the remaining point was made from Ridge and Valley chert from eastern Tennessee (Goodyear et al. 2004).



Landmarks 0 & 1: landmarks defining minimum width of haft region distal to basal edge

Landmarks 2 & 3: landmarks at locations of maximum width of haft distal to basal edge but proximal to Landmarks 0 and 1

Axial Plane: flat plane with corners defined by Landmarks 0, 1, 2, and 3 (indicated with dashed line on the diagram)

Landmark 4: landmark at location where axial line bisecting the Axial Plane intersects the basal edge of the haft

Landmarks 5 & 6: landmarks where lateral line bisecting the Axial Plane intersects the lateral edges of the haft

Landmark 7: landmark at location where axial line through Landmark 0 intersects the basal edge of the haft

Landmark 8: landmark at location where axial line through Landmark 1 intersects the basal edge of the haft

Landmark 9: landmark at location where axial line through Landmark 5 intersects the basal edge of the haft

Landmark 10: landmark at location where axial line through Landmark 6 intersects the basal edge of the haft

Landmarks 11 & 12: landmarks at locations of maximum proximal deviation of basal edge; on a point with no basal concavity (as shown in diagram A), these landmarks will be at the same location as the location of maximum convexity (typically near the center of the basal edge); on a point with a basal concavity, these landmarks will be on either side of the concavity as shown in diagram B

Figure 1. Definition of the landmarks used in morphometric analysis.

Methods

Although the morphometric data used in this analysis are two-dimensional, they were obtained from three-dimensional models produced using a laser scanner. This section describes the hardware, software, settings, and processing and mathematical procedures used to produce the models and extract data from them.

A NextEngine Desktop 3D scanner (UltraHD, Model 2020i with autodrive) was used to collect data for the production of 3D models. Each point was scanned in two orientations to collect data from the edges and faces of the point. For each orientation, the point was automatically rotated through 10 divisions. Data were collected at the middle HD setting (67k points/square inch).

Scan data were processed in ScanStudio software (version 2.0.2). The edge and face scans were trimmed to remove extraneous features (such as the arm holding the point). The edge and face scans were aligned and fused into a single model. Fused models were trimmed to remove artifacts left by the fusing process and then remeshed to smooth the surfaces and fill any holes. Finally, each model was simplified and then exported into file formats for analysis (.PLY) and online distribution (.STL).

Landmark software (version 3.0) was used to place a series of 13 landmarks on each of the 3D models. Definitions of the landmarks are provided in Figure 1. The first step in placing the landmarks was to orient the model to minimize the neck width (the lateral distance between the notches) and maximize the symmetry of the basal edge. This step has the potential to be slightly subjective. The first four landmarks are placed to mark the location of greatest constriction of the neck (Landmarks 0 and 1) and widest flare of the haft (Landmarks 2 and 3). Those four landmarks are then used to establish the corners of the axial plane. Landmarks 4-10 are placed with reference to the axial plane as described in Figure 1. The remaining two landmarks (11 and 12) are placed at the locations of the maximum proximal deviation of the basal edge. If there is a central basal concavity, these landmarks are positioned on either side of the concavity. If the basal edge is convex, both landmarks are placed at the single location of the greatest proximal deviation. Note that the defined landmarks are all located along the edges of the haft and essentially describe a two-dimensional shape.

Data were exported as a text file containing the xyz coordinates of all 13 landmarks placed on each model. These data were manually edited to produce a text file that could be imported into the program MorphoJ (version 1.06d).

MorphoJ was used to perform a full Procrustes fit on the three-dimensional coordinate data. Procrustes analysis is a mathematical procedure that uses the locations of corresponding points to scale, align, and rotate shapes, effectively filtering out size and allowing variation in shape to be independently analyzed (see Stegmann and Gomez 2002). The new (dimensionless) xyz coordinates produced by the Procrustes fit were exported and edited to remove the y coordinate, leaving the remaining two coordinates that described the two-dimensional shape of the haft as seen in plan view. Those coordinates were reimported into MorphoJ and a new Procrustes fit was performed on those two-dimensional data.

A principal components analysis (PCA) was performed on the results of the two-dimensional Procrustes fit, also using MorphoJ. PCA is a mathematical procedure that reduces the dimensionality of datasets with multiple variables. It uses analysis of covariance to first extract the axis which captures the greatest amount of variance in the data. This is called the first principal component. It then finds the axis orthogonal to the first axis which captures the greatest amount of variance (the second principal component). The process continues, with each succeeding component capturing less variance than the one that preceded it.

The linear distance between Landmarks 0 and 1 (i.e., "neck width") was measured digitally in Landmark. The maximum thickness of each point was measured using calipers. The maximum thickness measurement was taken at the point of maximum thickness along the proximal-distal axis, which was typically located distal to the neck of the point. This measurement was not taken if a point was broken or damaged in such a way as to make it unclear whether the thickest portion of the point was present.

Metric Data

Summary statistics for neck width and maximum thickness are shown in Table 2. The ranges, means, and standard deviations of these variables in the South Carolina sample are comparable to those of the much larger sample of Kirk points from the Midcontinent reported by White (2012, 2013). The two samples are the same in terms of mean neck width: both average 16.8 mm. The South Carolina sample is, on average, almost a millimeter thicker than the Midcontinental sample with higher minimum and maximum values. The difference in thickness between the South Carolina and the Midcontinental sample is statistically significant using a t-test to compare the means ($t = 6.0218$, $df = 639$, two-tailed $p < 0.001$).

The coefficient of variation (CV), calculated by dividing the standard deviation by the mean, is a simple statistic for expressing the amount of variability in an attribute relative to the value of the mean (Simpson and Roe 1939; Thomas 1986). This allows the relative amounts of variation to be compared among variables with different means.

As in the larger Midcontinental sample, the CV of both variables is less than 20 in the South Carolina sample. Previously (White 2012, 2013), I argued that these comparatively low coefficients of variation are likely because variability in hafting width and thickness is significantly constrained by the size and configuration of the hafts (shafts or foreshafts) in which a point will be mounted. In compound projectile weapons that are designed to perform a limited set of tasks, the sizes of the non-lithic parts of the weapon are similarly likely to be relatively standardized and may be highly curated, requiring more effort to produce than the points themselves (Keeley 1982). Neck width and maximum thickness are moderately correlated in the South Carolina sample ($r = 0.36$).

Table 2. Summary statistics for metric variables in the South Carolina sample described here and the Midcontinental sample described by White (2012).

		South Carolina sample	Midcontinental sample
Neck Width	*n*	46	628
	Minimum	12.2	9.7
	Maximum	25.3	27.1
	Mean	16.8	16.8
	Standard Deviation	2.61	3.04
	CV	15.5	18.1
Maximum Thickness	*n*	45	596
	Minimum	5.1	4.5
	Maximum	10.9	10.1
	Mean	7.5	6.6
	Standard Deviation	1.17	0.95
	CV	15.6	14.4

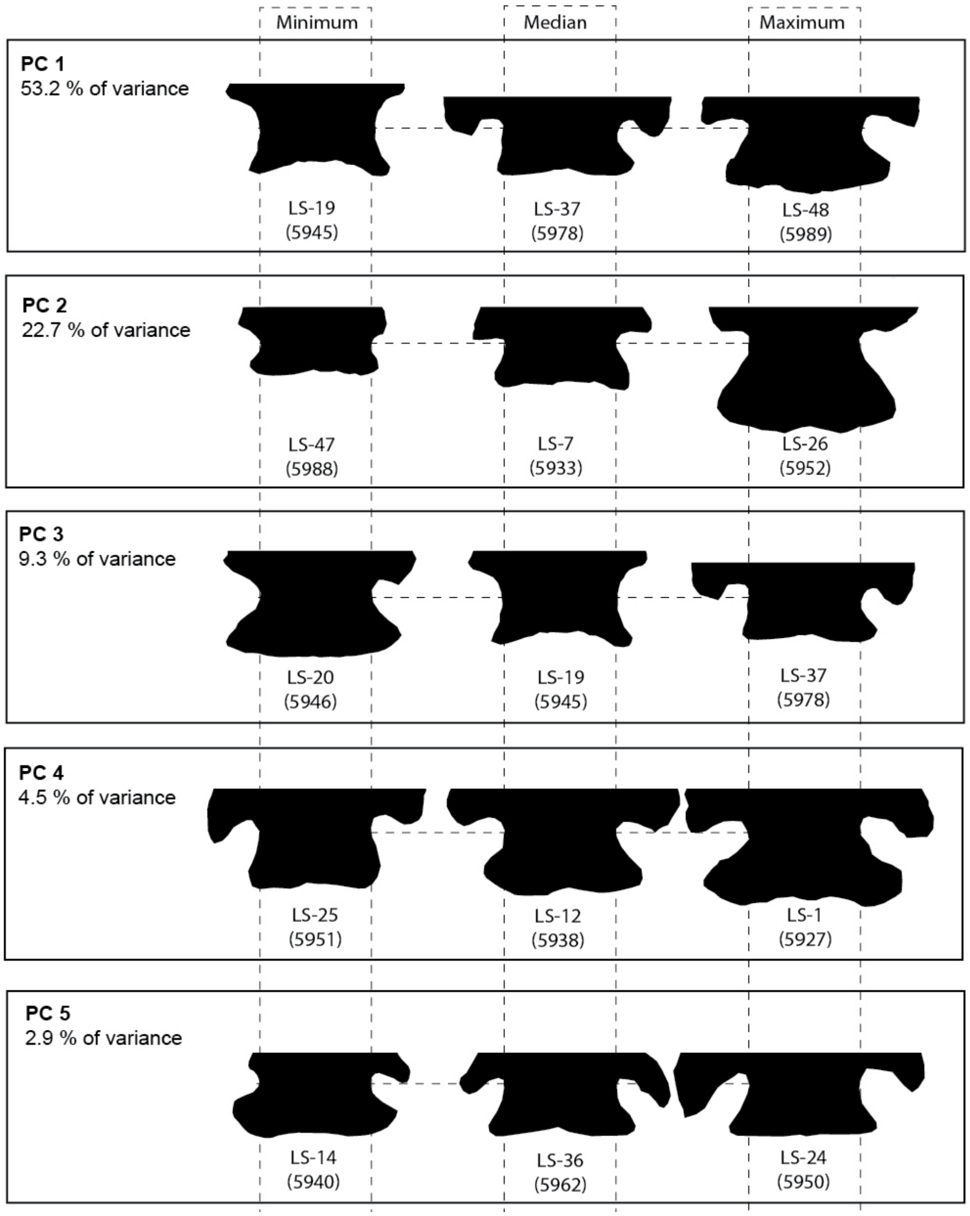


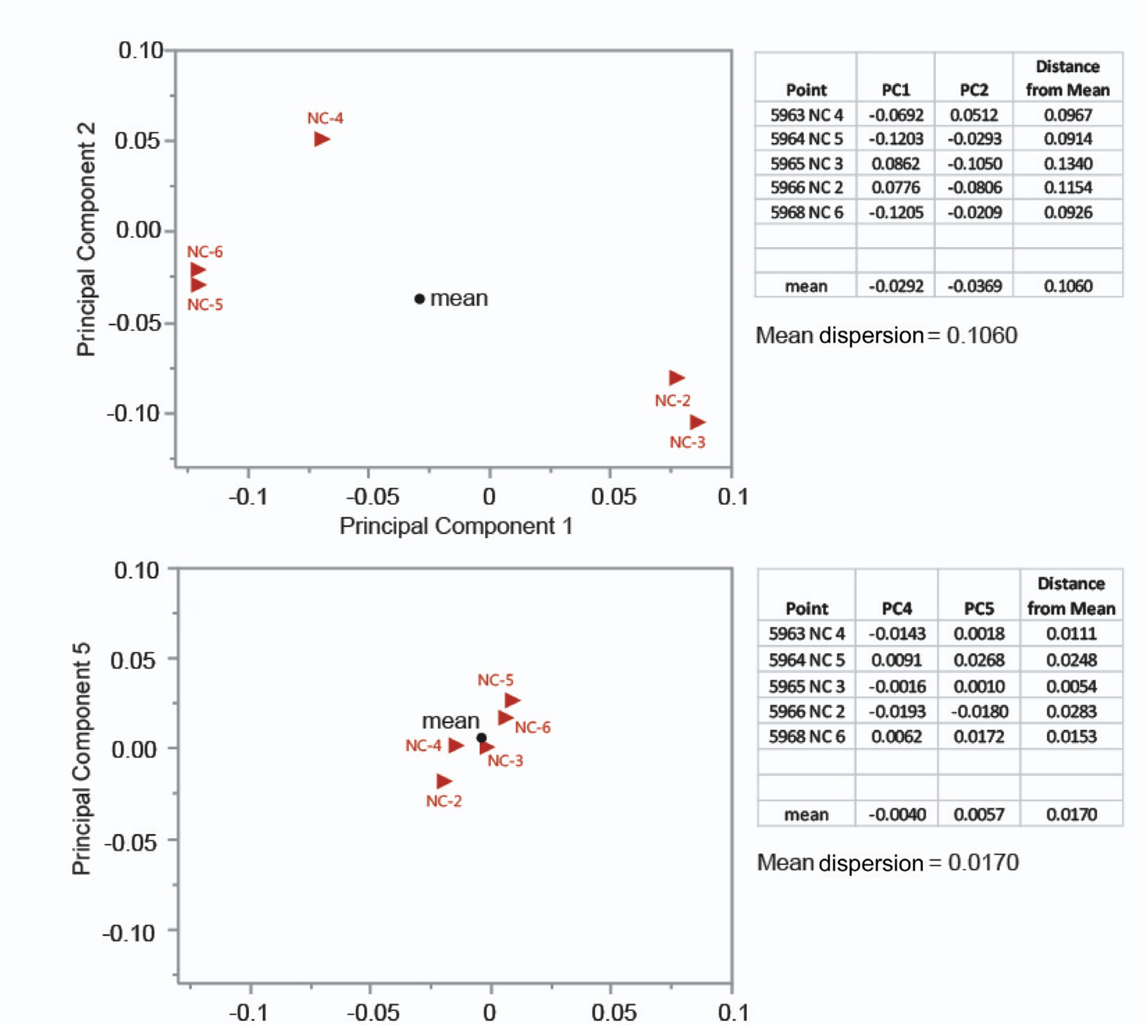
Figure 2. Basal shapes of points representing the minimum, median, and maximum values of principal components 1 through 5.

Principal Components of Shape

The principal components analysis of the two-dimensional Procrustes fit data returned results for 22 components, the first 5 of which captured over 92% of the variability. This analysis will only consider the first five components.

To try to understand what aspects of shape variability were captured by those components, the silhouettes of the hafts of points at the minimum, median, and maximum parts of the distribution of each of the principal components were compared (Figure 2). The silhouettes were scaled so that the minimum haft widths were approximately equal (vertical dashed lines) and placed to align the locations of the minimum haft width (horizontal dashed lines).

The first principal component accounts for over half of the variance in the sample. It appears to be most closely related to basal edge shape, specifically the presence and arrangement of incurvate and excurvate segments. While the points can be classified as having basal edges that are convex, concave, or straight, such a classification does not capture anywhere near the amount of variability in basal edge shape in the sample. Some convexities (such as on point LS-19 shown in Figure 2) span nearly the entire basal edge, while others (such on point LS-12 shown in Figure 2) are narrower concavities



Point	PC1	PC2	Distance from Mean
5963 NC 4	-0.0692	0.0512	0.0967
5964 NC 5	-0.1203	-0.0293	0.0914
5965 NC 3	0.0862	-0.1050	0.1340
5966 NC 2	0.0776	-0.0806	0.1154
5968 NC 6	-0.1205	-0.0209	0.0926
mean	-0.0292	-0.0369	0.1060

Point	PC4	PC5	Distance from Mean
5963 NC 4	-0.0143	0.0018	0.0111
5964 NC 5	0.0091	0.0268	0.0248
5965 NC 3	-0.0016	0.0010	0.0054
5966 NC 2	-0.0193	-0.0180	0.0283
5968 NC 6	0.0062	0.0172	0.0153
mean	-0.0040	0.0057	0.0170

Figure 3. Examples showing calculation of dispersion metric.

situated in the central portion of an otherwise convex basal edge. Concavities also vary in relative depth and in other aspects of their morphology.

Principal component 2, accounting for nearly a quarter of the variance, appears to be related to the proportions of the haft. Points with a relatively high ratio of haft width to haft length fall at one of the end of the spectrum, while points with a low ratio fall at the other.

Principal components 3, 4, and 5 appear to be capturing shape variation primarily associated with the lateral haft margins. The shape of the lateral haft edges is influenced by many things, including the angle, depth, width, and curvature of the notches, the roundedness of the basal ears, and the morphology of the articulation of the basal and lateral edges. Principal components 3 and 4 appear to be capturing the degree of haft flare (widening of the haft distal to the notches), while principal component 5 appears to be closely related to the distal-proximal location of the maximum haft width.

Inferring Sources of Variability

The sample of Kirk points incorporates a large amount of variability in shape. The Nipper Creek cache presents an opportunity to try to understand which dimensions of variability in the larger sample might be most sensitive to time. Because the Kirk points from the Larry Strong Collection (n=41) are made from a single raw material and were collected from a single county, the amount of variability attributable to differences in raw material and space is small in that portion of the sample: one would expect that a large proportion of the variability would be related to change through time and/or idiosyncratic variation. The points in the Nipper Creek cache (n=5), however, were presumably made during a very short period of time. This suggests temporal variability is likely to be minimal or absent. Variability in the Nipper Creek points would logically be attributable to some combination of space, raw material, and/or individual idiosyncrasies (there are two material types represented in the cache, and we cannot assume that all the points

Table 3. Summary of measures of variability of the principal components in the Nipper Creek and Larry Strong portions of the sample.

	PC 1	PC 2	PC 3	PC 4	PC 5
Nipper Creek ($n = 5$)	SD: 0.104 CV: 0.010 Range: 0.207	SD: 0.060 CV: 0.006 Range: 0.156	SD: 0.044 CV: 0.004 Range: 0.105	SD: 0.012 CV: 0.001 Range: 0.028	SD: 0.017 CV: 0.002 Range: 0.044
Larry Strong ($n = 41$)	SD: 0.088 CV: 0.009 Range: 0.385	SD: 0.057 CV: 0.006 Range: 0.238	SD: 0.037 CV: 0.004 Range:0.171	SD: 0.027 CV: 0.003 Range: 0.105	SD: 0.021 CV: 0.002 Range: 0.075

were made by the same individual).

Because the points in the Nipper Creek cache were presumably created over a much shorter period of time than those in the Larry Strong Collection, it is logical to expect that time-sensitive aspects of shape would be significantly less variable in the Nipper Creek points than in the Larry Strong Collection. Table 3 provides three measures of variability for each principal component: standard deviation, range, and coefficient of variation (note that the coefficients of variation were calculated after adding 10 to each individual principal component score to move the distribution into a positive number range). Only in principal component 4 is the Nipper Creek assemblage notably less variable than the Larry Strong Collection using both the standard deviation and coefficient of variation as measures of variability.

The absolute ranges of all the principal components are lower in the Nipper Creek assemblage than in the Larry Strong Collection, which is to be expected given the size difference in the assemblages. Calculating the ratio between the Nipper Creek and Larry Strong ranges shows that the *amount* of difference in the range varies from a high of about 66% to a low of about 27%. The ratio of the Nipper Creek range to the Larry Strong range is above 50% in principal components 1, 2, 3, and 5, suggesting that range of variability in the larger Larry Strong assemblage is less than twice that of the Nipper Creek assemblage in those measures of shape. In principal component 4, however, the range of variability in the Larry Strong Collection is almost four times that of the Nipper Creek assemblage.

Several simple indicators of variability suggest that principal component 4 is substantially less variable in the Nipper Creek assemblage than in the larger sample from the Larry Strong Collection. Principal component 4 seems to primarily capture the degree of flare of the lateral haft margins, an attribute that is fairly regular among the Nipper Creek points. The Nipper Creek points vary in their basal edge shape from slightly excurvate to straight to moderately concave, and also vary substantially in the morphology of the ears.

To investigate which *combination* of principal components might best reflect change through time, measures of the dispersion of the Nipper Creek and Larry Strong portions of the sample were calculated for each possible pairing of principal components. Assuming again that the points in the Nipper Creek assemblage represent manufacture during a much smaller window of time than those from the Larry Strong assemblage, one would expect that a plot that minimized the dispersion of the Nipper Creek points within a plot of the larger sample would be most likely to capture temporal variability.

An example of how the dispersion calculations were performed is shown in Figure 3. The dispersion of the Nipper Creek assemblage in these plots was calculated by first finding the means of the two principal component scores of all five points. The straight-line distance of each point from the mean was then calculated. These distances were averaged to calculate a measure of the dispersion of the points.

The results of the dispersion calculations (Table 4) show that the Nipper Creek assemblage is *more* dispersed (on average) than the Larry Strong assemblage when principal component 1 is involved in the plots but *less* dispersed when principal component 1 is not involved (Figure 4). The points in the Nipper Creek cache are the least dispersed relative to the Larry Strong Collection when principal components 4 and 5 are used. This observation is consistent with the idea that the morphology of the lateral haft edges may be a dimension of shape variability that is more sensitive to time than basal edge morphology and the and overall proportions of haft regions.

When the entire sample is plotted using principal components 4 and 5, the points from the Nipper Creek cache are confined to a relatively small portion of the distribution (Figure 5). The silhouettes of several of the points in the Larry Strong Collection (scaled to neck width) are provided to illustrate how shape is distributed across the plot. The continuum of haft flare captured by principal component 4 is visible along the x axis, with deeply notched points with widely flaring haft regions present on the left and less flared points on the right. On the y axis (principal component 5), points at the bottom of the plot tend to have rounded ears while points at the top tend to have sharper lateral/basal junctions. The points at the lower left of the plot are the most Taylor-like points in the sample, while some of those at the right edge are approaching an expanding stem configuration. Between these two extremes fall a variety of corner-notched Kirks with a wide range of ear and basal edge shapes.

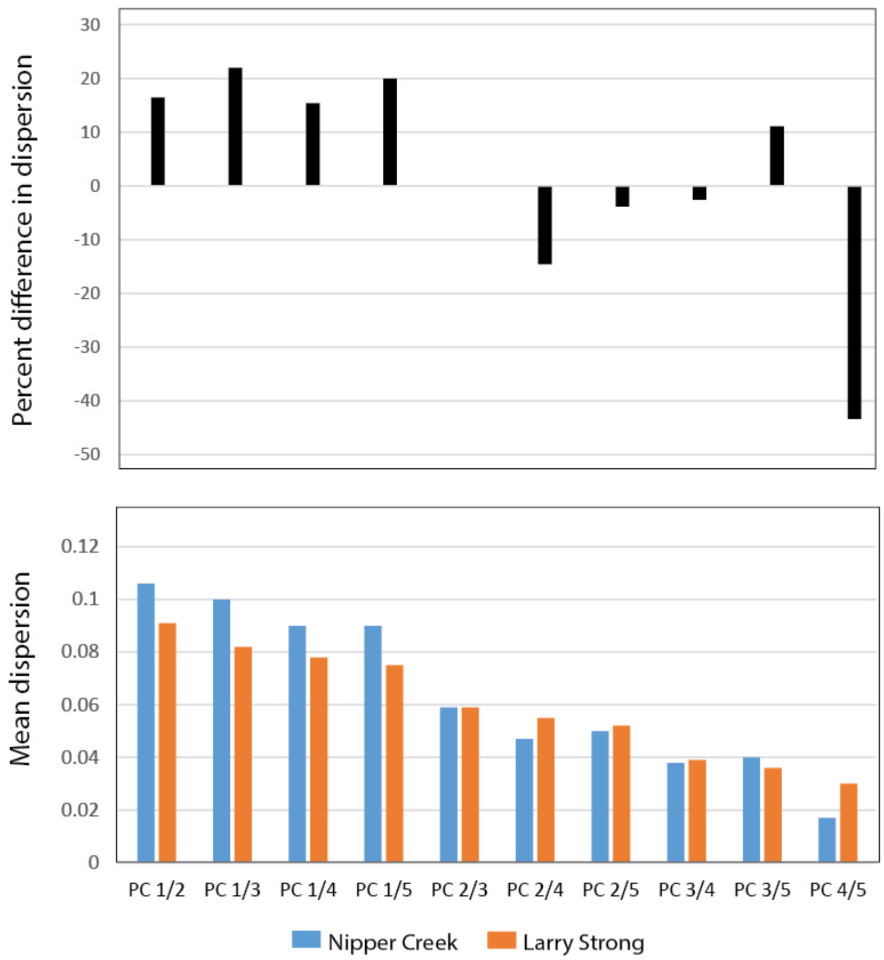


Figure 4. Comparison of mean dispersion of Larry Strong and Nipper Creek assemblages using every possible combination of principal components (bottom); percent difference in dispersion for each pairing, calculated as (Nipper Creek – Larry Strong)/Nipper Creek (top).

Discussion and Conclusions

While the plot shown in Figure 5 obviously does not capture "time" in any simple way, it does suggest several noteworthy aspects of haft variability among Kirk points from this region that may be related to time and thus provide a useful starting point for future analyses.

First, the comparison of patterns of variability in a "short time" assemblage (Nipper Creek) with a "long time" assemblage (Larry Strong) suggests that changes in the lateral edges of the haft (i.e., the degree of flare and shape of the lateral/basal junction) are potentially significant in terms of time. The Nipper Creek assemblage is fairly consistent in these attributes, which is what one would expect if design of the lateral haft margins was strongly influenced by some kind of cultural-bound choice (i.e, if lateral haft morphology is essentially isochrestic). Because we do not know if the Nipper Creek assemblage was created by a single individual, we have no way of knowing if the regularity

Table 4. Dispersion of the Nipper Creek and Larry Strong portions of the sample using each possible combination of principal components.

	PC 1	PC 2	PC 3	PC 4
PC 2	Nipper Creek: 0.106 Larry Strong: 0.091			
PC 3	Nipper Creek: 0.100 Larry Strong: 0.082	Nipper Creek: 0.059 Larry Strong: 0.059		
PC 4	Nipper Creek: 0.090 Larry Strong: 0.078	Nipper Creek: 0.047 Larry Strong: 0.055	Nipper Creek: 0.038 Larry Strong: 0.039	
PC 5	Nipper Creek: 0.090 Larry Strong: 0.075	Nipper Creek: 0.050 Larry Strong: 0.052	Nipper Creek: 0.040 Larry Strong: 0.036	Nipper Creek: 0.017 Larry Strong: 0.030

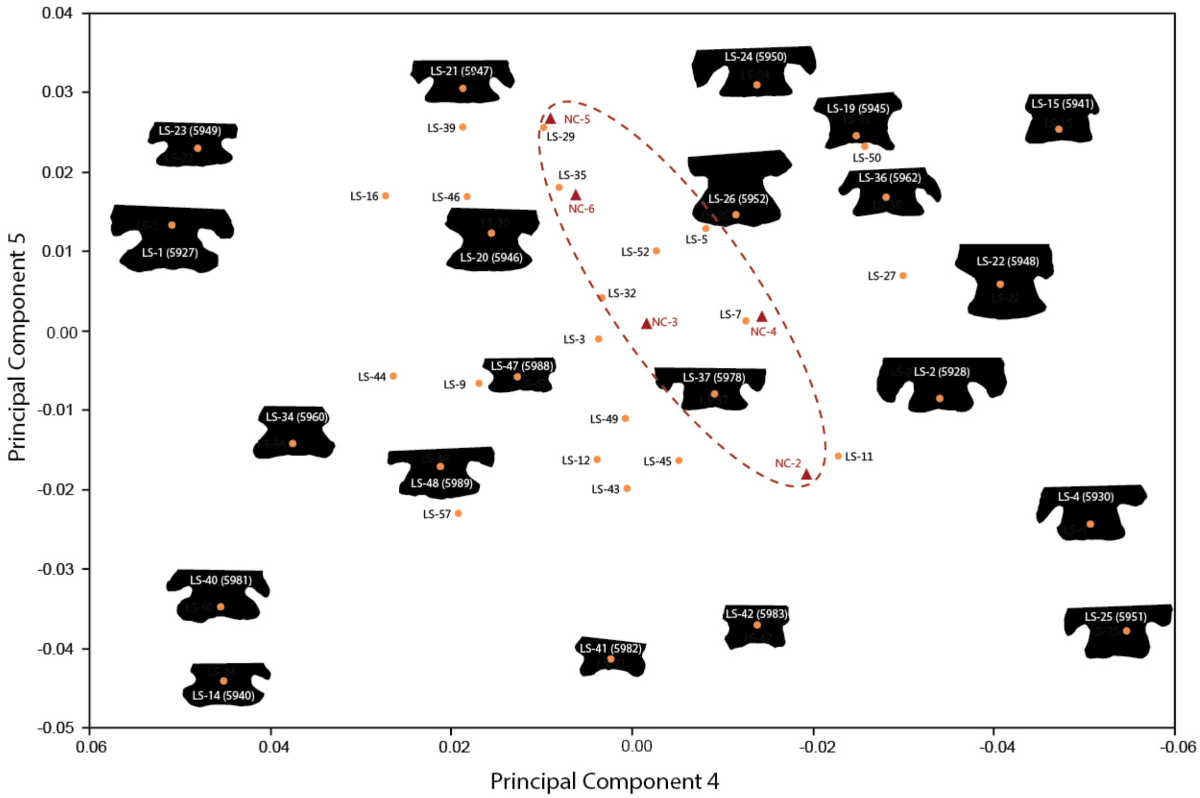


Figure 5. Sample plotted using principal components 4 and 5, with selected silhouettes superimposed to illustrate variability in haft shape; Nipper Creek points are represented by red triangles.

in the lateral haft margins can be attributed to a cultural convention or simply an individual choice.

Choices about basal edge morphology and overall haft proportions did not seem to be as regularized as choices about lateral haft shape in the Nipper Creek points (this is plain to see in the photo provided by Goodyear et al. 2004). Other "short time" Kirk assemblages also appear to encompass a larger degree of variability in the morphology of the basal edge than one would expect if those design choices were highly time-sensitive. The Kirk assemblage from the G. S. Lewis-East site, for example, contains points with straight, convex, and concave basal edges (see Sassaman et al. 2002:Figure 3-2). It is possible that basal edge shape was modified during the use-lives of these points: edges damaged during use would have been repaired by minor chipping and grinding, potentially transforming a convex or straight basal edge into a concave one. An association between the presence/degree of basal concavity and other indicators of use (such as blade attrition) is a testable proposition (Albert Goodyear, personal communication 2016).

The observation that basal edge morphology varies considerably, even in the "short time" assemblage from Nipper Creek, is potentially important, as basal edge shape and treatment are often thought to be a good attributes upon which to base "type" distinctions that are presumed to have temporal significance. While basal edge morphology appears to account for the greatest amount of variability in the shape analysis performed here, it may not be strongly linked to style *within* the Kirk Corner-Notched cluster (and may, in fact, be linked to function through haft repair and maintenance). It will be important to sort this out going forward to avoid inclusion of non-stylistic variability in a stylistic analysis.

This analysis is intended as a starting point. It could be augmented and expanded significantly in five ways:

(1) Incorporating more "short time" assemblages that provide windows into Kirk variability during relatively brief periods of time;

(2) Including point forms that immediately pre- and post-date Kirk;

(3) Increasing the size of the regional Kirk sample;

(4) Including comparative data from other regions; and

(5) Constructing and testing specific hypotheses about variability in lateral and basal edge morphology.

Addressing the question of patterns of change through time in Kirk would be greatly enhanced by the inclusion of more "short time" assemblages that can be placed within the continuum of Kirk variability. Such assemblages could include groups of points from excavated contexts with some control over time and, potentially, additional caches similar to the one from Nipper Creek. Single points from secure, radiocarbon-dated contexts could also serve as valuable data points.

Including points that pre- and post-date Kirk would help to evaluate to what degree the plot shown in Figure 5 has captured some aspects of change through time. The Larry Strong Collection contains numerous Taylor points (see Bridgman Sweeney 2013), which are thought to immediately pre-date Kirk. Although bifurcate/lobed points are largely absent from the Larry Strong Collection, Stanly points and points that fall within the range of Kirk Stemmed and Kirk Serrated are present. Based simply on haft morphology, Stanly could be a good candidate for a technological/stylistic descendant of Kirk (cf. Coe 1964:122), though most researchers place it after lobed/bifurcate forms in time.

This analysis utilized less than half of the Kirk points with intact haft regions from the Larry Strong Collection. Laser scanning and processing of the remainder is underway. Repeating the analysis with a larger sample will allow evaluation of the results discussed here and potentially allow ideas about the range and structure of variation in the lateral and basal haft edges to be refined.

Analysis of collections from other regions, both independently and combined with the South Carolina sample, would be useful for evaluating to what degree the range and patterns of variability observed in the Larry Strong points are present elsewhere and to begin assessing how patterns of variability in Kirk are structured with regard to space. Sites with large excavated assemblages in the Great Lakes, Ohio Valley, and Southeast (e.g., Broyles 1971; Chapman 1975; Coe 1964; Collins 1979; Daniel 1998; Ellis et al. 1991; Smith 1995) are good candidates for analysis, as are large surface collections.

Comparisons with other collections could be made using either 3D or 2D data; although the data utilized here were drawn from 3D models, they are essentially 2D and were analyzed as such. Two-dimensional data can be extracted from photographs and drawings, making large-scale analysis possible without the steps and time involved in capturing and processing 3D data.

The basic suggestion of this preliminary analysis is that variation in lateral haft edge morphology is, in general, more closely linked to time than basal edge morphology. This idea can be translated into formal hypotheses and tested in a number of ways using collections varying in temporal span and geographic scale. Analysis need not be limited to the kind of morphometric study presented here: there are numerous other ways to characterize, quantify, and compare aspects of shape. The digital 3D models that were used in this analysis will be freely available for anyone to use.

It is through a formal process of constructing and testing hypotheses that we can begin to understand how different aspects of variability in Kirk are patterned with regard to time and space. A good understanding of those patterns is a fundamental step toward building a robust framework for interpreting the patterns in terms of the people that made the points and the characteristics of the societies those people lived in.

References Cited

Adovasio, J. M. and Kurt W. Carr
2009 Shades of Gray: The Paleoindian-Early Archaic "Transition" in the Northeast. In *Sourcebook of Paleolithic Transitions*, edited by Marta Camps and Parth Chauhan, pp. 503-525. Springer, New York.

Anderson, David G., and Glen T. Hanson
1988 Early Archaic Settlement in the Southeastern United States: A Case Study from the Savannah River Valley. *American Antiquity* 53(2):262-286.

Bridgman Sweeney, Kara
2013 A Complex Web of History and Artifact Types in the Early Archaic Southeast. Ph.D. dissertation, University of Florida, Gainesville.

Brookes, Samuel O.
1985 The Kirk Point that Ate the Eastern United States. *Mississippi Archaeology* 20(2):24-31.

Broyles, B. J.
1971 Second Preliminary Report: The St. Albans Site, Kanawha County, West Virginia. *Report of Archaeological Investigations 3*. Geological and Economic Survey, Charleston, West Virginia.

Cable, John S.
1996 Haw River Revisited: Implications for Modeling Terminal Late Glacial and Early Holocene Hunter-Gatherer Settlement Systems in the Southeast. In *The Paleoindian and Early Archaic Southeast*, editors, David G. Anderson and Kenneth E. Sassaman, pp. 107-148. The University of Alabama Press, Tuscaloosa and London.

Cantin, Mark
2000 *Comparative Analysis of Thebes and Kirk Lithic Technology and Home Range Implications in Southwestern Indiana*. Master's thesis, Indiana State University, Terre Haute, Indiana.

Chapman, Jefferson C.
1975 The Rose Island Site and the Bifurcate Point Tradition. *Report of Investigations No. 14*. Department of Anthropology, University of Tennessee, Knoxville.

1976 The Archaic Period in the Lower Little Tennessee River Valley: The Radiocarbon Dates. *Tennessee Anthropologist* 1:1-12.

Coe, Joffre L.
1964 The Formative Cultures of the Carolina Piedmont. *Transactions of the American Philosophical Society* 54(5). Philadelphia.

Collins, Michael B. (editor)
1979 Excavations at Four Archaic Sites in the Lower Ohio Valley, Jefferson County, Kentucky. *Occasional Papers in Anthropology No. 1*. University of Kentucky, Lexington.

Daniel, I. Randolph
1998 *Hardaway Revisited: Early Archaic Settlement in the Southeast.* University of Alabama Press, Tuscaloosa.

2001 Stone Raw Material Availability and Early Archaic Settlement in the Southeast. *American Antiquity* 66(2):237-265.

DeRegnaucourt, Tony
1992 Field Guide to the Prehistoric Point Types of Indiana and Ohio. *Occasional Monographs of the Upper Miami Valley Archaeological Research Museum Number 1*. Second printing (revised edition). Ansonia, Ohio.

Eerkens, Jelmer W.
2000 Practice Makes within 5% of Perfect: Visual Perception, Motor Skills, and Memory in Artifact Variation. *Current Anthropology* 4:663-667.

Eerkens, Jelmer W., and Carl P. Lipo
2005 Cultural Transmission, Copying Errors, and the Generation of Variation in Material Culture and the Archaeological Record. *Journal of Anthropological Archaeology* 24:316-324.

Ellis, Christopher J., Albert C. Goodyear, Dan F. Morse, and Kenneth B. Tankersley
1998 Archaeology of the Pleistocene-Holocene Transition in Eastern North America. *Quaternary International* 49/50:151-166.

Ellis, Christopher J., Stanley Wortner, and William J. Fox
1991 Nettling: An Overview of an Early Archaic "Kirk Corner-Notched Cluster" Site in Southwestern Ontario. *Canadian Journal of Archaeology* 15:1-34.

Gillam, J. Christopher
2015 The Early Archaic Cultural Landscape of the South Carolina Coastal Plain. *South Carolina Antiquities* 47:1-10.

Goodyear, Albert C.
2014 Paleoindian in COWASEE: Time, Typology, and Raw Material Selection. *South Carolina Antiquities* 46:3-20.

Goodyear, Albert C., and Tommy Charles
1984 A Survey of Chert Quarries in Western Allendale County, South Carolina. *Research Manuscript Series 195*. South Carolina Institute of Archaeology and Anthropology, University of South Carolina, Columbia.

Goodyear, Albert C., William Radisch, Ruth Wetmore, and V. Ann Tippitt
2004 A Kirk Corner-Notched Point Cache from the Nipper Creek Site (38RD18), South Carolina. *Current Research in the Pleistocene* 21:42-44.

Justice, Noel D.
1987 *Stone Age Spear and Arrow Points of the Midcontinental and Eastern United States: A Modern Survey and Reference.* Indiana University Press, Bloomington.

Kamminga, Johan
1982 Over the Edge: Functional Analysis of Australian Stone Tools. *Occasional Papers in Anthropology.* Anthropology Museum, University of Queensland, St. Lucia.

Keeley, Lawrence H.
1982 Hafting and Retooling: Effects on the Archaeological Record. *American Antiquity* 47(4):798-809.

Kimball, Larry R.
1996 Early Archaic Settlement and Technology: Lessons from Tellico. In *The Paleoindian and Early Archaic Southeast*, editors, David G. Anderson and Kenneth E. Sassaman, pp. 149-186. The University of Alabama Press, Tuscaloosa and London.

Meltzer, David J.
1981 A Study of Style and Function in a Class of Tools. *Journal of Field Archaeology* 8:313-326.

Meredith, Steven M.
2011 "Multiple Geologic Sources of Tool Stone as Indicator of Geographic Range of Early Archaic Societies in the Gulf South." Paper presented at the annual meeting of the Society for American Archaeology, Sacramento, California.

Munson, Patrick J.
1986 What Happened in the Archaic in the Midwestern United States? *Reviews in Anthropology* Fall 1986.

Nolan, David J., and Richard L. Fishel
2009 Archaic Cultural Variation and Lifeways in West-Central Illinois. In *Archaic Societies: Diversity and Complexity Across the Midcontinent*, editors, Thomas E. Emerson, Dale L. McElrath, and Andrew C. Fortier, pp.

401490. State University of New York Press, Albany.

Sackett, James R.
1982 Approaches to Style in Lithic Archaeology. *Journal of Anthropological Archaeology* 1:59-112.

1985 Style and Ethnicity in the Kalahari: A Reply to Wiessner. *American Antiquity* 50(1):154-159.

1986 Style, Function, and Assemblage Variability: A Reply to Binford. *American Antiquity* 51(3):628-634.

1990 Style and Ethnicity in Archaeology: The Case for Isochestism. In *The Uses of Style in Archaeology*, editors, Margaret Conkey and Christine Hastorf, pp. 32-43. Cambridge University Press, Cambridge.

Sassaman, Kenneth E., I. Randoph Daniel, Jr., and Christopher R. Moore
2002 G. S. Lewis-East: Early and Late Archaic Occupations along the Savannah River, Aiken County, South Carolina. *Savannah River Archaeological Research Papers 12*. Occasional Papers of the Savannah River Archaeological Research Program, South Carolina Institute of Archaeology and Anthropology, University of South Carolina.

Simpson, George Gaylord, and Anne Roe
1939 *Quantitative Zoology*. McGraw Hill, New York.

Smith, Edward E.
1995 The Swan's Landing Site (12HR304): An Early Archaic (Kirk Horizon) Site in Harrison County, South-Central Indiana. *Midcontinental Journal of Archaeology* 20(2):192-238.

Stafford, C. Russell
1994 Structural Changes in Archaic Landscape Use in the Dissected Uplands of Southwestern Indiana. *American Antiquity* 59:219-237.

Stafford, C. Russell, and Mark Cantin
2009 Archaic Period Chronology in the Hill Country of Southern Indiana. In *Archaic Transitions in Ohio and Kentucky Prehistory*, editors, Olaf H. Prufer, Sara E. Pedde, and Richard S. Meindl, pp. 287-313. The Kent State University Press, Kent, Ohio.

Stegmann, Mikkel B., and David Delgado Gomez
2002 *A Brief Introduction to Statistical Shape Analysis*. Technical University of Denmark, Lyngby.

Stothers, David M., Andrew M. Schneider, and Mark Pape
2001 Early Archaic Side-Notched Points from East-Central Ohio. In *Archaic Transitions in Ohio and Kentucky Prehistory*, editors, Olaf H. Prufer, Sara E. Pedde, and Richard S. Meindl, pp. 210-230. The Kent State University Press, Kent, Ohio.

Thomas, David H.
1986 *Refiguring Anthropology: First Principles of Probability and Statistics*. Waveland Press, Prospect Heights, Illinois.

Tuck, James A.
1974 Early Archaic Horizons in Eastern North America. *Archaeology of Eastern North America* 2(1):72-80.

White, Andrew A.
2012 The Social Networks of Early Hunter-Gatherers in Midcontinental North America. Ph.D. dissertation, University of Michigan, Ann Arbor.

2013 Functional and Stylistic Variability in Paleoindian and Early Archaic Projectile Points from Midcontinental North America. *North American Archaeologist* 34(1):71-108.

2014 Changing Scales of Lithic Raw Material Transport among Early Hunter-Gatherers in Midcontinental North America. *Archaeology of Eastern North America* 42:51-75.

2016 The Research Potential of Large Surface Collections: The Larry Strong Example. *Legacy* 20(2): in press.

Searching for the Earliest Corn Crop in South Carolina: Radiocarbon Dating of Charred Maize Kernel and Cupule Fragments from the Johannes Kolb Site (38DA75) in Darlington County, South Carolina

Christopher Judge

Abstract

This research project details the analysis of five maize fragments recovered from the Johannes Kolb archaeological site, located in Darlington County, South Carolina, and the determination of their age using Accelerator Mass Spectrometry (AMS) Radiocarbon and Stable Isotope Ratio delta^{13}C techniques. The hypothesis proposed here asserted that the Kolb site maize was the earliest from any archaeological site in South Carolina, based on the occurrence of maize in Middle Woodland contexts in various parts of Eastern North America. A compilation of known maize occurrences and carbon dates associated with maize in South Carolina was assembled in order to place the Kolb samples in proper chronological position with other known maize samples. Results of this study found 46 South Carolina maize occurrences from 30 sites with 23 dates ranging from A.D. 890-A.D. 1800. Three samples from the Kolb site recovered from Late Woodland features proved to be contamination from a late 18th- early 19th-century enslaved African-American occupation of the Kolb site, and a fourth turned out not to be maize at all. Sample five returned a date of A.D. 1640 +/20 years—hardly the earliest corn crop in South Carolina.

Introduction

The impetus for this research emerged from a couple of ordinary questions about the archaeological time frame known as the Woodland Period (circa 3,000-1,000 years ago). The first question proposed—What are the signs of the changing lifestyles that define the Woodland Period 3,000-1,000 years ago, and particularly in the Great Pee Dee River valley? Obvious material signs include expansion of clay pottery, appearance of small stemmed and triangular shaped arrow points signaling the introduction of the bow and arrow, use of platform pipes, polished stone gorgets, and marine shell beads, while activities include horticulture and related construction and use of subterranean storage pits, houses and other aspects of village life, mound, cremation and ossuary forms of burial, and a transegalitarianism shift from generalized hunting and gathering strategies to more complex ones. The second question was when exactly does horticulture and subsequently corn agriculture appear in the archaeological record in the Great Pee Dee River drainage in Eastern South Carolina? Answering the second of these two simple questions is the goal of this project, and perhaps it will, in some small way, facilitate an answer to the first question.

In the year A.D. 1585, Englishman Thomas Hariot wrote a description of a grain grown by Native Americans in coastal North Carolina that he called *Pagatwor* in the Algonquian language of the local people describing it in the following manner:

> Pagatwor, a kinde of grain so called by the inhabitants; the same in the West Indies is called Mayze: English men call it Guinney wheate or Turkie wheate, according to the names of the countreys from whence the like hath beene brought. The graine is about the bignesse of our ordinary English peaze and not much different in forme and shape: but of diuers colours: some white, some red, some yellow, and some blew. All of them yeelde a very white and sweete flowre: beeing vsed according to his kinde it maketh a very good bread (Hariot 1585).

In the early historic period, corn was grown, harvested, and then dried for long-term preservation by Native Americans. On July 8, 1609, Spanish sailor Ecija sailed into the River Jordan (Santee River) and "going inland from the two headlands there is a large river, which we ascended until we reached some cabins and fields sown with corn, where an Indian lived, who was the manador, which is what we call those [i.e., leaders] of the Jordan" (Hann 1986:26). Uses include many in both food and non-food categories. John Lawson, who trekked through South Carolina in 1701, noted that dried kernels were used in rattles, to keep score in games, and was a well-established ingredient in Native Carolina cuisine. Corn cribs, or what the Spanish referred to as " barbacoas," were common features in Mississippian and historic period villages (Judge 1991) and Lawson described early 18th-century cribs as follows:

> They make themselves Cribs after a very curious Manner, wherein they secure their Corn from Vermin; which are more frequent in these warm Climates, than Countries more distant from the Sun. These pretty Fabricks are commonly supported with eight Feet or Posts, about seven Foot high from the Ground, well daub'd within and without upon Laths, with Loom or Clay, which makes them tight, and fit to keep out the smallest Insect, there being a small Door at the gable End, which is made of the same Composition, and to be remov'd at Pleasure, being no bigger, than that a slender Man may creep in at, cementing the Door up with the same Earth, when they take Corn out of the Crib, and are going from Home, always finding their Granaries in the same Posture they left them… (Lawson 1709:16-17).

Lawson experienced these first hand among the Santee Indians located in the 18th century along the Santee River in the vicinity of present day Lake Marion:

> We found great Store of Indian Peas, (a very good Pulse) Beans, Oyl, Thinkapin Nuts, Corn, barbacu'd Peaches, and Peach-Bread; which Peaches being made into a Quiddony, and so made up into Loves like Barley-Cakes, these cut into thin Slices, and dissolved in Water, makes a very grateful Acid, and extraordinary beneficial in Fevers, as hath often been try'd, and approv'd on by our English Practitioners (Lawson 1709:17).

When he reached the Congaree Indian Town located somewhere between the confluence of the Congaree and Wateree rivers and the town of Camden:

> The Women were very busily engag'd in Gaming: The Name or Grounds of it, I could not learn, tho' I look'd on above two Hours. Their Arithmetick was kept with a Heap of Indian grain (Lawson 1709:25).

Just upriver of the Wateree Indians, living somewhere between Camden and the upper reaches of Lake Wateree, Lawson found much "cleared" ground indicating extensive agricultural practices:

> Bidding our Waterree King adieu, we set forth towards the Waxsaws, going along clear'd Ground all the Way. Upon our Arrival, we were led into a very large and lightsome Cabin, the like I have not met withal. They laid Furs and Deer-Skins upon Cane Benches for us to sit or lie upon, bringing (immediately) stewed Peaches and green Corn, that is preserv'd in their Cabins before it is ripe, and sodden and boil'd when they use it, which is a pretty sort of Food, and a great Increaser of the Blood (Lawson 1709:33).

He also observed among the Waxhaw located in Lancaster County:

> At last, they cut two or three high Capers, and left the Room. In their stead, came in a parcel of Women and Girls, to the Number of Thirty odd; every one taking place according to her Degree of Stature, the tallest leading the Dance, and the least of all being plac'd last; with these they made a circular Dance, like a Ring, representing the Shape of the Fire they danced about: Many of these had great Horse-Bells about their Legs, and small Hawk's Bells about their Necks. They had Musicians, who were two Old Men, one of whom beat a Drum, while the other rattled with a Gourd, that had Corn in it, to make a Noise withal: To these Instruments, they both sung a mournful Ditty; the Burthen of their Song was, in Remembrance of their former Greatness, and Numbers of their Nation, the famous Exploits of their Renowned Ancestors, and all Actions of Moment that had (in former Days) been perform'd by their Forefathers (Lawson 1709:38-39).

Along the Savannah River in 1736, Philip Von Reck witnessed a Creek Indian "Busk" Ceremony also known as the Green Corn Ceremony:

> The fire in all the huts of the Indian town is put out, and a new fire is made. They take two pieces of wood and twirl them long enough on each other

> until one of them smokes and a fire starts. Each of them lights his tobacco pipe from this fire and takes some of it home with him. Also in this festival a ripe ear of corn is brought from the field and hung up, which is kept throughout the year until the next such time (Kristian 1980:48-49).

Trinkley et al. provide an interesting mid-18th-century depiction of Carolina corn agriculture:

> One of the few detailed, early accounts of corn agriculture in the Southeast is that by Peter Kalm (1974), a member of the Swedish Academy of Sciences who toured the area in 1748. He describes two principal types of corn: One he calls big corn or simply corn and the other he calls "three months" corn, although he notes that there are more varieties of maize the more south you go . .. . (Kalm 1974:107). The big corn is almost certainly the Southern Dent race, while the smaller is probably either Northern or Southeastern Flint. Kalm (1974:108) remarks that the big corn is most commonly planted in the Carolinas, although the Indians use much of these three-month maize. While the short corn which ripened in three months is an equivocal description of the Southeastern Flints, it is probable that both the Indians and the Colonial settlers in the Charleston area were producing a variety of corns in the early eighteenth century (1983:58).

Mid-18th-century white settlers near the Catawba inflated corn prices at a time of great vulnerability:

> As white settlers and Catawba began to have difficulties in the Spring of 1759 the settlers began to abuse the Catawba who needed food…." When the governor's agent, James Adamson, arrived in the Nation in early June, he was furious to learn that the settlers were stirring up trouble. They "has the Con[science] to take advantage of the Indian's food shortage, swapping corn at exorbitant rates for the presents Lyttelton had sent the Nation, a" new gun for a bushiull of corn and a match Coat for a Bushiull." (Merrell 1989:190).

In her diary in 1797, Lady Henrietta Liston described a Catawba Town:

> On the Colonel's fire stood a pot, & there was a hoecake on the hearth. I asked what was in the pot, he said deer flesh for breakfast, but did not offer us any. In another hut we found wild turkey preparing in the same manner. The only cultivation we saw was a small quantity of Indian corn in the vicinity of the town, cultivated I am told by the women, & this is rather for traveling with (when an Indian sets out on a journey the flour of Indian corn in a bag & pot to boil it in is all his provision) than to use as bread (Liston 1797:28 in Fitts 2015:231).

Frank Speck collected the following taboo amongst the Catawba, "When a person dies the corn-crib door is not opened for three days, and the deceased is not mentioned for three days."

> This taboo probably indicates that the soul of the deceased was believed to remain about the scenes of life for three days. It seems that the Cherokee hold a similar belief, since they do not enter the corn-crib for any purpose for the same length of time, fearing that the "corn will all disappear if they do." I was told, however, that the Cherokee do not have the ruling about throwing out the ashes of the fire (Speck 1934 :44).

The above quotes from the 16th- and 20th centuries point to the importance and use of maize for more than just a staple food item in the historic era. In fact, maize appears to operate in the subsistence economy, recreational pursuits, and ritual practice of historic period Native Americans in South Carolina (Anderson 1989:120). But how long have South Carolina Native people grown maize?

Returning to the question at hand, the adoption of plant domestication after millions of years of practicing a generalized hunting and gathering strategy leading to an intensification of subsistence related activities must have triggered fundamental and profound change within society. Of course, the question becomes what were the causal factors of this intensification? Cultural Intensification, for the purposes of this study is defined as — changes to everyday life involving everything from larger group sizes and smaller territories, to increased expenditures of energy, labor, and social capital, caused by or the products of significant changes in technology, politics, economy, and/or social life. One such intensification involves alterations in the subsistence economy of a prehistoric group, such as the addition of horticulture or agriculture. The domestication of native plants, such as maygrass and squash, indicates the shift to a mixed economy of gardening, hunting, and gathering indicative of horticultural presence. In some places, horticulture is followed by the introduction of exotic species such as maize and the economic label, agriculture.

Small amounts of maygrass and squash have been recovered from Woodland deposits at the Kolb site, findings indicative of some level of horticultural activities (Hollenbach 2010). For the purposes of this study, maize fragments recovered from the Johannes Kolb archaeological site in Darlington County, South Carolina, were proposed, by this author, as the oldest ever recovered in South Carolina (Figure 1).

The possibility of maize in the Middle Woodland period in Eastern North America has been established at a small number of locations, including sites in Southern Quebec, Illinois, Michigan, New York, and Tennessee (Gates St-Pierre 2013; Riley et al. 1994; Hart et al. 2012; Chapman and Crites 1987), using AMS dating of macrobotanical and microbotanical remains. Hart et al. report on the recovery of maize phytoliths from residues encrusted on pottery vessels and AMS dating of bulk 13C values from the Saginaw River Basin in Michigan dating cal 350-40 B.C. (2012:315-323). They also report on similar evidence for maize phytoliths recovered from residues on pottery vessels from as early as cal 300 B.C. at sites in Central New York (Hart et al. 2012:317). What is unresolved is the importance and level of contribution of maize to the overall subsistence strategy of Middle Woodland chefs.

Few sites of any time frame have produced corn within the Great Pee Dee River drainage. Corn (*Zea mays*), or maize, is a new world crop domesticated from the wild grass teosinte. Deborah Pearsall asserts that maize was introduced into South America before 7000 years ago, became an important crop after 3500 years ago (Wenke 1999), and was introduced into Mesoamerica about 5600 years ago. It then migrated into the Southwestern United States circa 3000 years ago and later moved eastward. Competing models trace corn's path to the Eastern United States via the Southwest or via the Gulf Coast into Florida.

Regardless of its entry point, corn appears in Eastern North America between 400 and 200 B.C. (Gates St-Pierre 2013):

> Until very recently there were no indications of domesticated plants in Southern Quebec before the Late Woodland period. However, a recent analysis and dating of the phytoliths contained in the carbonized encrustations on Middle Woodland ceramics revealed that corn appears to have been obtained through exchange and consumed as early as the beginning of the Early Middle Woodland period, at around 400 or 200 B.C., and was probably being cultivated on a small scale during the Late Middle Woodland Period beginning at around 500 AD, in both the Montreal and Quebec City areas (Gates St-Pierre 2013) (Table 3). These data are the oldest and northernmost evidence of corn consumption in the Northeast.

A maize phytolith from coastal Alabama has been dated to 3500 B.P. (Fearn and Liu 1995, 1997), the earliest documented evidence of corn in the Southeastern United States. "The Lake Shelby pollen adds to a growing body of microfossil evidence supporting the presence of maize in eastern North America much earlier than the macrobotanical records indicate. Corn was probably present in eastern as well as western North America by 3000 B.P." (Fearn and Liu 1995).

The earliest documented macrobotanical evidence in the Southeastern United States comes from the Icehouse Bottom site on the Little Tennessee River in Tennessee where it is reported during the Middle Woodland period at A.D. 175 (Chapman and Crites 1987). Sometime after A.D. 900, during the Mississippian period, corn became a prominent contributor to prehistoric diet across the Eastern United States. The question of interest to this study is when did it first appear in the Great Pee Dee River drainage of Eastern South Carolina?

Based on the early dates discussed above, my hypothesis was that the Kolb site specimens are the oldest corn recovered thus far from an archaeological context in South Carolina. I based this opinion on the fact that the Kolb site has very little in the way of evidence supporting a Mississippian occupation (A.D. 1000-1600); however, ample evidence of Middle and Late Woodland occupations is present. The significance of this find revolves around the transition from a subsistence strategy based on hunting and gathering ultimately to one based on agriculture— a phenomena that triggers substantial changes in political, religious, and social aspects of late prehistoric Native American life.

Michie and Crites noted that "Corn discoveries and associated radiocarbon dates have been both elusive and minimal" (1991:49). Prior to the present study, South Carolina Paleoethnobotanist Gail Wagner noted that "so far domesticated crops appear late in the record in South Carolina…and maize is not securely present until A.D. 1100" (Wagner 1995:11). Twenty years have passed since Wagner's assertion, and additional knowledge of maize has been gained through archaeological research. Alternatively, the null hypothesis would indicate, as

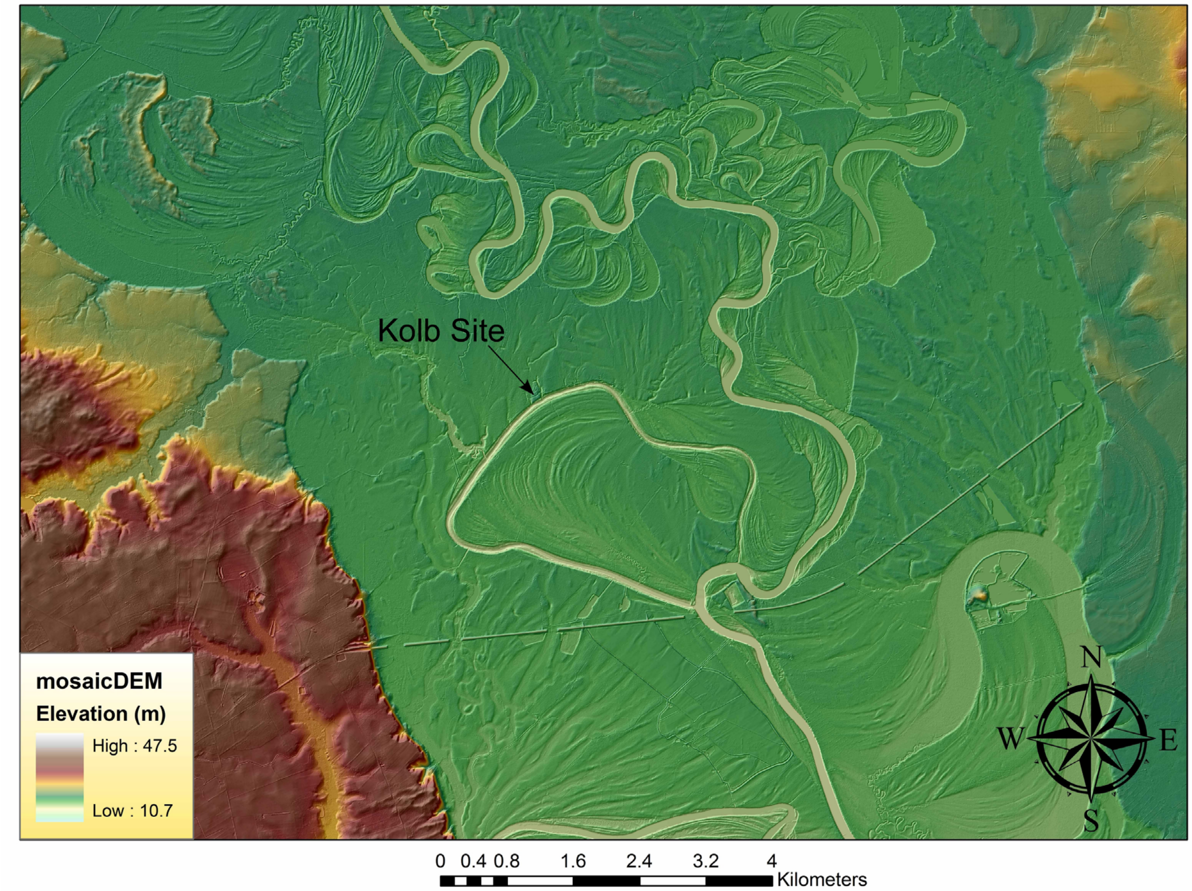


Figure 1. Kolb Site in Great Pee Dee River drainage.

Wagner has proposed, a late arrival of maize in South Carolina in the Mississippian period, and the continuation of long established hunter-gatherer strategies up through the Late Woodland.

To support my hypothesis, I needed a suite of radiocarbon dates that unequivocally and securely demonstrate that the age of the Kolb site specimens was indeed the oldest. There was a related need to assemble and construct a table of all known maize dates from South Carolina to validate the hypothesis (See Table 2 below). In 2014, I was a fortunate recipient of a USC Lancaster *Faculty Research and Productive Scholarship Grant* enabling the AMS dating of five maize samples from the Kolb site and the time to conduct the necessary background research (Judge 2015, 2016).

The following section details the five maize samples analyzed for this project. Analyses were performed by Dr. Alexander Cherkinsky of the Center for Applied Isotope Studies at the University of Georgia Athens. The carbonized macrobotanical maize fragments from the Kolb site were isolated and sealed in 4 mil zip lock bags. Leslie Raymer, an archaeologist and paleoethnobotanist, confirmed our field observations that these macrobotanical samples were indeed 10 row maize cob fragments. The maize cupule from Feature 01-84, Sample 1, a 17th-century burial, was identified by Dr. Kandi Hollenbach, a paleoethnobotanist at the University of Tennessee (Hollenbach 2010:8).

The recovery of corn from several of the samples from the Kolb site suggests a relatively late date for these contexts within the Woodland period. These samples are enumerated as UGAMS#s 18058-18062, and further details can be found in Table 1.

Sample 1 (UGAMS # 18058) was a corn cupule recovered from Feature# 07-04, level 6, a deep Woodland pit feature. The maize here produced a date of 150 years B.P. +/- 20 years (B.P. = before present and is standardized by convention to A.D. 1950). This would place this maize around the year A.D. 1800, when historic documentation and archaeological research points to a village of enslaved people occupying the site.

Sample 2 (UGAMS#18059) was thought to be a maize kernel but apparently turned out to be another C4 plant but definitely not maize. C4 plants include sugarcane, maize, sorghum, millet, switch grass, and amaranth. The plant material of Sample 2 produced a date of 1210 B.P. +/- 20 years or A.D. 740, which would have turned out to be the earliest maize in South Carolina

UGAMA#	Sample ID	Material	δ13C,‰	14C age, years BP	+/-	pMC	+/-
18058	1	Cupule	-10.3	150	20	98.1	0.27
18059	2	Kernel?*	-30.5	1210	20	85.96	0.24
18060	3	kernel	-9.4	180	20	97.78	0.27
18061	4	cupule	-10.4	310	20	96.27	0.28
18062	5	cupule	-11.0	150	20	98.17	0.27

^ Report dated July 29, 2014. *Stable isotopic analyses indicated this is a C4 plant but it is not maize.

albeit it would have been an erroneous and potentially quite embarrassing determination.

Sample 3 (UGAMS#18060) was recovered from PF-10, a post-like feature recovered in a 4x4 m block excavation. This corn kernel produced a date of 180 years B.P. or A.D. 1770 and is associated with occupation of the site shortly after Johannes Kolb died in 1765.

Sample 4 (UGAMS#18061) was a corn cupule recovered from pit fill in Feature# 01-84, a human burial. The cupule produced a date of 310 years B.P. or A.D. 1640 +/- 20 years. A previous carbon date from soot recovered from the surface of a complicated stamped pot in the same burial produced a date of 370 years B.P. or 1580 +/-25 years. Averaging the two dates produces a date of A.D. 1610, one year after Spanish sailor Ecija left beads with natives near the mouth of the Santee River (Hann 1986), less than 25 years after the demise of the Spanish Colonial town of Santa Elena, a year after the founding of Jamestown in Virginia, and 60 years prior to the founding of Charles Towne.

Sample 5 (UGAMS#18062) was a cupule recovered in association with a prehistoric pot bust in midden fill in level 5 at E105 N77. This corn cupule produced a date of 150 years B.P. or A.D. 1800, and its presence, as with Samples 1 and 3, is associated with the enslaved occupation of the Kolb site. An aside, this sample was recovered by an experimental technique utilizing a shop vacuum powered by a small generator.

Ultimately, and rather disappointingly, the null hypothesis must be accepted as the Kolb site corn is not the oldest recovered corn in South Carolina. Corn discovered in Woodland pit features in the three examples reported here all date to the turn of the 18th/19th centuries and thus can only be the result of contamination by the occupants of the slave village that existed onsite from circa A.D. 1790 up until the Civil War. Possibly cornstalks standing in household gardens were burned after harvest to make way for the next crop and hoeing of these plots introduced carbonized corn into the subsoil where it subsequently migrated into earlier cultural features. Interestingly, investigators at the Middle Woodland Holding site in Illinois suspected contamination from a nearby Euroamerican homestead when Woodland dates were originally obtained there (Riley et al.1994:493). Regardless, the earliest corn recovered from the Kolb site dates to circa A.D. 1640 +/-20 years.

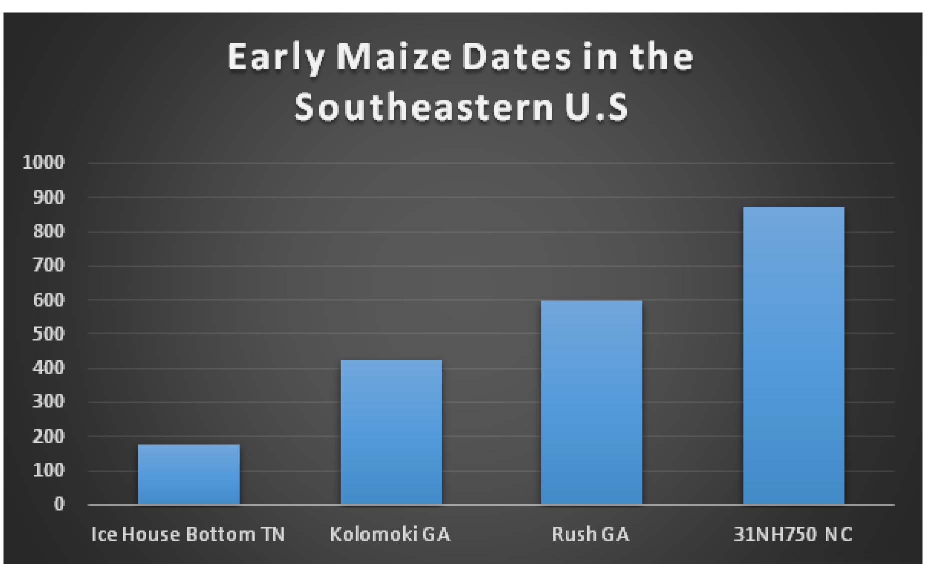


Figure 2. Early macrobotanical maize dates from states nearby South Carolina.

Early macrobotanical maize dates from states nearby South Carolina

In this section of the report I review corn from dated archaeological contexts in the nearby and neighboring states of Tennessee, Georgia, and North Carolina before discussing the dates from South Carolina (Figure 2). As mentioned above, a maize kernel fragment recovered from Stratum II at the Icehouse Bottom site in Tennessee produced an AMS date of 1775 +/- 100 B.P. (Beta # 16576) (Chapman and Crites 1987:353). In southwest Georgia, a pit containing corn, associated with a keyhole-shaped structure at the Kolomoki site, is dated between A.D. 350 and A.D. 500 (Pluckhahn 2003). A second early date on corn in Georgia is from the Late Woodland Rush site near Rome, Georgia, excavated by Southeastern Archeological Services, Inc. dating to around A.D. 600 (Wood and Bowen 1995) See Figure 2.

Archaeological research conducted prior to the construction of the Richard B. Russell Dam and Lake along the Savannah River produced three sites with maize. Tippett and Marquardt (1984) report corn in an Early Mississippian Etowah context at the Clyde Gulley site in Elbert County, Georgia. At the Ruckers Bottom site, also in Elbert County, Georgia, corn was discovered in a number of Early Mississippian components and increases 34% between Early and Later Mississippian components (Anderson and Schuldenrein 1985:678). A third Elbert County site, the Beaverdam mound and village, produced corn in A.D. 1200-1250 period contexts (Rudolph and Hally 1985:400). Additionally, they provide further details (Rudolph and Hally 1985:405):

> Fragments of corn cob comprised 53% of the plant food by weight and were present in 93% of the smaples. In a sample of twenty cobs 15 were eight-rowed, four were ten-rowed, and one was twelve-rowed. Measurement of cupules, the small cup-like structures of the cob from whence two kernels arise, indicate a mean cupule width of 7.4 mm with a standard deviation of 1.88mm and a mean cupule height of 3.0 mm with a standard deviation of 0.48 mm. Frgamentary kernels were also well represented, but none was complete enough to allow measurement. Overall it appears that the sample is dominated by the eight-rowed variety of corn variously called Eastern Complex, Northern Flint, or Maiz de Ocho and which is the characteristic variety of the Eastern United States in late prehistoric times (Galinat 1970).

In North Carolina, John and Margaret Scarry sum up maize in the prehistoric record:

> Corn (*Zea mays*) and the common bean (*Phaseolus vulgaris*), the important tropical New World crops appear in North Carolina sites in the Late Woodland and Mississippian periods, and are consistently found in the later periods as well (Scarry and Scarry 1997).

Recently New South Associates produced a Standard AMS date of a sample containing 57 maize cupules and 1 kernel fragment from Feature 2, Block 2 at 31NH750 (Beta - 434843). Measured Radiocarbon Age 620+/- 30 B.P. Conventional Radiocarbon Age: 870 +/- 30 B.P. 2 Sigma Calibration dates: Cal A.D. 1050 to 1085 (CA B.P. 900 to 865), cal A.D. 1125 to 1140 (Cal B.P. 825 to 810); Cal A.D. 1150 to 1225 (Cal. B.P. 800 to 725). Feature 2, a pit feature, had one Hanover sherd at the top of it. Most of the pottery from the block was Hanover and Cape Fear (Natalie A. Pope personal communication July 19, 2016). Joe Mountjoy reports Pee Dee phase pottery in association with charred corn cobs dating A.D. 1040 +/- 60 (Beta # 18410) at the Payne site on the Deep River in Moore County, North Carolina (Mountjoy 1989:15). Oliver reports charred corn kernels from Feature 4 at the Leak site where wood charcoal produced a date of A.D. 1272 +/-50 (UGA # 6050) (Oliver 1992:115). Salvage excavations at the Forbush Creek site, in the Yadkin drainage of North Carolina provide a date from a Late Woodland context. This Uwharrie phase site (circa A.D. 1200-1400) contained subsistence evidence, including deer, rabbit, raccoon, birds, mussel, corn, acorn, and other nuts (Coe 1972:13; McManus 1985:31). A second Late Woodland site, Donnaha (31YD9) in the Upper Yadkin drainage revealed that *Zea mays* was ubiquitous in flotation samples making up 40% of recovered macrobotanical materials (Mikel 1987 cited in Cable et al.1998:41). At the Broad Reach site (31CR218) Mathis reports charred corn cobs from Feature 590 where wood charcoal dated to A.D. 1439-1473 (1 sigma) (Mathis 1999). Six corn cob pits are reported at the Crowder's Creek site where a C-14 date of 350+/-50 years or A.D. 1600 (Beta# 13917) comes from Feature 79 (May 1989:42).

South Carolina Maize

In this section, I review reported maize discoveries and dates in South Carolina, nearly 25 years after Michie and Crites' lamentation quoted above (Table 2). These data were collected and assembled by an extensive background literature search, an email inquiry to all members of the Council of South Carolina Professional Archaeologists (COSCAPA) looking for recently published and unpublished dates, and a Facebook post seeking relevant information. A total of 46 maize occurrences were identified in South Carolina from 30 sites. Analysis of the 23 dates revealed not only the earliest date for maize, but three clusters of dates were noted as well (Figure 3).

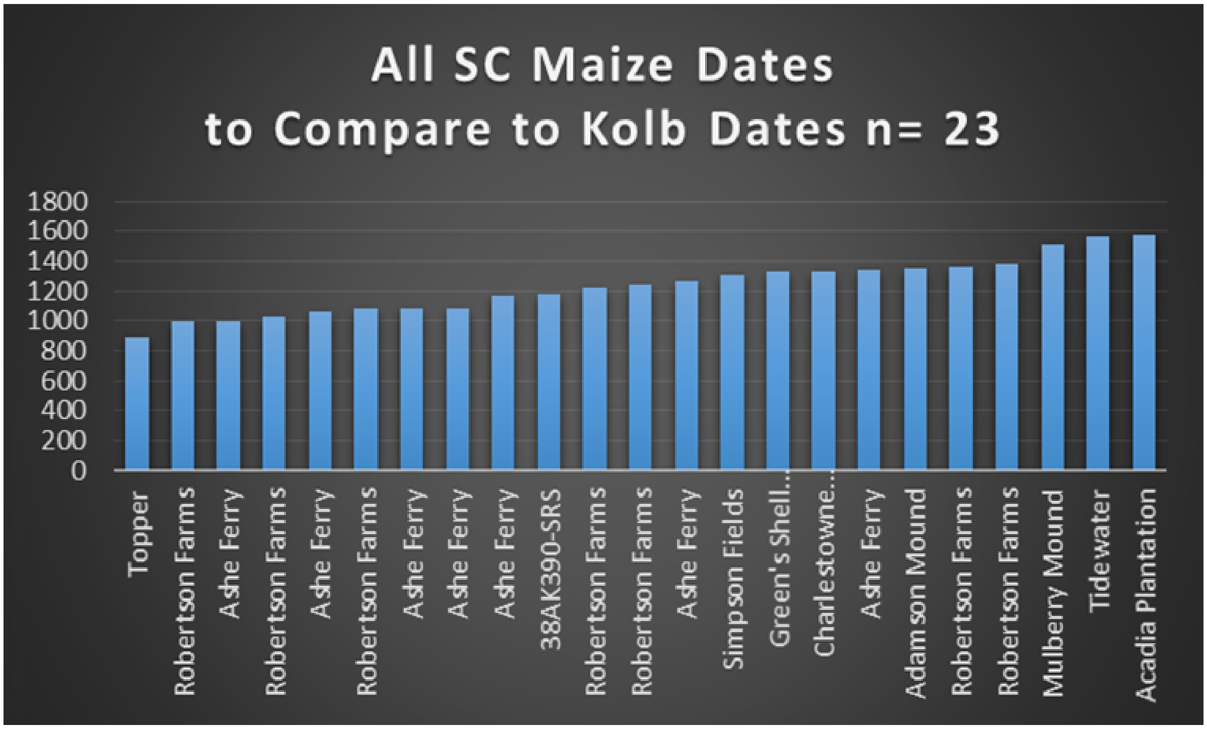


Figure 3. South Carolina's Maize Dates.

Cluster 1) circa A.D. 890-1193 (dates #1-10 in Table 2)
Cluster 2) circa A.D. 1225-1385 (dates # 11-20 in Table 2)
Cluster 3) circa A.D. 1510-1580 (dates # 21-23 in Table 2)

Curiously at this time, there are no maize dates east of the Catawba/Wateree/Santee river drainage, thus no maize as of yet in the Great Pee Dee River drainage where the Kolb site is situated. The first cluster (Figure 4) appears to be associated with the Medieval Warm Period from A.D. 800 to A.D. 1200 when intensive maize agriculture appears in the Southeastern United States (Anderson and Sassaman 2012:163).

The earliest maize in South Carolina is from the Topper site with a date for this early outlier at A.D. 890 —the only date in my sample prior to A.D. 1000 (Table 2 date # 1). The now famous Topper site (38AL23) is located along the Savannah River in Allendale County, South Carolina, in an area where numerous Coastal Plain chert outcrops occur and a location where prehistoric people extracted tool-grade stone raw materials. Since 1984, excavations led by Albert C. Goodyear III of the South Carolina Institute of Archaeology and Anthropology (SCIAA) have revealed a multicomponent prehistoric site with rich and significant Late Pleistocene and Early Holocene deposits.

On May 24, 2011, a 50 cm square column sample was excavated in the area of the Topper Site known as the "Hillside," located in sandy soils above the river and creek floodplain. Walters et al.(2013) presented a poster on Topper paleoethnobotany at the *Paleoamerican Odyssey Conference* in Santa Fe, New Mexico, in 2013 and surely those gathering to engage in Late Ice Age prehistoric archaeology may have missed a rather important fact related to my research in the much later Woodland Period.

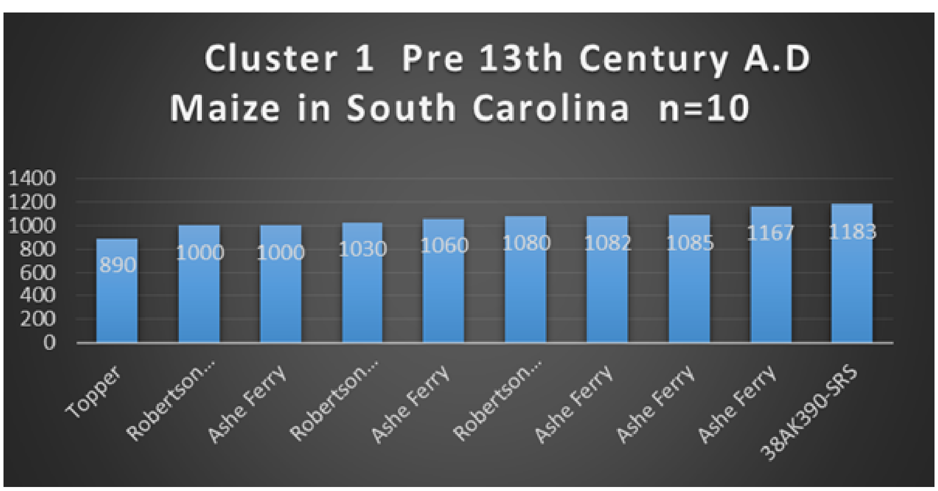


Figure 4. Cluster I Maize dates–Pre 13th-Century A.D.

Table 2. Dated maize from South Carolina Archaeological Sites (n=26)*.

#	Site	County	Site #	Date	Cal	Reference	Notes
1	Topper	Allendale	38AL23	A.D. 890	yes	Walters et al. 2013	Cupule Beta #350126
2	Robertson Farms	Greenville	38GR1	A.D. 960-1040	yes	T.Ferguson pers. comm. 2013	Fea. 337 A.D. 1000
3	Ashe Ferry	York	38YK533	A.D. 970 to 1030	yes	Riggs et al. 2015	Fea. 77 A.D.1000
4	Robertson Farms	Pickens	38PN35	A.D. 910-1150	yes	T.Ferguson pers. comm. 2013	Fea. 38 AD 1030
5	Ashe Ferry	York	38YK533	A.D. 990 -1040 A.D. 1100 to 1120	yes	"	Fea. 50 A.D. 1060
6	Robertson Farms	Greenville	38GR1	A.D 1020-1200	"	T. Ferguson, pers. comm. 2013	Fea. 286 A.D. 1080
7	Ashe Ferry	York	38YK533	AD 970 -1050 AD 1090 - 1120	"	"	Fea. 53 (b) A.D. 1082
8	"	"	"	AD 1010 -1160	"	"	Fea. 52 A.D. 1085
9	Ashe Ferry	York	38YK533	A.D. 1030 - 1190 A.D. 1200 - 1210	"	Riggs et al. 2015	Fea. 53 (a) A.D. 1167
10	SRS	Aiken	38AK390	A.D. 1170-1240 A.D. 1050-1270		Adam King and Keith Stephenson personal communication	Cob impressed Savannah Pot Beta# 145499 A.D. 1183
11	Robertson Farms	Pickens	38PN35	A.D 1170-1280		Ferguson, pers. comm	Fea. 79 A.D. 1225
12	Robertson Farms	Pickens	38GR1	A.D. 1200-1290	yes	Ferguson, pers comm.	Fea. 187 A.D. 1245
13	Ashe Ferry	York	38YK533	A.D. 1230 -1290	"	Riggs et al. 2015	Fea. 78 A.D. 1260
14	Simpson Fields	Anderson	38AN8	A.D. 1310	MASCA	Wood et al 1986:108 and Gardner 1986:377	Beta #2803 Fea. 160, 12 row
15	Green's Shell Enclosure	Beaufort	38BU63	A.D. 1325	no	Judge 2000	Corn cupule charcoal
16	Charlestown Landing	Charleston	38CH1	1 sigma Cal 1276-1387 or A.D. 1331.		South 2002:227,1971:216, 240	Corn Feas.242, 243, 322 UGA#410
17	Ashe Ferry	York	38YK533	A.D. 1280 - 1400	yes	Riggs et al. 2015	Fea. 41 A.D. 1340
18	Adamson	Kershaw	38KE11	A.D. 1300-1400		Wagner n.d.:14	A.D. 1350
19	Robertson Farms	Pickens	38PN35	A.D 1300-1420	yes	Ferguson pers comm.	Fea. 56 A.D. 1360
20	Robertson Farms	Pickens	38PN35	A.D. 1320-1450	yes	Ferguson pers comm.	Fea. 76 A.D. 1385
21	Mulberry	Kershaw	38KE12 premound A midden	430 +/- 200A.D. 1320-1700	no	Ferguson 1972	UGA #3922 uncorrectedcorn A.D. 1510
22	Tidewater	Horry	38HR254	A.D. 1450-1675	yes	Dawn Reid pers. comm. 2013	A.D. 1562
23	Acadia Plantation	Georgetown	38GE424	A.D. 1520-1640		Michie and Crites 1991	Corn Beta #53765 A.D. 1580
24	Kolb	Darlington	38DA75	A.D. 1580 +/- 30	yes	Judge 2015	Pot soot Fea 01-84 UGAMS#11037 A.D. 1580
25	Kolb	Darlington	38DA75	310 Cal B.P. +/- 20 A.D. 1640	yes	Judge 2015	Fea. 01-84 corn cupule UGAMS # 18061
26	Riverfront	Aiken	38AK933	A.D. 1680	AMS	Whitley 2013:276	8,10,12 row

*(Note on the data compiled in Table 2: No attempt has been made to smooth these data using Bayesian statistics. I have entered the data in the tables as reported by archaeologists with one exception. In cases where dates were reported with a +/- range, I calculated and entered the median between the two dates in Table 2 and in Figures in this article generated from the data in Table 2. Future researchers may want to better calibrate the accuracy of my data using Bayesian statistical smoothing to answer other questions about the past).

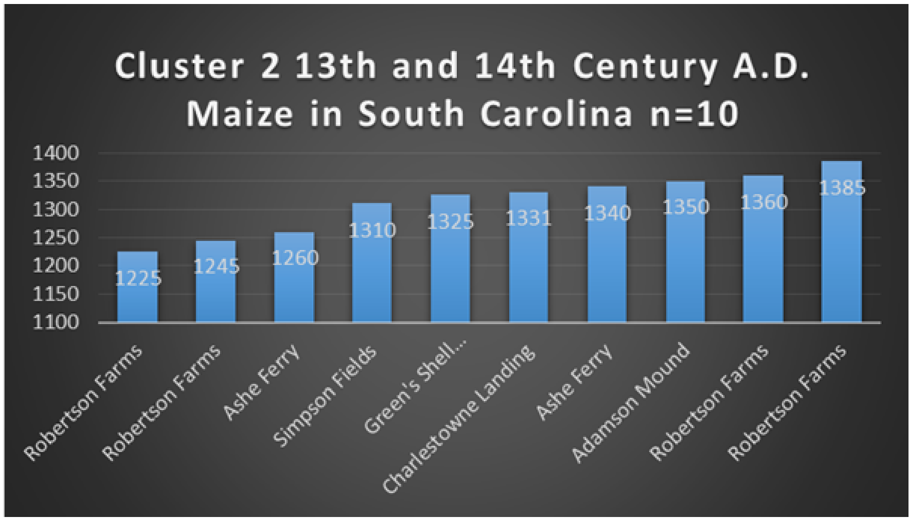


Figure 5. Cluster 2 Maize Dates 13th and 14th centuries A.D.

The focus of the poster was an argument for the potential for recovery of carbonized botanical materials in acidic sandy deposits, based on promising results from Topper.

Interestingly for my research, Walters et al. (2013) report an AMS date on a corn cupule recovered by flotation from a 50-cm square hand dug column, between 50-55 cmbs that produced a date of 730-910 Cal B.P. or A.D. 890 +/- 30 years (Beta # 350126). Topper has and may continue to produce "firsts" and "earliest" but who would have imagined that it would produce the earliest maize. Al Goodyear reports that additional maize samples have been recovered from Topper and await AMS analyses (Goodyear, 2015, pers. comm.).

Moving forward in time, South Carolina maize dates for Cluster 1, represented by nine AMS dates from three Piedmont sites, the Robertson Farms site in Greenville and Pickens counties (T. Ferguson, personal communication), the Ashe Ferry site located in York County (Riggs et al. 2015), and 38AK390 on the Savannah River Site, occur at a time of initial and widespread corn farming across the Eastern United States at the onset of the Mississippian Period. These are dates numbered 2-10 in Table 2. The earlier dates in Cluster 1 would be more or less contemporary with 31NH750 and the Payne site in North Carolina mentioned above.

To the Cluster 1 suite, although its exact age has not yet been determined, I must add the Savannah I (A.D. 950-1100) phase pit from the Lewis-West site (38AK228) where six maize fragments were recovered (Wagner and Stephenson 2014:4).

Cluster 2 (Figure 5) has 10 dates and includes 4 dates from Robertson Farms and 2 from Ashe Ferry, as well as well known Mississippian sites—Simpson's Field, Green's Shell Enclosure, Charles Towne Landing, and Adamson Mound. These dates are numbered 11-20 in Table 2. The bulk of these dates would conform with Anderson's prediction in 1989:

> One thing that is emerging from recent work, is that characteristically Mississippian complicated stamped ceramics do not appear until at least A.D. 1100, and probably not until as late as A.D. 1200, over much of the South Carolina area. Whether this means that the Mississippian adaptation itself, specifically the adoption of intensive agriculture within the context of a hierarchical ranked society, occurred earlier remains unknown (Anderson 1989:115).

Cluster 2 includes three maize dates each from Robertson Farms and Ashe Ferry, as well as the inclusion of the earliest maize from a Mississippian period mound in South Carolina at the Belmont Neck site (38KE06) on the Wateree River 80 km below the Ashe Ferry site and just below the town of Camden. These dates are numbered 13-17 in Table 2. These dates would be contemporaneous with the Beaverdam Creek Mound in Georgia mentioned above, while the Leake site in North Carolina mentioned above would fall on the divide between Cluster 3 and Cluster 4.

These include Lamar, Pee Dee, and Irene components, four sites with monumental architecture—three Wateree Valley Mound sites—Belmont Neck, Adamson and Mulberry, and the Irene shell feature at Green's Shell Enclosure on Hilton Head Island, plus the moundless ceremonial center at Charles Towne Landing (Cable et al. 1999; Judge 2000; South 1971, 2001).

On the Savannah River in Anderson County, South Carolina, at a site called Simpson's Fields, a Mississippian burial in the floor of a house dated 630 BP +/- 40 years or A.D. 1310 (Wood 1986:117). Maize was also discovered in that burial pit at Simpson's Field, along with maypops, persimmon, strawberry, grape, chenopod, acorn, and hickory. At the Mattassee Lakes site (38BK226) in Berkeley County, Anderson et al. (1982:346) report that Feature 21 contained "eight measurable cob fragments and numerous cupules, all totaling 13.323 grams." While no corn was reported, the upper level of the Blair Mound in Fairfield County produced a date of A.D. 1325+/- 75 (UGA #405), and it would be contemporaneous with Cluster 4 (South 2002:227). The Town Creek mound site in North Carolina would also fit here with three dates

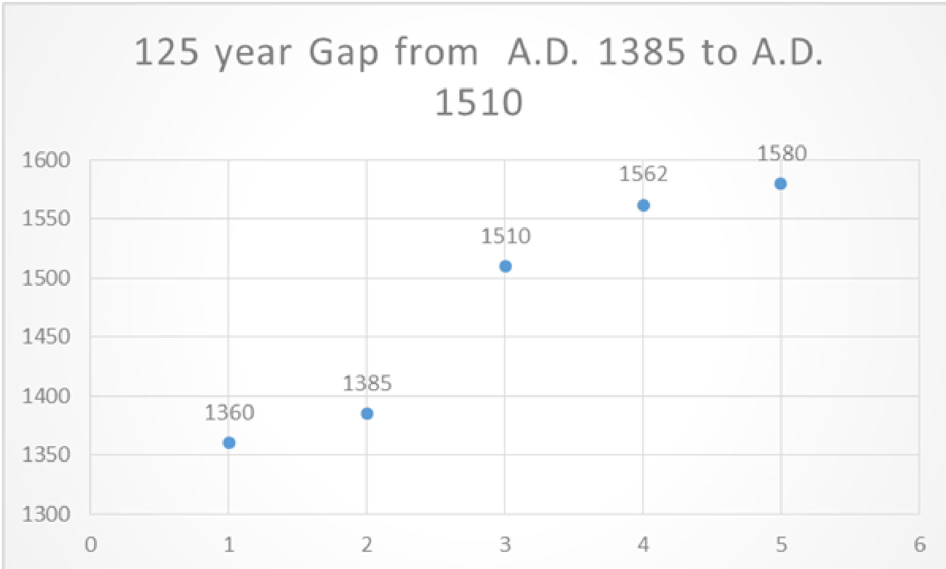


Figure 6. Gap of 125 years in Maize Dates in South Carolina.

(FSU 184-186) falling between A.D. 1161-1440 with a median for the four of A.D. 1301 (South 2002:226), and four dates from the mound first reported by Reid (1967) have subsequently been calibrated (CALIB 3.0.3C Struiver and Reimer 1993) to A.D. 1283, 1300, 1328, and 1397 (FSU #174, 176, 145, and 175) (Trinkley in Coe 1995:302; Oliver 1992).

In 1947, Brown and Anderson described 8 and 10 row corn from the McDowell Mound (aka Mulberry Mound -38KE12) (Trinkley in Coe 1995:131). Presumably, these materials were from Henry Reynold's excavation in 1891. Charred maize fragments dated to A.D. 1320-1700 (Table 2 date 21) were recovered by Leland Ferguson at the base of Mound A at the Mulberry site (38KE12) on the Wateree River near Camden (Ferguson 1973:18) "on top of about one foot of pre-mound midden. A small pit filled with corn cobs was found eroding from this midden. The pit was excavated and samples recovered for use in radiocarbon dating."

Kimberly Grimes reported that "159 whole and partial corn kernels, 636 corn cupules, and several small cob fragments" were recovered from the Mica House excavations at the Mulberry site in 1985 (Grimes 1986:38). A good percentage of the cobs were from a smudge pit located 60 cm west of the central hearth in the structure (Grimes 1986:27). Kernels averaged 5.06 mm in length and 6.67 mm in width. Estimated length of cupules was 3.0 mm and average width was 6.458 mm. Cob fragments exhibit 8 rows with string row pairing and appear to be Eastern Complex, similar to Beaverdam Creek Mound discussed above (Grimes 1986:38). A date for this structure was obtained in 1998—Cal A.D. 1650-1955 (Beta-131286) at 1 sigma Cal A.D. 1665 to 1700.

Up until the time of the Green's Shell Enclosure date at A.D 1325, (date # 32), there are no maize dates to be found east of the Wateree River, leaving eastern South Carolina devoid of dated maize up to this point.

That situation changes after about A.D. 1450. On the north coast of South Carolina, Dawn Reid reports a corn-filled pit in Horry County within the Little River drainage at the Tidewater site (38HR254) producing a date of A.D. 1450-1675 (Table 2, date #22), and Jim Michie recovered maize dating to A.D. 1520-1640 (Table 2, date # 23) at Arcadia Plantation on the Waccamaw River in Georgetown County (Michie and Crites 1991; Dawn Reid, 2013, pers. comm.). These are the first two maize dates in Eastern South Carolina. If we take the median dates for Mulberry, Tidewater, and Arcadia Plantation sites (Table 2, date #s 21, 22, and 23), we

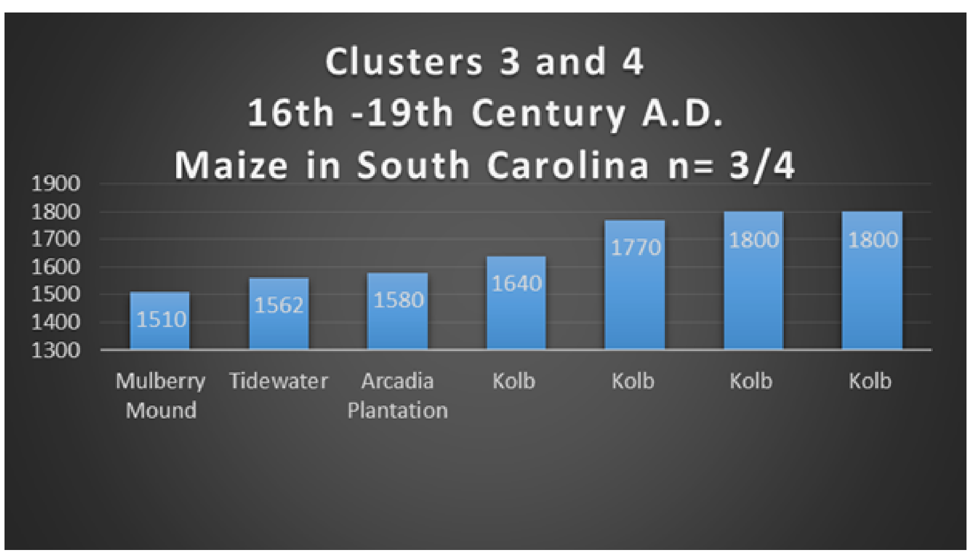


Figure 7. Clusters 3 and Maize Dates in South Carolina.

have the reasonably close dates of A.D. 1510, A.D. 1562, and A.D. 1580 respectively, and they span the era of European explorers such as Ayllon, DeSoto, and Pardo. A pre DeSoto date of A.D. 1510 for the <u>base</u> of the Mulberry Mound would seemingly be rather late in time. This uncalibrated date should be calibrated and additional dates should be obtained for this important site. Future Federal Electric Regulation Commission (FERC) sponsored excavations at Mound A at Mulberry, designed to mitigate the impact of 50 years of dam operation by Duke Energy, may result in the recovery of better datable maize or other organic samples.

At the Colonial Spanish town of Santa Elena, founded by Menendez in A.D. 1566 in Beaufort County, South Carolina, a cob of indigenous Eastern Complex corn was recovered from Feature 63 deposited sometime between A.D. 1577 and 1587 (Scarry in South and DePratter 1993:201-204). (Table 3, date #s 10 and 11). Both Mexican and local varieties of corn were reported at Santa Elena from the 1979 excavations in a 1566-1576 context (South 1980:ii).

Later at 38BK1633, a contact period site (A.D. 1590-1670) on Daniels Island in Berkeley County just north of Charleston (Table 3, date #14), the majority of the paleoethnobotanical assemblage is described as "native in constitution," dominated by maize with over 1500 individual elements, and clearly pointing to maize as a staple crop (Lansdell, Marcoux, and Poplin 2008:95). At the Kolb site in Darlington County, South Carolina, a corn cupule was recovered from a late 16^{th}-/early 17^{th} -century feature (date # 37). Soot from a pottery vessel in the same feature returned a C-14 date of A.D. 1580 +/- 30 years (UGA 11037). An AMS date on the cupule for the Kolb burial (date # 40) as detailed in Table 1, produced a date of 310 B.P. +/- 20 years or A.D. 1640, which is roughly contemporaneous with the median date of A.D. 1630 at the previously mentioned site on Daniel Island. The burial at the Kolb site contained glass beads with potential sources including Ayllon, Santa Elena, Jamestown, or closer to the median date of the two Kolb C-14 dates—1610—could date to the time of Ecija. On July 8, 1609, Spanish sailor Ecija sailed into the Rio Jordon, known today as the Santee River, and met an Indian named Alonso. Ecija was reconnoitering the coast in search of a rumored English settlement. Returning south he again sailed into Santee River and went to an Indian Town where he met with Alonso's brother (Lowery 1959:449).

A similar burial of a subadult is reported from Lower Saratown. Excavations conducted by the University of North Carolina's Research Laboratories of Archaeology at Lower Saratown (31RLA-RK1; 31RK1) on the Dan River near the town of Eden, North Carolina, produced evidence of European trade goods, including brass, iron, and glass beads in association with Native American artifacts made of stone, clay, shell, and bone. Based the low numbers of European goods, Ward and Davis (1993) propose that the site was occupied in the mid-17^{th} century (circa 1620-1650) by people who had indirect contact with Europeans (Ward and Davis 1993:206-207). Maize was also recovered in the fill of this burial, prompting an interpretation that charred corn cobs "reflect soil from areas of food preparation or possible ritual activity conducted as part of the mortuary ceremony" (Ward and Davis 1993:177).

A Yamasee Indian settlement at Chechesy Town (38BU1605) in Beaufort County occupied between A.D. 1687 and 1715 produced maize (Table 3 # 15), including four whole cobs in a smudge pit (Feature 677) (Southerlin et al. 2001:161). Here, domesticated plants only made up about 15% of the overall plant contributions to subsistence suggesting a greater reliance on indigenous plants and animals (Southerlin et al. 2001:163-164).

No attempt has been made to smooth these data using Bayesian statistics. I have entered the data in the tables as reported by archaeologists with one exception. In cases where dates were reported with a +/- range, I calculated and entered the median between the two dates in Table 2 and in

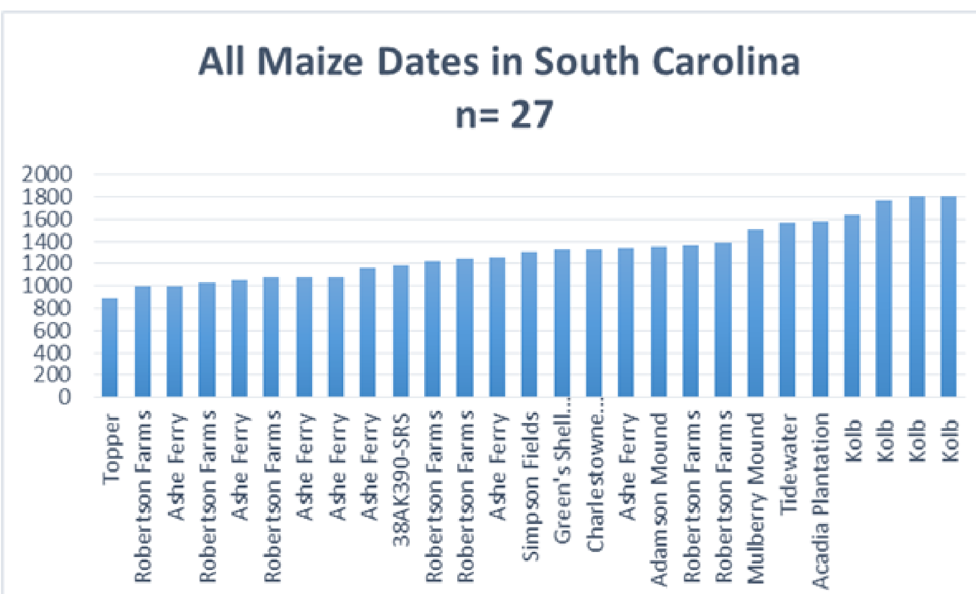


Figure 8. All Dated Maize in South Carolina with Kolb Dates.

Table 3. Undated maize from South Carolina Archaeological Sites (n=20).

#	Site	County	Site #	Date	Cal	Reference	Notes
1	Mattassee Lake	Berkeley	38BK226	A.D. 1000 Late Woodland/ Mississippian?		Anderson et al 1982:346	Relative, Fea. 21
2	Dunlap	Darlington	38DA66	Late Wood/Miss		Wagner 2015	No dates
3	Heyward Point	Beaufort	38BU1854	Late Woodland/ Mississippian		Hollenbach 2007,2010:10-11	
4		Beaufort	38BU2116	Late Woodland-Middle Mississippian		Hollenbach 2006, 2010:10-11.	
5	Cooper River Rediversion	Berkeley	38BK235	? Mississippian		Brooks and Canouts 1984	Non-Dent
6	Spratt's Bottom	York	38YK03	A.D. 1100		Wagner 1995:10; Civitello 2005	
7	Track	Beaufort	38BU927	A.D. 1100-1200		Gremillion in Mistovich and Clinton 1991:86,143	Savannah/ Irene Relative
8	Belmont Neck	Kershaw	38KE06	A.D. 1250-1300		Wagner n.d.:14	Relative
9	McCollum Mound	Chester	38CS2			Trinkley in Coe 1995:131; Ryan 1971	No dates
10	Santa Elena	Beaufort	38BU162A	A.D. 1566-1576		South 1980:ii & 14-19, Cutler 1980	Dent and Eastern 8 row Relative
11	Santa Elena	Beaufort	38BU162N	A.D. 1577-1587*		Scarry 1993	*relative
12	Yourhaney Plantation	Georgetown	38GE18	Mississippian		Adams et al 2006:93	Relative cupule
13	Charlestown Landing	Charleston	38CH1	A.D. 1500-1700		Wagner 1995:26	
14	Daniel Island	Berkeley	38BK1633	A.D 1590-1670*		Lansdell et all 2001	*relative
15	Chechesy	Beaufort	38BU1605	A.D. 1687- 1715*	Yes	Southerlin et al 2001	*relative
16	Mulberry	Kershaw	38KE12	A.D. 1665-1700		Grimes 1986;Cable et al 1999	1 sigma
17	Fort Moore	Aiken	38AK4	A.D. 1700s		Wagner 1995:26	
18	Wachesaw Landing	Georgetown	38GE7	A.D. 1700-1735		Trinkley et al 1983:57; Wagner 1995:26	Relative 10,12, 14 row
19	Fort Independence	Abbeville	38AB218	A.D. 1777-1779		Bastain 1982	Relative 12 & 14 Flint
20	Ayers Town	York	38YK534	Federal Period 1781-1800		Fitts in Davis et al 2015:233-234	

Figures in this article generated from the data in Table 2. Future researchers may want to better calibrate the accuracy of my data using Bayesian statistical smoothing to answer other questions about the past).

Conclusions

The most striking observation from the data is that while dates are known for each of the Savannah, ACE, and Santee basins, thus far there are no pre-contact archaeological assemblages containing dated maize in the Pee Dee drainage where the Kolb site is situated. There are the two dates from the north coast of South Carolina discussed above in proximity to the Pee Dee drainage. All of the pre-contact dates across South Carolina are well within the Mississippian period or later, and dates for Woodland Period corn are nonexistent in South Carolina, save perhaps Topper and the Lewis-West site. Little to no evidence of the Mississippian Period is present at the Kolb site but Middle and Late Woodland components are numerous, fueling my speculation that Kolb site maize is earlier than the Mississippian Period.

> The plant assemblage from the Kolb site does suggest relatively little, if any, investment in horticultural activities by its Middle/Late Woodland occupants, perhaps until the arrival of corn in the region (Hollenbach 2010:12).

If the maize from the Kolb site was from the Mississippian period, then we would have

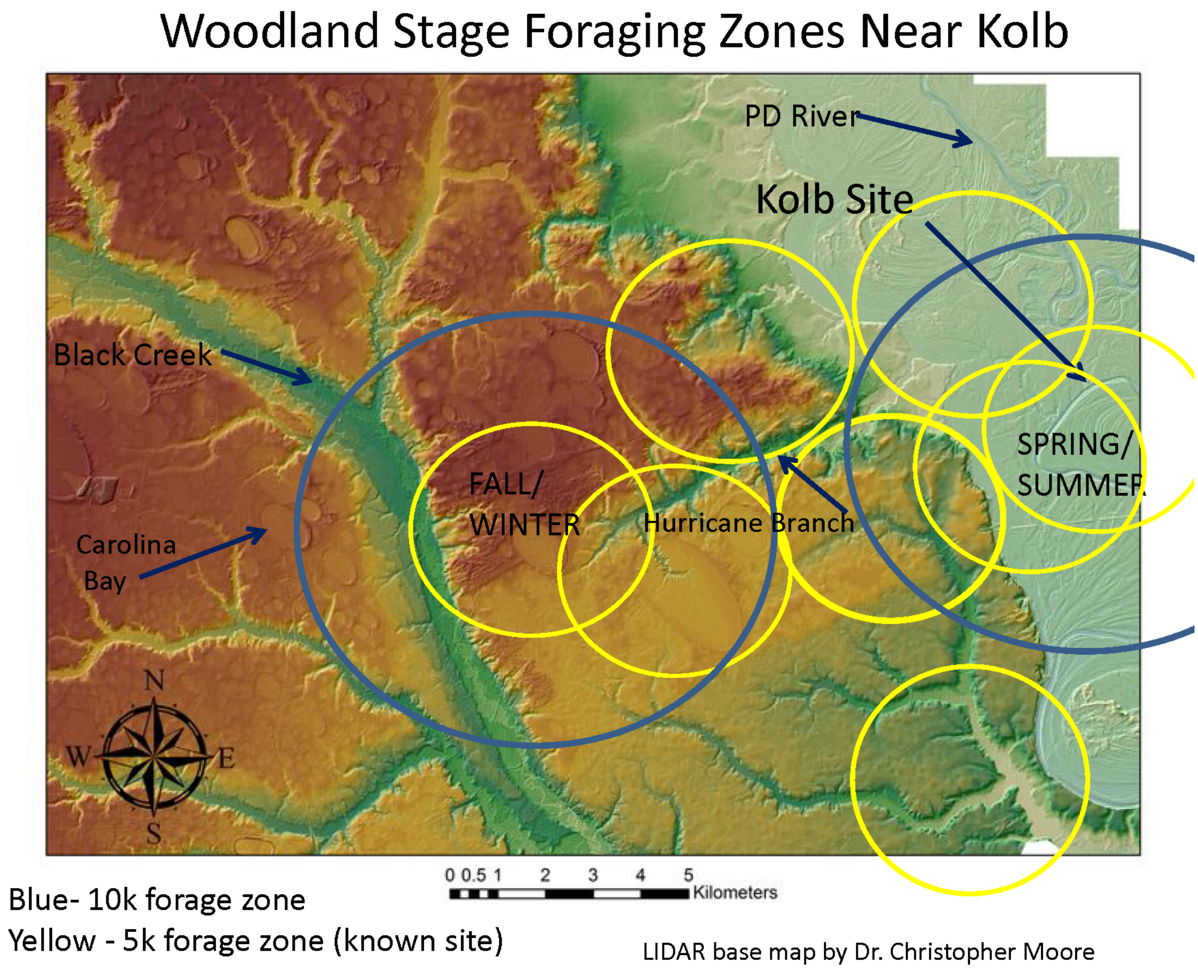


Figure 9. Woodland Stage Foraging Zones near the Kolb Site.

documented use of this site via floral remains in the absence of artifacts from that time period in definitive contexts. This study is of great importance to our knowledge of the prehistoric subsistence practices of South Carolina Native Americans.

Accepting the null hypothesis however requires a brief explanation. My assertion is that Woodland occupants at the Kolb site continued long established hunter-gatherer subsistence strategies involving foraging in 5 km ranges from shifting residential base camps within the Great Pee Dee River drainage and its tributary, Hurricane Branch. A Spring/Summer occupation at the Kolb site is predicted due to lack of substantial Woodland houses at Kolb, while a Fall/Winter base camp is predicted at the headwaters of Hurricane Branch on the rim of a large Carolina Bay in the uplands. Such strategies are indicated by the data exhibited in Figure 9. My hope was to document the earliest archaeologically recovered maize in South Carolina. While I did manage to accomplish that task, needless to say, the Kolb site is not the location of the earliest corn in South Carolina. A positive by-product of this research is that there is now a database of known maize dates in South Carolina to aid future research into maize farming and use among Native American people in what eventually became known as South Carolina.

Acknowledgements

Numerous colleagues have assisted me by providing information on dates and/or site reports or by calling my attention to South Carolina archaeological sites that have produced evidence of maize, including Natalie A. Pope, David Anderson, Al Goodyear, Terry Ferguson, Bob Parler, Eric Poplin, Brett Riggs, Dawn Reid, the late Stanley A. South, Bobby Southerlin, Keith Stephenson, and Sarah Walters. I extend my thanks to the *Faculty Research and Productive Scholarship Committee* of the University of South Carolina Lancaster and the committee's chair, Professor Fran Gardner, along with USCL Dean Walt Collins for providing financial support for running the five AMS dates. Thanks to my Co-Prinicpal Investigators at the Kolb site—Carl

Steen and Sean G. Taylor. Christopher Moore kindly provided the LiDAR map of the Kolb site. Finally, Sherri Gregory of the USCL Office of Advancement managed the grant funds in her ever cheerful manner.

References Cited

Anderson, David G.
1989 The Mississippian in South Carolina. In *Studies in South Carolina Archaeology. I*n Studies in South Carolina Archaeology: Essays in Honor of Robert L. Stephensen. Edited by Albert C. Goodyear III. South Carolina Institute of Archaeology and Anthropology, University of South Carolina.

Anderson, David G. , Charles E. Cantley, and A. Lee Novick
1982 T*he Mattassee Lake Sites: Archeological Investigations along the Lower Santee River in the Coastal Plain of South Carolina.* Report prepared for the U.S. Department of Interior, National Park Service, Atlanta by Commonwealth Associates Inc., Jackson, Michigan.

Anderson, David G. and Joseph Schuldenrein, assemblers
1985 *Prehistoric Human Ecology Along the Upper Savannah River: Excavations at the Rucker's Bottom, Abbeville and Bullard Site Groups.* National Park Service, Interagency Archaeological Services–Atlanta, Russell Papers.

Anderson, David G. and Kenneth E. Sassaman
2012 *Recent Developments in Southeastern Archaeology: From Colonization Complexity.* Society for American Archaeology, SAA Press. Washington D.C.

Bastain, Beverly E.
1982 *Fort Independence: An Eighteenth-Century Frontier Homesite and Militia Post in South Carolina. Russell Papers.* Report Submitted to the U.S. Army Corps of Engineers, Savannah District by Building Conservation Technology Inc. Nashville, TN.

Brooks, Mark J. and Veletta Canouts
1984 Modeling Subsistence Change in the Late Prehistoric Period in the Interior Lower Coastal Plain of South Carolina. *Anthropological Studies 6 Occasional Papers of the South Carolina Institute of Archaeology and Anthropology*, Columbia.

Brown, William L. and Edgar Anderson
1947 The Northern Flint Corns. *Annals of the Missouri Botanical Garden* 34:1-20.

Cable, John, Gail E. Wagner and Christopher Judge
1999 *Wateree Archaeological Research Project 1998 Survey and Testing at Belmont Neck (38KE06), Adamson (38KE11), and Mulberry (38KE12) Sites: Mississippian Occupation in the Wateree River Valley*, South Carolina Department of Archives and History, Columbia.

Chapman, Jefferson and Gary D. Crites
1987 Evidence of Early Maize (Zea mays) from the Icehouse Bottom Site, Tennessee. *American Antiquity* 52:353-354.

Civitello, Jamie A.
2005 Anthropogenic Landscapes at Spratt's Bottom (38YK3), South Carolina. Master's thesis, Department of Anthropology, University of South Carolina, Columbia.

Coe, Joffre L.
1972 Field Report of Highway Salvage Archaeology at Site YD1, Yadkin County, North Carolina. Manuscript on file at the Research Laboratories of Archaeology, University of North Carolina, Chapel Hill.

1995 *Town Creek Indian Mound: A Native American Legacy.* University of North Carolina Press, Chapel Hill.

Cutler, Hugh C.
1980 Corn from 38BU162A: A South Carolina Site from about A.D. 1566-1587. In The Discovery of Santa Elena. Edited by Stanley A. South. *Research Manuscript Series* 165, South Carolina Institute of Archaeology and Anthropology, University of South Carolina, Columbia.

Davis, R. P. Stephen, Jr., Brett H. Riggs, and David J. Cranford
2015 *Archaeology at Ayers Town: An Early Federal Period Community in the Catawba Nation. Research Report 37, Research Laboratories of Archaeology, University of North Carolina, Chapel Hill.* Report prepared for Mulkey Engineers and Consultants and the South Carolina Department of Transportation.

Fearn, M. L. and Liu, K. B.
1995 Maize pollen of 3500 B.P. from southern Alabama. *American Antiquity* 60(1):109-117.

1997 Identification of maize pollen: a reply to Eubanks. *American Antiquity* 62(1):146-148.

Ferguson, Leland
1973 Mulberry Mound Exploratory Archaeology. *Research Manuscript Series* 54, South Carolina Institute of Archaeology and Anthropology, University of South Carolina, Columbia.

1974 Archaeological Investigations at the Mulberry Site. *The Notebook* 6(3-4). South Carolina Institute of Archaeology and Anthropology, University of South Carolina, Columbia.

Fitts, Mary Elizabeth
2015 Archaeobotanical Analysis. In Archaeology at Ayers Town: An Early Federal Period Community in the Catawba Nation. By R. P. Stephen Davis, Jr., Brett H. Riggs and David Cranford. Research Report 37, Research Laboratories of Archaeology, University of North Carolina, Chapel Hill Report prepared for Mulkey Engineers and Consultants and the South Carolina Department of Transportation.

Galinat, Walton C.
1970 Maize from the Blain Site. In Blain Village and the Fort Ancient Tradition in Ohio, edited by O.H. Prifer and O. Shane III. Pp 219-226. Kent State University, Kent, Ohio.

Gates St-Pierre, Christian and Claude Chapdelaine
2013 After Hopewell in Southern Quebec. *Archaeology of Eastern North America*, 41.

Gremillion, Kristen
1991 *Plant Remains from the Track Site (38BU927), Beaufort County, South Carolina. In Archaeological Data Recovery at the Track Site, 38BU927, Marine Corps Air Station, Beaufort, South Carolina.* Report prepared for the U.S. Army Corps of Engineers, Savannah District by The University of Alabama, Alabama Museum of Natural History, Division of Archaeology, Report of Investigations 60.

Grimes, Kimberly
1986 Dietary Choices at the Mulberry Mound Site. Master's thesis, Department of Anthropology, University of South Carolina, Columbia.

Hann, John H.
1986 Translation of the Ecija Voyages of 1605 and 1609 and the Gonzalez Derrotero of 1609. *Florida Archaeology* 2:1-80.

Hariot, Thomas
1585 A briefe and true report of the new found land of Virginia. Made available by the University of North Carolina Chapel Hill electronically at http://docsouth.unc.edu/nc/hariot/hariot.html (page 13). Accessed May 30, 2015.

Harris, Suzanne E. and Elizabeth Sheldon
1982 *Ethnobotanical Analyses. In The Mattassee Lake Sites: Archeological Investigations along the Lower Santee River in the Coastal Plain of South Carolina.* Report prepared for the U.S. Department of Interior, National Park Service, Atlanta by Commonwealth Associates Inc., Jackson, Michigan.

Hart, John P. William Lovis, Robert J. Jeske, and John D. Richards
2012 The Potential for Bulk 13C on Encrusted Cooking Residues as Independent Evidence for Regional Maize Histories. *American Antiquity* 77(2):315-325.

Hollenbach, Kandace D.
2006 Plant Remains from 38BU2116, Beaufort County, South Carolina. Report submitted to Brockington and Associates, Inc., Jacksonville, Florida. Archaeological Research Laboratory, University of Tennessee, Knoxville.

2007 *Plant Remains from Heyward Pointe (38BU1854), Beaufort County, South Carolina. Report submitted to Brockington and Associates, Inc., Mt. Pleasant, South Carolina.* Archaeological Research Laboratory, University of Tennessee, Knoxville.

2010 *Plant Remains from Three Prehistoric Sites in the South Carolina Coastal Plain.* Report Prepared For: Christopher Judge University of South Carolina Lancaster P.O. Box 889 Lancaster, South Carolina 29721. Submitted By: Kandace D. Hollenbach, Ph.D. Archaeological Research Laboratory Department of Anthropology University of Tennessee, Knoxville.

Hvidt, Kristian (editor)
1980 VON RECK'S VOYAGE. Drawings and Journal of Philip Georg Friedrich von Reck. With the Assistance of Joseph Ewan, George F. Jones and William C. Sturtevant. The Beehive Press, Savannah.

Judge, Christopher
1991 Some Preliminary Thoughts on Barbacoas and the Importance of Food and Tribute Storage in Late Mississippian Times. *South Carolina Antiquities* 23:19-31.
2000 An Overview of the Irene Period in South Carolina. Paper presented at the 57th Annual Meeting of the Southeastern Archaeological Conference, Macon, Georgia.

2015 Searching for the Earliest Corn Crop in South Carolina: Radiocarbon Dating of Charred Maize Kernel and Cupule Fragments from the Johannes Kolb Site (38DA75) in Darlington County, South Carolina. Paper presented at the Annual Conference on South Carolina Archaeology, Columbia, South Carolina.

2016 This is Not Father Earth… And They are not Called the Three Brothers: Women, War Woman, WARP and WAC. Paper presented at the Southeastern Archaeological Conference, Athens, Georgia.

Kalm, Peter
1974 Description of maize (translated and edited by Margit Oxholm and Sherret S. Chase). *Economic Botany* 28:105-117.

Lansdell, Brent, Jon Marcoux, and Eric Poplin

2008 Draft report: Data Recovery at 38BK1633: A Contact-Era Household on Daniel Island. Report prepared by Brockington and Associates for the Daniel Island Company, Daniel Island, South Carolina.

Lawson, John
1709 *A New Voyage to Carolina.* London.

Liston, Henrietta
1797 Tour to the Southern States: Virginia, North and South Carolinas. Unpublished manuscript on microfilm, North Carolina Collection, University of North Carolina, Chapel Hill.

Lowery, Woodbury
1959 T*he Spanish settlements within the present limits of the United States. Florida, 1562-1574.* Russell and Russell.

McManus, Jane
1985 An Analysis of Lithic Artifact Assemblages from the Forbush Creek Site (31YD1), Yadkin County, North Carolina. *Southern Indian Studies.* Volume 34.

Mathis, Mark
1999 Mortuary Processes at the Broad Reach Site. http://homepages.rootsweb.ancestry.com/~jmack/algonqin/mathis.htm Accessed May 30, 2015.

May, J. Alan
1989 Archaeological Excavations at the Crowders Creek Site (31GS55): A Late Woodland Farmstead in the Catawba River Valley, Gaston County, North Carolina. *North Carolina Archaeology* 38:23-48.

Merrell, James Hart
1989 *The Indians' New World: Catawbas and Their Neighbors from European Contact Through the Era of Removal.* Chapel Hill, University of North Carolina Press.

Michie, James L. and Gary D. Crites
1991 Charred Corn Fragments from the Waccamaw River Area of Georgetown County, South Carolina. *South Carolina Antiquities* 23:48-50.

Mikel, Gregory
1987 The Donnaha Site: Late Woodland Period Subsistence and Ecology. Master's thesis. Department of Anthropology, Wake Forest University, Winston Salem.

Mistovich, Tim S. and Catherine E. Clinton.
1991 *Archaeological Data Recovery at the Track Site, 38BU927, Marine Corps Air Station, Beaufort, South Carolina.* University of Alabama, Office of Archaeological Research.

Mountjoy, Joseph B.
1989 Early Radiocarbon Dates from a Site on the Pee Dee-Siouan Frontier in the Piedmont of Central North Carolina. *Southern Indians Studies* 38:7-22.

Oliver, Billy L.
1992 Settlements of the Pee Dee Culture. Unpublished Ph.D. dissertation, Department of Anthropology, University of North Carolina, Chapel Hill.

Pluckhahn, Thomas J.
2003 *Kolomoki: Settlement, Ceremony and Status in the Deep South, A.D. 350-750.* University of Alabama Press, Tuscaloosa.

Reck, Philipp Georg Friedrich von
1980 Von Reck's voyage : Drawings and Journal of Philip Georg Friedrich von Reck / edited by Kristian Hvidt, with the assistance of Joseph Ewan, George F. Jones, and William C. Sturtevant. Savannah, Beehive Press.

Reid, J. Jefferson
1967 Pee Dee Pottery from the Mound at Town Creek. Master's thesis, University of North Carolina Chapel Hill.

Riggs, Brett, R. P. Stephen Davis Jr. and Mazry Elizabeth Fitts
2015 Archaeology at Ashe Ferry: Late Woodland and Middle Mississippian Period Occupations in the Lower Catawba River Valley, York County, South Carolina. *Research Report 36*, Research Laboratories of Archaeology, University of North Carolina, Chapel Hill Report prepared for Mulkey Engineers and Consultants and the South Carolina Department of Transportation.

Riley, Thomas J., Gregory W. Walz, Charles J. Bareis, Andrew C Fortier, and Kathryn Parker
1994 Accelerator Mass Spectrometry (AMS) Dates Confirm Early *Zea mays* in the Mississippi River Valley. *American Antiquity* 59(3):490-498.

Rudolph, James L. and David J. Hally
1985 *Archaeological Investigations at the Beaverdam Creek Site (9EB85) Elbert County, Georgia.* Russell Papers. Atlanta: National Park Service, Interagency Archaeological Services.

Ryan, Thomas
1971 Test Excavations at the McCollum Mound Site. *The Notebook* 3(5):104-110. South Carolina Institute of Archaeology and Anthropology, University of South Carolina, Columbia.

Scarry, John F. and C. Margaret Scarry
1997 Subsistence Remains from Prehistoric North

Carolina Archaeological Sites. Research Laboratories of Archaeology University of North Carolina at Chapel Hill. (http://www.archaeology.ncdcr.gov/subsist/subsis.htm#Archaeobotanical) accessed Nov. 18, 2013.

Scarry, Margaret C.
1996 Analysis of Plant Remains from Santa Elena Excavation (38BU162N). In Discovery at Santa Elena: Block Excavation 1993. Stanley A. South and Chester DePratter B. DePratter. South Carolina Institute of Archaeology and Anthropology, *Research Manuscript Series* 222. University of South Carolina, Columbia.

Smith, Bruce D., and C. Wesley Cowan
2003 Domesticated Crop Plants and the Evolution of Food Production Economies in Eastern North America. In *People and Plants in Ancient Eastern North America*, Editor, Paul E. Minnis, pp. 105-125. Smithsonian Books, Washington, D.C.

South, Stanley A.
1971 Archeology at the Charles Towne Site (38CH1) on Albemarle Point in South Carolina, Part I, The Text. *Research Manuscript Series* 204, South Carolina Institute of Archaeology and Anthropology, University of South Carolina, Columbia.

2002 *Archaeological Pathways to Historic Site Development.* New York: Kluwer Academic/Plenum.

South, Stanley, and Dr. DePratter B. DePratter
1993 Discovery at Santa Elena: Block Excavation 1993. *Research Manuscript Series* 222. South Carolina Institute of Archaeology and Anthropology, University of South Carolina, Columbia.

Southerlin, Bobby, Dawn Reid, Connie Huddleston, Alana Lynch and Dea Mozingo
2001 *Return of the Yamasee: Archaeological Data Recovery at Chechesy Old Fields, Beaufort County, South Carolina.* Report prepared by Brockington and Associates for Chechessee Land and Timber Company, Okatie, South Carolina.

Speck, Frank
1934 *Catawba Texts.* Columbia University Press, New York.

Tippett V. Ann, and William H. Marquardt
1984 The Gregg Shoals and Clyde Gulley Sites: Archaeological and Geological Investigations at Two Piedmont Sites on the Savannah River. *Russell Papers.* Report Submitted to the U.S. Army Corps of Engineers, Savannah District by South Carolina Institute of Archaeology and Anthropology, University of South Carolina, Columbia.

Trinkley, Michael
1995 Plant Resources. In *Town Creek Indian Mound: A Native American Legacy* by Joffre L. Coe. University of North Carolina Press, Chapel Hill.

Trinkley, Michael, S. Homes Hogue, Martha Zierden and Jack H. Wilson, Jr.
1983 Test Excavations at the Wachesaw Landing Site, Georgetown County, South Carolina. North Carolina Archaeological Council Publication No. 20.

Wagner, Gail
n.d. The Sequence of Mississippian Plant Use in the Middle Wateree Valley. Manuscript in possession of the author.

1995 The Prehistoric Sequence of Plant Utilization in South Carolina. Paper presented at the 52nd Southeastern Archaeological Conference, Knoxville, TN.

Wagner, Gail E., and Jamie Civitello
2000 Ancient Gardening in South Carolina, 10,000 B.C. – A.D. 1700. Electronic document, http://www.cas.sc.edu/anth/gardening/ancientgardening.html#c, accessed January 10, 2008.

Wagner, Gail E. and Keith Stephenson
2014 Middle to Late Woodland Subsistence at the G.S. Lewis Site (38AK228) South Carolina. Paper presented at the Southeastern Archaeological Conference, Greenville, South Carolina.

Walters, Sarah, E. Sean Cary von Gunter, and Albert C. Goodyear III
2013 The Secret Life of Carbonized Plant Remains: A Guide to Dating in the Age of Clovis. Poster presented at the Paleoindian Odyssey Conference, Santa Fe, New Mexico.

Ward, H. Trawick, and R. P. Stephen Davis, Jr.
1993 Indian Communities on the North Carolina Piedmont, A.D. 1000 to 1700. Monograph No. 2, Research Laboratories of Anthropology, University of North Carolina, Chapel Hill. (with contributions by Jane M. Eastman, Kristen J. Gremillion, and Mary Ann Holm)

Wenke, Robert J.
1999 *Patterns in Prehistory: Humankind's First Three Million Years.* Oxford University Press, pp.622-643.

Whitley, Thomas G.
2013 *Archaeological Data Recovery at Riverfront Village (38AK933): A Mississippian/Contact Period Occupation.* Report prepared for Davis and Floyd and the South Carolina Department of Transportation by Brockington and Associates, Atlanta,Georgia.

Wood, W. Dean, editor
1986 *Prehistory in the Richard B. Russell Reservoir: The Archaic and Woodland Periods in the Upper Savannah River.* Final Report of Data Recovery at the Anderson and Elbert County Groups. Russell Papers. Atlanta: National Park Service, Interagency Archaeological Services.

Wood, W. Dean and William R. Bowen
1995 Woodland Period Archaeology in Northern Georgia. Georgia Archaeological Research Design, Paper 9 Department of Anthropology, University of Georgia, Athens.

Hernando de Soto and Juan Pardo in Interior South Carolina: A Response to Val Green

Chester B. DePratter

Val Green published proposed routes for portions of the explorations by 16th-century Spanish explorers Hernando de Soto (1539-1543) and Juan Pardo (1566-1568) in the last issue of this journal. He based his routes on "current generally available information, along with additional historical sources" (Green 2015:51). In this response to Green's proposed route reconstructions for Soto and Pardo, I will consider two major issues. First, did Green use all available information to reconstruct these routes, and second, do Green's proposed routes fit with portions of these routes that precede or follow the segments he chose to describe.

Although some might disagree (see papers in Galloway1997, for example), I believe that any effort to track the routes of 16th-century Spanish explorers in the interior is a worthwhile pursuit. The main expeditions under consideration here are those of Hernando de Soto (in the Carolinas in 1540) and Juan Pardo (in the Carolinas and Tennessee in 1566 to 1568). There are four contemporary Spanish accounts for the Soto expedition (Clayton et al. 1993; Robertson 1993; and Worth 1993a and 1993b), and five that relate to the Pardo expedition (Hoffman 1990 a-d; Worth 2016). While there are flaws in these extant accounts, and the information they contain is at times incomplete or contradictory, the effort still needs to be made to identify the routes by utilizing all available sources.

There have been a great many efforts to track the routes of Soto and Pardo in the interior southeast. In the 1939 final report of the United States De Soto Expedition Commission, John Swanton produced a map showing 11 major efforts to track Soto published between 1718 and 1907 (Swanton 1939, Map 2). This map has become known as the "spaghetti map" with its divergent strands meandering across the landscape. There have been additional efforts since 1939 to trace the Soto route, in whole or in part, across the Southeast (see compilation in Brain and Ewen 1993). There have been fewer efforts to identify the routes of Juan Pardo's two expeditions into the interior, because the best contemporary narrative describing those journeys did not become readily available until Paul Hoffman (1990a) published a complete translation in Charles Hudson's (1990) book on Pardo's explorations. That is not to say that those of us with access to this and other Pardo related documents did not work earlier to figure out Pardo's routes into the interior (DePratter and Smith 1980; DePratter, Hudson, and Smith 1983). Charles Hudson and those of us who worked with him were able to refine previous Soto and Pardo route tracings using newly available documents and archaeological data (Hudson 1990, 1997a, 1997b). Using our reconstructed routes, David Moore and Robin Beck were ultimately able to identify the Berry site as the place where Juan Pardo built Fort San Juan in the Indian town of Joara in 1566 (Beck et al. 2016; Moore 2002), and which had been visited by Soto, who called this town Xuala, 26 years earlier. This location was far north of where most tracings of Pardo's route had put it (though see Baker 1974).

As indicated above, there are several sources for both Soto and Pardo expeditions that could be used to reconstruct their respective routes. Green (2015:52) chose to use only a single Soto source, the account of Rodrigo Ranjel, and two Pardo sources, the "long" Bandera account and Domingo de León's account written 26 years after he was last in the interior with Pardo. Further, Green did not even use the best and most recent translation of the Bandera account (see Hoffman 1990a), instead choosing to use an older, anonymous translation in the North Carolina State Archives. This selective use of sources resulted in Green's being able to accurately reconstruct the routes in question.

Tracing of exploration routes is more than just an exercise of drawing a line on a map to show where some group of Spaniards wandered through the interior Southeast more than 450 years ago. These Spaniards traveled through and recorded details about a region that was about to undergo great change brought about, in part, by the expeditions that we now work to track. Soto saw great chiefdoms ruled by powerful chiefs in most of the river systems he crossed on his four-year-long trek (DePratter 1983; Hudson and Tesser 1994). These chiefdoms soon went into decline, at least in part due to disease and depopulation associated with the introduction of new, virulent pathogens by the Spanish expeditionaries. That decline was underway by the time Pardo entered the interior 26 years after Soto, and it continued into the 18th century and beyond. During the century following the passage of Soto, mound construction ceased, population declined, and great migrations and societal coalescences occurred across the region (see papers in Ethridge and Hudson 2002; Ethridge 2010; Smith 1987). By the time John Lawson passed through the interiors of South Carolina and North

Carolina in 1701, he was observing a much changed world from what Soto and Pardo saw (Lefler 1984).

Tracing 16th-century exploration routes will ultimately provide us with a map of where identifiable Indian societies were located in the interior prior to the dramatic transformations that followed the arrival of Europeans in the region. This map can then be used in conjunction with our knowledge of archaeological site distributions to study and better understand depopulation, migrations, societal coalescences, and changes in material culture in the decades and centuries following the passage of Soto and those who followed and colonized Spanish La Florida (Hudson 1997a).

I applaud Val Green for his efforts, and I appreciate his acknowledgment that I assisted him along the way by providing documents and insights that were useful to him. Val has spent decades tracing the route John Lawson followed through interior South Carolina and North Carolina in 1701, and I feel certain that his reconstruction of Lawson's route is the most accurate of all that have been attempted. While it may be that both Soto and Pardo followed portions of the same trails followed by Lawson, those overlaps would have taken place on the route segments along the Wateree and Catawba rivers, and not in those places south from there across the Coastal Plain of South Carolina where Lawson did not travel.

Green proposes a reconstruction of the Soto and Pardo routes that stretches from Santa Elena, the 16th-century capital of Spanish La Florida, located on present-day Parris Island, all the way to Xuala (Soto) or Joara (Pardo) near Morganton, North Carolina (Figure 1). I will not comment on every point along Green's reconstruction, but I will focus instead on the first two places that he identifies with the Soto and Pardo routes: Hymahi or Guiomae (Guiomas in Green) and Canos, also called Cofitachequi. If these two places are incorrectly positioned, then the rest of the route Green proposes from there onward cannot be correct.

Hudson and colleagues placed the town of Guiomae at the junction of the present-day Wateree and Congaree Rivers based on evidence found in both the Soto and Pardo accounts (Hudson 1990, 1997; Hudson et al. 1984; Hudson et al. 1990 (Figure 1). Soto arrived at Hymahi after a long, difficult passage across a broad, uninhabited landscape that stretched from just east of the Oconee River in Georgia to the Broad River in South Carolina. First-hand accounts describing this part of Soto's trek focus on the hardships suffered, but Ranjel (Worth 1993a:274) describes crossings of three major rivers in this difficult passage that lasted 13 days according to Biedma (Robertson 1993:229). The first of these rivers was clearly the Savannah, which was crossed at the Fall Line shoals in the vicinity of present-day Augusta, Georgia (Worth 1993a:274). The second, was likely the Saluda, and the third was the Broad River just upstream from Columbia, South Carolina. Biedma (Worth 1993b:230) refers to this last river as "a large river," while Ranjel (Worth 1993a:274) describes it as an "extremely large river, and difficult to cross, which was divided in two branches, with bad entrances and worse exits." Elvas (Robertson 1993:80) says they "came to another river with a more powerful current and wider [than the two previous crossings of the Savannah and Saluda Rivers, in Hudson's 1997 tracing] which was crossed with great difficulty." These descriptions by Ranjel and Elvas fit very well with the Broad River crossing northwest of Columbia as identified by Hudson et al.

Val Green (2015:54-55, 59), in his tracing of this part of the route, agrees with Hudson's placement of the crossing of the Savannah River near Pace's Ferry at Augusta, Georgia, but he deviates from the track they proposed from there, instead turning to the southeast across the North Fork of the Edisto as the second river crossing. Continuing on, Green places the third river crossing at where he says that Soto and his men again crossed the North Fork of the Edisto and later that afternoon they crossed Caw Caw Swamp, stating that "Ranjel thought they had crossed two forks of the same river" (Green 2015:54). It seems evident to me that the North Fork of the Edisto River and Caw Caw Swamp some miles away are not even close to the "extremely large river…in two branches" described by Ranjel or the wide, powerful river described by Elvas.[1]

Once Soto had reached and crossed the Broad River, he stopped to find his bearings. Soto and a small group of his men continued on five or six leagues looking for a road to follow, but at the end of the day they returned to the banks of the Broad River without success (Robertson 1993:80). Ranjel (Worth 1993a:274) says that Soto dispatched mounted groups of soldiers to search for a path forward. One group went "upriver to the northwest," another group went "downriver to the southeast," while a third went to the north (Worth 1993a:274-275). Biedma (Worth 1993b:230) also describes two parties that were sent upriver to the northeast and another that went downriver to the southeast. The soldiers sent downriver found an Indian town, called Hymahi (Ranjel) or Aymay (Elvas), and Soto, on horseback, traveled there the next day. The rest of the army took an additional day to march there (Worth 1993a:275). Hudson (1997) and his colleagues place this town of Aymay or Hymahi at the junction of the Wateree and Congaree rivers on the west side of the Wateree (Figure 1).

Green places Hymahi or Aymay at the junction of the Edisto River and Four Holes Swamp near Givhans Ferry. In looking at Green's (2015, Figure 1) route map, one does not see how riders could have gone downstream along an "extremely large river" (Ranjel) to reach Hymahi following the third river crossing described in the accounts. No one who has ever seen the North fork of the Edisto would refer to it as "extremely large."

So now we have shown how Soto and his men reached

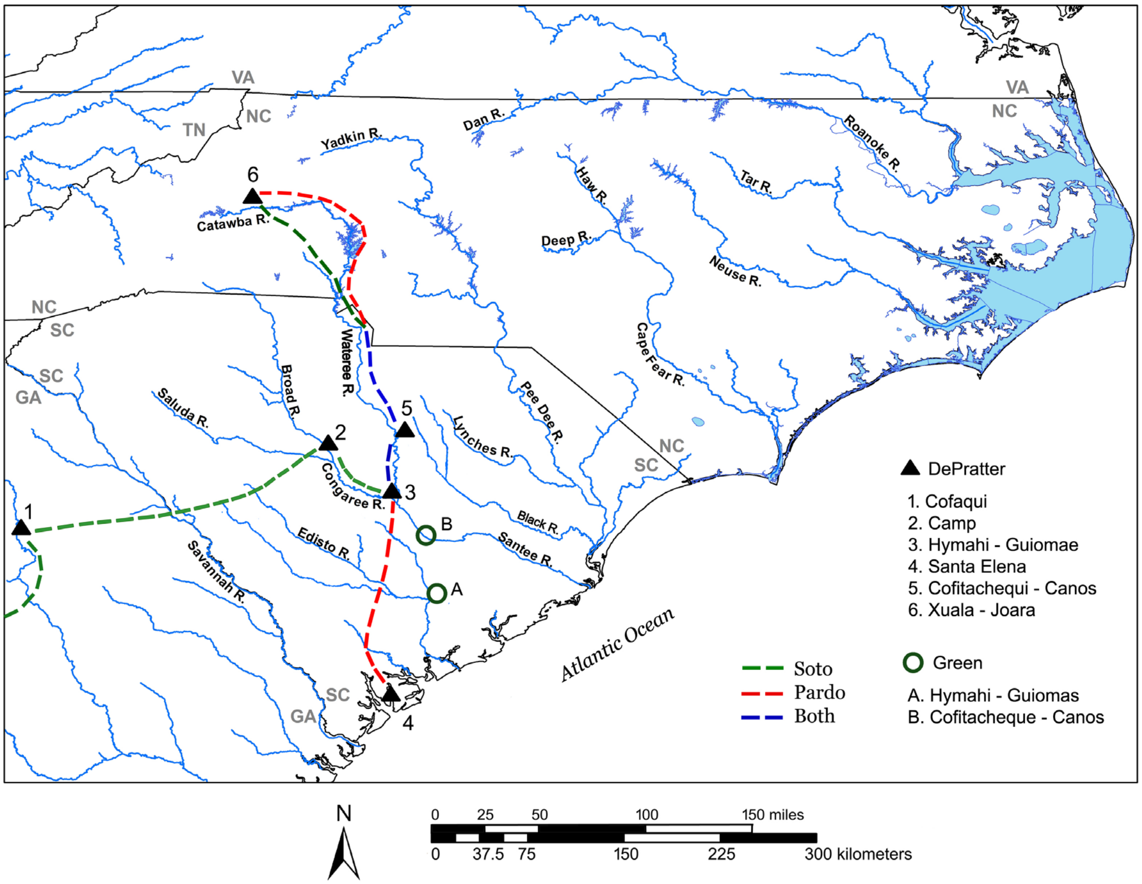


Figure 1. Map of Soto and Pardo routes showing differences between Green (2015) placements of Hymahi/Guiomae and Cofitachequi/Canos and placements by DePratter (this paper).

Hymahi or Aymay. This is the place where Juan Pardo and his men enter the picture, because they also visited Hymahi in the 1560s, though they called it Guiomae. Green (2015:59) acknowledges that Soto's Hymahi and Pardo's Guiomae (or Guiomas as he calls it) are the same place.

The Pardo accounts provide good descriptions for the location of Guiomae or Hymahi. Juan Pardo, himself, (Hoffman 1990c:311) says that it was 40 leagues across many swamps from Santa Elena. The shorter of two Pardo expedition accounts by Juan de la Bandera says that Guiomae was 40 leagues from Santa Elena over a "somewhat difficult road" that crossed some large, deep swamps" (Hoffman 1990d:301). Each of these accounts was written in the late 1560s, soon after the end of Pardo's journeys into the interior. Using Google maps, one can readily measure the distance from the junction of the Wateree and Congaree rivers to the Santa Elena site on Parris Island near Beaufort, SC. The straight line distance is right at 100 miles, or almost exactly 40 of the common Spanish leagues Green (2015:53) prefers to use (Figure 1).

But Green (2015:59) argues that Guiomae was not 40 leagues from Santa Elena, arguing instead that it was only 30 leagues distant. To make this case, he ignores the distance estimates provided in contemporary accounts by Pardo and Bandera, and he turns instead to a document written in October, 1584, 16 years after the expedition by translator, Domingo de León (Worth 2016) who says that the distance was 30 leagues. But Green's placement of Guiomae near Givhans Ferry does not even fit with León's shorter estimated distance, since Givhans Ferry is only about 53 miles, or 20 leagues, from Santa Elena. Green's inaccurate placement of Guiomae alone is enough to discredit the remainder of his route reconstructions.

So who was Domingo de León, and what else did he have to say about the Pardo expedition into the interior? León was a Spanish soldier who arrived in Florida with founder Pedro Menendez in 1565, who learned the Indian languages and became a translator, and who traveled into the interior with Juan Pardo (Worth 2016:216). After long service in Florida and New Spain, León petitioned King Philip to clear his record of false charges brought against him during his nearly two decades of service. Thus, in 1584, he submitted a series of documents which included a lengthy description of his recollections concerning the Pardo expeditions. As part of that document, he provides what Green (2015:59) calls "Domingo León's Mental Image." Based on what León wrote, John Worth (2016:74) created an outline map of the Carolina interior, but León never drew such a map. Instead, León simply wrote about what he remembered from his time spent in the interior.

León provides a great deal of geographical information concerning the interior, and his errant memory of the distance from Santa Elena to Guiomae should not negate the importance of whatever else he might have to say. León provides important information on the location of Guiomae and the rivers adjacent to it. León (Worth 2016:69) says, "Thirty leagues from the coast [at Guiomae] two rivers join, and only one comes out at the sea. One arm goes to the northwest and the other to the west." He goes on to say that the river to the northwest "reaches up to the mountain range" and "is depopulated something like forty leagues." As is noted by John Worth in his paper on the León document, it is evident that this "west" river is the Broad River. In describing the river that runs northwest from Guiomae, León (Worth 2016:69) says it "goes through settlements" that were spaced a half a league or a league apart, all on the east bank. By traveling twelve leagues up that river, one reached Canos [or Cofitachequi] according to León. León's "northwest" river is clearly the Wateree/Catawba River that flows north and then west to the mountains, and we know from the 19th-century observations of William Blanding (Blanding 1847:105-108) and more recent archaeological excavations (DePratter 1989) and mapping along the Wateree River, that there are several mounds and villages along the east side of that river to the north and south of Camden, South Carolina. León (Worth 2016:69) says these settlements stretched for 20 leagues along the east bank of the river that flowed by Canos. In referring to a river that flowed to the sea, León is clearly referring to the Santee which is formed by the junction of the Wateree and Congaree rivers. Green (2015:56) claims that Leóns estimates the distance from Canos to the coast at 30 leagues, and he uses that figure to argue for his placement of Canos on the Santee River. It is clear, however, that León was estimating the distance to the coast from Guiomae, not Canos, when he says "thirty leagues from the coast two rivers join, and only one comes out at the sea" (Worth 2016:69). All of the accounts relating to Soto and Pardo place Guiomae, not Canos, at the junction of two rivers (Figure 1).

In reconstructing this part of Pardo's route from Guiomae to Canos, Green (2015:55) does not follow a river as León described. Instead, he takes the expedition north through Four Holes Swamp (see Green 2015:56, 59, Fig. 4) to the Santee River where a crossing was made near Nelson's Ferry and the mouth of Taw Caw Creek on the north bank of the Santee (Green 2015, Fig. 5). He (Green 2015:56, 60) places the main town of Canos, or Cofitachequi, near the river on Goat Island with associated occupation "on both sides of Taw Caw Creek and extended south as far as Wyboo Creek."

There are several problems with these interpretations and with the placement of Canos on Goat Island. The very Pardo source that Green seems to prefer takes the expedition up a major river to Canos from Guiomae while noting that all settlements were on the east side of the river (Worth 2016:69). Clearly, Green's route does not follow a major river the 12 leagues from Guiomae to Canos, also called Cofitachequi, and surely Green will not be able to find 16th-century Indian towns that stretch for 20 leagues (c. 50 miles) along Taw Caw Creek adjacent to his placement of Canos (Cofitachequi).

The Soto expedition went from Hymahi or Guiomae to Cofitachequi 26 years before Pardo, and the related accounts provide good information on this part of the route. Ranjel (Worth 1993a:278) says that Soto left Aymay (Hymahi) for Cofitachequi on horseback ahead of the rest of his army, and he spent the night "hard by a large and deep river." One of his lieutenants rode ahead to arrange for canoes to cross this same river when he arrived opposite the main town of Cofitachequi. Soto crossed the river, arrived at Cofitachequi, and met the woman chief there on the second day of his travels, which is consistent with León's estimate of 12 leagues or approximately 30 miles north from Hymahi. Taking into account what León says about the relative locations of Guiomae and Cofitachequi, Soto rode up the west side of the Wateree and then crossed the river to the east side where the main town of Cofitachequi was located. Hudson (1997) and colleagues (Hudson et al. 1990, 2008) have placed Cofitachequi on the east bank of the Wateree River at the Mulberry site at the mouth of Big Pine Tree Creek. This location is consistent with directions and travel distances provided in both the Soto and Pardo accounts. The map distance from the junction of the Wateree and Congaree rivers (Guiomae) to the mouth of Big Pine Tree Creek is about 30 miles or 12 leagues, consistent with distance León gives and an easy distance for Soto to have covered on horseback in two days.

I should note that because Green's placement of Cofitachequi is more than 50 miles to the southeast of Hudson et al. placement of that same town, Green had to raise his estimate of how fast the army had to travel to reach Joara from Canos in the ten days the expedition took to get there. Green (2015:53) argues that the army generally traveled a little more than five leagues (c. 13.25 miles) a day under normal circumstances, but to reach the interior town of Joara from his Cofitachequi placement, he had to increase his estimate of the distance covered each day by 60% to 22.5 miles (8.5 leagues), a near impossible rate of march to maintain for 10 days (Green 2015:57) through uncharted territory.

Green continues his reconstruction on from Canos to the north, but I will not concern myself with this portion of his work. His errant placements of Guiomae and Canos render the remainder of his reconstruction irrelevant.

In the end, Green made an effort to relocate the Soto and Pardo routes from those proposed by Hudson and his colleagues in multiple publications on this subject. It is my belief that he failed in this effort. His selective use of documents, misinterpretation of portions of those documents, and willingness to ignore evident contradictions between his interpretations and what the documents actually say, in the end, render his route reconstructions and town placements invalid.

Notes

[1]Hudson and colleagues place this crossing of the Broad River in the vicinity of present-day Haltiwanger Island. While this particular island may not have existed in 1540, the Fall Line shoals in that part of the river would always have contained islands of varying size. The crossing of two channels separated by an island is consistent with the Soto accounts. The two channels currently at Haltiwanger Island are approximately 300 ft. and 450 ft. in width, respectively. This should be compared to Green's placement of this same crossing at the North Fork of the Edisto River, which is a slow-moving channel only 150 ft. wide, with his second channel being Four Holes Swamp, which is not really a river channel at all.

Acknowledgements

The author is grateful to Lisa Hudgins for producing Figure 1 used in this paper and to Jim Legg for reading a draft and providing useful comments.

References Cited

Baker, Steven C.
1974 *Cofitachaque: Fair Province of Carolina.* Master's Thesis, Department of History, University of South Carolina, Columbia.

Beck, Robin A., Christopher B. Rodning, and David G. Moore (editors)
2016 *Fort San Juan and the Limits of Empire: Colonialism and Household Practice at the Berry Site.* University Press of Florida, Gainesville.

Blanding, William
1847 Remains on the Wateree River, Kershaw District, South Carolina. In *Ancient Monuments of the Mississippi Valley Comprising the Results of Extensive Original Surveys and Expeditions*, editors E. G. Squier and E. H. Davis, pp. 105-108. Smithsonian Contributions to Knowledge, Volume 1. Smithsonian Institution, Washington, D.C.

Brain, Jeffrey, and Charles R. Ewen
1993 *Bibliography of De Soto Studies.* In The De Soto Chronicles: The Expedition of Hernando De Soto to North America in 1539-1543, edited by L. A. Clayton, V. J. Knight, Jr., and E. C. Moore, pp. 515-550). University of Alabama Press, Tuscaloosa.

Clayton, L. A., V. J. Knight, Jr., and E. C. Moore (editors)
1993 The Florida of the Inca. In *The De Soto Chronicles: The Expedition of Hernando De Soto to North America in 1539-1543*, Volume 2. University of Alabama Press, Tuscaloosa.

DePratter, Chester B.
1983 *Late Prehistoric and Early Historic Chiefdoms in the Southeastern United States.* Ph.D. Dissertation, Department of Anthropology, University of Georgia, Athens.

1989 Cofitachequi: Ethnohistorical and Archaeological Evidence. In *Studies in South Carolina Archaeology: Essays in Honor of Robert L. Stephenson*, editors A. C. Goodyear, III, and Glen Hanson, pp. 133-156. South Carolina Institute of Archaeology and Anthropology, Anthropological Studies 9.

DePratter, Chester B., Charles Hudson, and Marvin T. Smith
1983 The Route of Juan Pardo's Explorations in the Interior Southeast, 1566-1568. *Florida Historical Quarterly* 62:125-158.

DePratter, Chester B., and Marvin T. Smith
1980 Sixteenth Century European Trade in the Southeastern United States: Evidence from the Juan Pardo Expeditions (1566-1568). In *Spanish Colonial Frontier Research*, edited by Henry F. Dobyns, pp. 67-77. Center for Anthropological Research, Albuquerque, New Mexico.

Ethridge, Robbie
2010 *From Chicaza to Chickasaw: The European Invasion and the Transformation of the Mississippian World.* University of North Carolina Press, Chapel Hill.

Ethridge, Robbie, and Charles Hudson (editors)
2002 *The Transformation of the Southeastern Indians, 1540-1760.* University Press of Mississippi, Jackson.

Galloway, Patricia (editor)
1997 *The Hernando de Soto Expedition: History, Historiography, and "Discovery" in the Southeast.* University of Nebraska Press, Lincoln.

Green, Val
2015 The Routes of the Spanish in 16th-Century Carolina: A Historical Narrative. *South Carolina Antiquities*: 47:107-119.

Hoffman, Paul (translator and editor)
1990a The "Long" Bandera Relation. In *The Juan Pardo Expeditions*, edited by Charles Hudson, pp. 205-296.

Smithsonian Institution Press, Washington, D.C.

1990b The Martinez Relation. *The Juan Pardo Expeditions*, edited by Charles Hudson, pp. 317-321. Smithsonian Institution Press, Washington, D.C.

1990c The Pardo Relation. *The Juan Pardo Expeditions*, edited by Charles Hudson, pp. 305-316. Smithsonian Institution Press, Washington, D.C.

1990d The Short Bandera Relation. In *The Juan Pardo Expeditions*, edited by Charles Hudson, pp. 297-304. Smithsonian Institution Press, Washington, D.C.

Hudson, Charles
1990 *The Juan Pardo Expeditions: Exploration of the Carolinas and Tennessee, 1566-1568*. Smithsonian Institution Press, Washington, DC.

1994 The Hernando de Soto Expedition, 1539-1543. In *The Forgotten Centuries: Indians and Europeans in the American South, 1521-1704*, edited by Charles Hudson and Carmen Tesser, pp. 74-103. University of Georgia Press, Athens.

1997a The Historical Significance of the Soto Route. In *The Hernando de Soto Expedition: History, Historiography, and "Discovery" in the Southeast*, editor Patricia Galloway, pp. 313-326. University of Nebraska Press, Lincoln.

1997b *Knights of Spain, Warriors of the Sun: Hernando de Soto and the South's Ancient Chiefdoms.* University of Georgia Press, Athens.

Hudson, Charles, Marvin T. Smith, and Chester B. DePratter
1984 The Hernando De Soto Expedition from Apalachee to Chiaha. *Southeastern Archaeology* 3(1):65-77.

Hudson, Charles, Robin Beck, Jr., Chester B. DePratter, Robbie Ethridge, and John E. Worth
2008 On Interpreting Cofitachequi. *Ethnohistory* 55(3):465-490.

Hudson, Charles, John E. Worth, and Chester B. DePratter
1990 Refinements in Hernando de Soto's Route through Georgia and South Carolina. In *Columbian Consequences*, Volume 2, edited by David Hurst Thomas, pp. 107-119, Smithsonian Institution Press, Washington, D.C.

Lefler, Hugh T. (editor)
1984 *A New Voyage to Carolina.* University of North Carolina Press, Chapel Hill.

Moore, David G.
2002 *Catawba Valley Mississippian: Ceramics, Chronology, and Catawba Indians.* University of Alabama Press, Tuscaloosa.

Robertson, James A. (translator and editor)
1993 The Account by a Gentleman from Elvas. In *The De Soto Chronicles: The Expedition of Hernando De Soto to North America in 1539-1543*, edited by L. A. Clayton V. J. Knight, Jr., and E. C. Moore, pp. 19-220. University of Alabama Press, Tuscaloosa.

Smith, Martin T.
1987 *Archaeology of Aboriginal Culture Change in the Interior Southeast: Depopulation during the Early Historic Period.* University of Florida Press, Gainesville.

Swanton, John
1939 *Final Report of the United States De Soto Expedition Commission.* 76th Congress, 1st Session, House Document No. 71. Government Printing Office, Washington, D.C.

Worth, John (translator and editor)
1993a Account of the Northern Conquest and Discovery of Hernando de Soto by Rodrigo Ranjel. In *The De Soto Chronicles: The Expedition of Hernando De Soto to North America in 1539-1543*, edited by L. A. Clayton V. J. Knight, Jr., and E. C. Moore, pp. 247-306. University of Alabama Press, Tuscaloosa.

1993b Relation of the Island of Florida by Luys Hernandez de Biedma. In *The De Soto Chronicles: The Expedition of Hernando De Soto to North America in 1539-1543*, editors L. A. Clayton V. J. Knight, Jr., and E. C. Moore, pp. 221-246. University of Alabama Press, Tuscaloosa.

Worth, John
2016 Recollections of the Juan Pardo Expeditions: The 1584 Domingo de León Account. In *Fort San Juan and the Limits of Empire: Colonialism and Household Practice at the Berry Site*, editors Robin A. Beck, Christopher Rodning, and David G. Moore, pp. 58-80. University Press of Florida, Gainesville.

A Reply to Dr. Chester DePratter

Val Green

I am not a historian by education or trade, but I am educated as an engineer; and, I have practiced that calling for longer than I care to admit. The history bug that has infected me did so when I was much younger, and it has never left.

The path I took to investigate the Spanish routes has an engineering focus, more so than a history one. The primary focus was about finding roads. Engineers are trained to look for the shortest route between two points to affect a solution to a problem. That is basically what I did. In starting that procedure, I read everything I could find on the subject, and concentrated my efforts on what seemed like the most credible references.

For instance, I read all four of the DeSoto accounts. They all contained different dates and contradictory information, as Dr. DePratter alluded to. I did not just use Ranjel exclusively, but I used him primarily because he was trained for the job and should have been the most reliable.

Once I had chosen a probable route for a section of the trip, I used the engineering criteria of searching for a "fatal flaw," or something that could not have happened if the chosen route was correct. I cannot say that there are absolutely no flaws in the routes I chose—there are; however, regardless of whether there are flaws in my routes, or in the Hudson, DePratter, and Smith routes (or any others), we do not have the information to find a perfect solution at present.

In answering Dr. DePratter's responses, I separated his paragraphs by numbers and replied accordingly:

Paragraph 1. There are two questions that are poised here. First, I believe I did use most of the available information, but certainly not all. I consider some of it to be irrelevant, some of it to be just wrong (as in having a fatal flaw), and some unsupported by any reasonable known facts. The second criteria Dr. DePratter questioned was whether I fit sections of the routes to others in completing the whole. The answer is, I did this remedially, changing wording of map points to complement those before or after, etc.

Paragraph 2. Dr. DePratter has used this paragraph to say what everyone who has involved himself in this mystery knows, and that is, there are problems that, 400 plus years later, we do not have answers for. I agree. I will comment again on this at the end of this response.

Paragraph 3. Dr. DePratter was an integral part of the group (Hudson et al.) that drove the nails into Swanton's coffin. The last of these nails was pounded in with the finding of the Fort San Juan site by Beck, Rodning, and Moore.

Paragraph 4. I related above that it is my estimation that Rodrigo Ranjel was the most trustworthy source for DeSoto. I did look at all of them many times in fits of indecision. Ranjel almost always came out on top; however, someone once said that Spanish chronicles always had an element of "fictionalization" about them.

I believe the long Vandera (pronounced Bandera) account would win out against others as a necessary element in the Pardo expeditions. He was, like Ranjel, given the specific job of recording the information; however, even Bandera had his faults. On leaving Santa Elena, Bandera stated that it was 40 leagues to Canos. On the return trip he stated that it was 55 leagues from Canos to Santa Elena; therefore, even his information can be suspect.

I will talk about León's contribution later. The account I primarily used is called the Herbert Ketcham translation (c.1950s). I have read most of the later accounts, but do not see much material difference.

Since Dr. DePratter mentioned it, I wish to say that I have read Hoffman. The Paul Hoffman book on *A New Andalucia and a way to the Orient* is a fascinating read; however, Hoffman's rework of Hudson's routes of Pardo is mostly uninformative to me. There may be some very reliable information in parts of it, but not on the part of the journey that I discussed.

Hoffman's route from Santa Elena to Canos and on to Arachuchi and Otari does not contain anything quantitative. Further, he has missed the mark in detailing Pardo's return from Guatari to Arachuchi. Putting aside the fact that he only states Guatari is on the Yadkin River, (at no particular location), he also states Pardo went back through the Charlotte area to return to the main route back to Canos. I do not believe that is correct.

This is one point where I believe I have compelling evidence that the route from Guatari to Arachuchi is along the Salisbury/Concord/Indian Trail Road. I believe this was the 16^{th}-century route. I also believe it was the 18^{th}-century route, and I believe it can be driven today with very little change from its primitive location. See Figure 8 in my paper (Green 2015).

Paragraphs 5, 6, and 7. Although Dr. DePratter did not directly contest anything in these paragraphs, he did give an interesting, thoughtful, and accurate picture of Carolina from the time of DeSoto to the beginning of the 18th century.

It seems this is a good point to introduce the connections that the John Lawson Trek had on my thinking. Dr. DePratter is essentially correct in saying that Lawson's route and the Spanish routes only overlap along the Wateree/Catawba River. I suggest there are some notable exceptions to this.

Foremost among these exceptions is our difference of opinion regarding the location of Cofitachequi. The Hudson group (1983) proposed in their initial paper that the town DeSoto wanted to find was at or near Camden, or more precisely on Mulberry Plantation, just south of Camden. Excavations before that time, and after, have not turned up anything Spanish. This is not news to anyone, but I say it here to emphasize, and admit, that there is no Spanish evidence that I know of, outside of Santa Elena, in South Carolina; however, there are some connections to be made concerning the overlap of the Spanish and John Lawson routes. Lawson intercepted the Trading Path on the east side of the Santee River at the crossing of the river where it became known as Nelson's Ferry. Lawson traveled this route from the crossing until he reached the Yadkin River and Saponi.

It is my contention that Lawson's route from Nelson's Ferry to Charlotte is the same road that DeSoto used, and the same road that Pardo used. This route, which is partially along the east side of the Santee/Wateree drainage, appears to have been the principal thoroughfare for Carolina Native commerce of the 16th century, and may have served as such through the early Colonial period. I need to add here that this route did not always remain close to the river floodplain.

It is also my belief that Pardo found the Guatari town on the same site that Lawson found Saponi. Today, it looks essentially just as Lawson described it—a hundred acres on the bank of the Yadkin River several miles south of the town of Salisbury. The local story is that Guatari is buried beneath the waters of the flooded river, but that assumption does not fit the geography, because there is very little riparian acreage, and the lake along this section of the river is very shallow. The owner calls this place the River Farm. There is another element of the Lawson story that, while I cannot say it provides any "proof," it does solicit some thoughts that I have long believed are an integral part of the picture.

About noon on January 8, 1701, Lawson stopped at a house of the Santee Indians. This location is half a mile south of the current confluence of Taw Caw Creek into the Santee River Swamp. Lawson was fed lunch and then spent the next two hours talking to the "Santee King." His interpreter was a Frenchman named Jean Couture, whom Lawson later called the "Greatest Traveler in America." In summary, this Santee King described his people as a Mississippian culture. See Lawson's book (Lefler 1984). Remember that the CharlesTown colony was well aware that Cofitachequi was in the interior, and not that far from Charleston. Maurice Matthews visited with the Indians there, and the name Cofitachequi was used at least as late as 1681.

Paragraph 8. In reference to John Lawson's route through SC, I strongly believe that he was on the main Indian Path (Road) as he traveled from Nelson's Ferry to Charlotte. Lawson had the same problem as the Spanish had incurred—an insufficient supply of food. So, if this was the "main road" and the Indian towns were located on this road, it is almost a certainty that both DeSoto and Pardo also traveled this same route.

The differences between Dr. DePratter's conclusions and mine are rooted in the DeSoto route. He believes they went toward Columbia, and I believe they went down the Edisto Basin to the confluence of the Edisto and Four Holes Swamp. I will note here that the road from Givhans up the west side of the Edisto River is called the "Augusta Highway" today. I agree that the Saluda and the Broad rivers are larger than the Edisto, but I recently took a trip to Givhans Ferry State Park and took some pictures of the Edisto River. On that day, the Four Holes Swamp was over 200 feet wide. Our Lowcountry rivers have relatively flat gradients, and during rainy weather they can become large watercourses.

Paragraph 9. The route by Hudson et al. was constructed with the idea that Cofitachequi had to be at Mulberry, just below Camden. To make this destination fit the route, DeSoto had to cross two rivers, after crossing the Savannah. Rodrigo Ranjel, DeSoto's secretary, said they crossed the first of these two rivers the second day after crossing the Savannah. There is agreement that the crossing of the Savannah was at Augusta, Georgia, on April 17th. On Monday the 19th, they crossed the first of two large rivers. Hudson et al. believed this river was the Saluda River above Columbia.

At a point just east of Lexington, the Saluda River is approximately 68 miles from Augusta (along Highway 1). To accomplish this, the Spaniards would have needed to travel over 35 miles each day and, then, cross a large river. That is over 15 leagues a day, when the rate of a walking soldier is about 5 leagues per day. They crossed the Savannah River on April 17th. Ranjel says they crossed the first large river on April 19th; therefore, at best, they only had two and half days of travel—at 14 miles a day, equals 35 miles. They were only half way to the Saluda from the Savannah River on the 19th.

Also, according to Ranjel, two days after that (crossing the Saluda River) they crossed another large river divided into two branches. Hudson identifies this as the Broad River—a short distance above Columbia.

From Dr. DePratter's Note, there is no second branch (channel) along the Broad River. Hudson's account says DeSoto crossed in the vicinity of Haltiwanger Island. The islands in the Broad River do not necessarily indicate more than one channel. The types of islands that are in the floodplain are inundated by large rainfalls. There is no alluvial Broad River floodplain or relict rock channel north of Columbia that would indicate there ever has been such a channel. To have a second channel, there need to be a land mass that has elevations that would be above large storm events. I believe the salient point here is that there is an excessive distance from the Savannah for DeSoto to have traveled to the Saluda and Broad in the time indicated. Without the identity of the two river crossings as the Saluda and the Broad, the Hudson route cannot place Cofitachequi at Mulberry.

Paragraphs 10-13. Also, I want to point out that Dr. DePratter has suggested that the first town, Guiomae, is a straight line distance of about 100 miles (40 leagues) from Santa Elena. Another document says it is 12 leagues (31 miles) from that town to Canos. Dr. DePratter has suggested that using the straight line distance from Santa Elena to the intersection of the Congaree and Wateree rivers is about 100 miles (and that is correct), but the routes that the Spanish had to follow were anything but a straight line. The Map Quest distance following even today's highways is 122 miles to Wateree Junction (closest point on Map Quest).

Paragraphs 14 and15. The contents of this paragraph concern a contradiction of sources. Domingo León said the distance from Santa Elena to Canos was 40 leagues, not 40 leagues to Guiomae. Traveling through Givhans Ferry, the highway distance from Parris Island to Taw Caw Creek (Canos) is 108 miles, which equals 41 leagues.

According to Bandera, the distance from Santa Elena to San Juan is 120 leagues. Using the Hudson common league (3.45 miles per league), the distance would be 414 miles. Using the short league (2.63 miles per league), the distance should be 316 miles. While no one knows the exact route taken on any of the trips, the approximate distance should be between 300 and 350 miles. Anything I could say further would be pure speculation, so I will leave it at that.

Paragraphs 16 and 17. Dr. DePratter gives a very good review of Domingo León. This information is recorded in the recent book *Fort San Juan and the Limits of Empire* by Beck, Rodning, and Moore. John Worth provides the information on Domingo León, including León's account and a "Mental Image Map", purported to be a drawing of the descriptions of the territory that León traveled with Pardo.

It appears that the problem with this "Mental Image" is that Dr. Worth has misconstrued what León said, and/or León himself may have been confused about the geography of the countryside he was traveling; or, his description was not sufficient to allow an accurate map to be formulated. The drawing shows a river intersection where there is an Indian town that León calls the "First Town." Pardo called this town Guiomae. Pardo, coming from Santa Elena, had to cross a river to get to this town. I believe this crossing was the Edisto River, near Givhans Ferry. From this town traveling north, León stated that it was 12 leagues to Canos; however, Canos was across a river from the road the Spanish were traversing. León noted that Canos was on the other side (the Mental Image shows that), and they had to cross a river to get to it. What León either did not describe sufficiently or he did not realize was that the Spanish had left one watershed (the Edisto) and entered another (the Santee). The Mental Image Map makes it appear that the two towns are on the same watershed.

Other notes on the map are items León was told. One notation that is correct is the distance from Canos to the Sea—recorded as 30 leagues. The actual distance is 78 miles (29.6 leagues) from Taw Caw Creek to the mouth of the South Santee River.

The note León makes on the map, "Canos, forty leagues from Santa Elena to the north" is the one that Dr. DePratter and I have an impasse over. I do not think we can solve this until some archaeological find provides new evidence. As I have said previously, I will readily admit that I am not the expert on the Southeast that Dr. DePratter is, but it occurs to me that given the possible falsifications that may have occurred with the Spanish documents, it pays to search for validity. However, I believe the León document is an original, and it may be the more trustworthy.

There is one more interesting facet of this story that Dr. DePratter did not dwell on, and I would like to elucidate. It is the side trips off the main route that both DeSoto and Pardo found necessary to obtain food for the horses and men. The name given to this town by Ranjel was Illapi. Bandera called it Ylasi. The town is described as being off the main road, and Bandera stated it was 12 leagues from Canos. Pardo came back through Ylasi on his return trip in 1568. The route Pardo followed to Ylasi separated at Heath Springs, and generally followed Hanging Rock Branch and then Little Lynches River into Kershaw County.

Below the Town of Kershaw, this road bears the name Old Georgetown Road. About 10 miles below the town of Kershaw, the road splits at a place called Lockhart's Old Field. The eastern branch of the road generally follows Lynches River, but changes watersheds to Black River some miles above Indiantown. This road ends at Black River, across from the first Prince Frederick's Parish Church in Georgetown County.

The western branch of Old Georgetown Road goes through eastern Kershaw County and into Lee County, where it continues due south, and into Sumter County at Mayesville. This route ends at the junction of Black River and Scape Ore Swamp two miles below Mayesville.

This road predates the Revolution, and the eastern branch was used during the War to move British troops to Charlotte from Georgetown. Almost all of it is a paved country road today. I believe it was the route used by DeSoto and Pardo to travel to Illapi/Ylasi, and back to the main road. The distance from Heath Springs down to Mayesville Opening is 55 miles. Bandera stated it was 20 leagues (equals 52.6 miles).

When Pardo was returning to Canos in 1568, he left Ylasi and traveled two days through the road where "Swamps were not lacking." Bandera stated they traveled five leagues the first day and six leagues the second day. On the third day, he stated Canos was just two leagues away resulting in a total distance of 34 miles.

Hudson stated Illapi/Ylasi was on the Pee Dee River near the town of Cheraw. The distance from Camden to Cheraw is over 60 miles. Even if the long league is used, 13 leagues is only 45 miles.

I have spent some time in the last few years attempting to locate the probable placement of Ylasi. I used the Taw Caw Creek location for a starting point, and just drew arcs of a 31 mile length. The location which seemed to be the most favorable for an agriculturally available region was a site in lower Sumter County just south of the town of Mayesville. The area is called the 'Maysville Opening' and is approximately a 2000-acre setting in row crops situated between Black River on the east and Scape Ore Swamp on the west.

To add to the attractiveness of this area, local folks said there was an "Indian Mound" in the swamp. I inquired and located the mound. In March 2016, Dr. Chris Moore and Rooney Floyd from the Savannah River Archaeological Research Program (SRARP) investigated the so-called "Indian Mound." Although this anomaly turned out to be a natural formation, it is a very impressive one that measures 25 feet high and about 400 feet long (see Green 2015:Figure 12). Some of the locals have impressive artifact collections, so I am hopeful we may yet find the site of Ylasi in this area.

I would like to include a final thought on Pardo's last trip to Ylasi. Pardo left Guatari (near Salisbury, NC) and followed a road back to the main road and the town of Aracuchi (near Indian Land situated north of Lancaster). From Aracuchi, he traveled down the main road to what is now Heath Springs. The total distance is approximately 98 miles. After traveling from Salisbury to Heath Springs, he left the main route and went to Ylasi.

If you concur with the Hudson route, Pardo would have traveled from Heath Springs to Cheraw, South Carolina, heading almost due east for a distance of 51 miles. From Cheraw, Pardo returned to Canos, traveling 55 miles to Camden. The total distance he traveled on that trip from Salisbury to Camden would have been 204 miles.With his hand full of Indian guides who knew the country well, why didn't Pardo just travel due south from Salisbury, down the Yadkin/Pee Dee River directly to Cheraw, a distance of only 83 miles. Then to get to Canos, all he had to do was travel southwest (along the modern Highway 1) to Canos/Camden, a distance of 55 miles. If he had gone this route, he only had to travel 138 miles vs. 204 miles the other route? He could have saved himself 66 miles of traveling.

In summary, I would like to say that I have the utmost respect for the professionals that have worked on the Spanish expeditions for the last 30 years or more. If the public is to ever know our correct history, then there is plenty more to do. Unfortunately, South Carolina is cursed with a legislature that is composed of people who are there for their own gain. The legislators funnel millions of dollars into public education so that schools can hire more administrators and athletic coaches, but they will not adequately fund projects that will add knowledge to our history. There are volumes of knowledge still lying beneath the surface. All South Carolinians need in order to find this knowledge is some assistance from the clueless ones in our government. Then, Dr. DePratter and many more of us can agree that we know that "DeSoto Slept Here."

References Cited

Green, Val
2015 The Routes of the Spanish in 16th-Century Carolina: A Historical Narrative. *South Carolina Antiquities*, 47:51-67.

Lefler, Hugh T. (editor)
1984 *A New Voyage to Carolina.* University of North Carolina Press, Chapel Hill.

BOOK REVIEWS

James H. Tuten. Lowcountry Time and Tide: The Fall of the South Carolina Rice Kingdom **2010. University of South Carolina Press, Columbia, South Carolina. ISBN: 978-1-57003-926-3.**

James H. Tuten, a South Carolina Lowcountry native who grew up on a former rice plantation, comprehensively describes the development and decline of the "rice culture" of South Carolina in the 17th through 20th centuries in his book *Lowcountry Time and Tide: The Fall of the South Carolina Rice Kingdom.* While Tuten provided a sufficient background in the early history of growing rice in South Carolina, he focuses on the "postbellum" period from 1877-1930. The author uses "culture" in two ways, one to describe the agricultural activity of growing rice, or "rice culture," and secondly, as it has been defined by Clifford Geertz, a context of symbols and meanings. He also incorporated Bourdieu's notions of cultural/social capital and the idea of symbolic capital, both having effects on the persistence of rice cultivation even when it was no longer economically feasible. This persistence in rice cultivation is what led Tuten to primarily investigate the "postbellum" period. I felt he did a wonderful job of incorporating historical records and photographs to support his argument. His comprehensive approach was successful in demonstrating the reasons behind the persistence in rice cultivation and in demonstrating the effects of "rice culture" in South Carolina culture.

The book is organized into two parts, the first of which is a "Chronological View of Rice Culture." This part contains three chapters that cover the history of rice culture prior to 1870, the rejuvenation of rice cultivation following the Civil War from 1872-1893, and the eventual collapse and decline of rice culture from 1893-1929. These chapters incorporate historical records, statistics concerning production and profit increases and decreases, and a thorough discussion of the relevant names of commercial rice planters and their plantations. The second part of the book discusses the themes of rice culture in the postbellum period. Two chapters discuss the changes in agricultural practices made to combat environmental conditions, as well as technological advances, and the focus on rice as a cultural symbol and foodway in the Lowcountry.

Chapter one places the book's topic of rice culture into context. Just as other crops have shaped the landscape and people on it in other places, such as sugarcane in Louisiana or tobacco in Virginia and Maryland, so too did rice shape the landscape in South Carolina and Georgia. The author discusses the geographic extent of rice cultivation as having existed in some capacity from North Carolina all the way down the coast to Florida. Despite having been somewhat widespread, rice cultivation was densest along the South Carolina coast and tidal rivers. This concentration had an astounding effect on the local people as the author demonstrates in this chapter. This chapter discusses the effects of rice cultivation on the local economy as a food source, means for business growth in the form of rice mills and middlemen, and the changes that occurred as a result of Emancipation during the Civil War. The author is thorough in discussing each of these aspects and more.

Chapter two discusses the persistence of rice planters to continue the cultivation of a crop that no longer had a high demand in Europe. The opening of the Suez Canal in 1869 allowed Europe to obtain rice from India and Asia much more efficiently than from the United States. The author focuses on discussing the perceived social impacts and perceived social identities that the plantation owners possessed about commercial rice cultivation. Historical sources, such as speeches at the Agricultural Society meetings, demonstrate the extent to which planters maintained social status and personal identity in their work as commercial plantation owners. These sources are adequate in demonstrating the extent to which social status and prestige played a role in the persistence of commercial rice farming in the South Carolina Lowcountry.

The third chapter discusses the factors which brought about the collapse of rice cultivation in South Carolina. Hurricanes and other environmental conditions made it increasingly difficult to control the aquatic environment necessary for rice cultivation. The increase in other industries locally attracted laborers away from rice cultivation. These industries included timber, turpentine and tar production, and phosphate mining to name a few. Rice cultivation was labor intensive and unpleasant work in wet and insect-infested fields. Also discussed is the shift in cultivation to crops such as cotton and corn as being more profitable and labor efficient. These factors, coupled with decreasing demand in Europe for rice, ultimately ended rice farming in South Carolina. All of these factors are discussed using historical accounts and records which express the variety of reasons that collectively killed the rice industry in the Lowcountry.

The many ways in which agricultural practices affected rice cultivation are discussed in the fourth chapter. Technological advances prolonged rice cultivation in South Carolina, but ultimately led to its extinction by enabling farmers in places such as Louisiana, Texas, and Arkansas to produce rice in more stable, controlled inland environments. Also introduced into agricultural industries were a variety of mechanized machines that completed a variety of tasks, such as planting and harvesting crops. Steam engines had been harnessed in a variety of ways, especially transportation, prior to their introduction to agriculture. Tractors were introduced in the early 20th century having followed a variety of mule drawn devices. The postbellum period also saw an increase in scientific interests in solving problems in rice cultivation, such as the control of a variety of pests including insects, birds, and fungal infections. This scientific interest encouraged experimentation. In discussing these changes, the author places into context the condition of rice culture in the Lowcountry. This condition was a swiftly changing one struggling to adapt to a new economy. This context was appropriate in addressing the author's question concerning how rice planters persisted for so long in an economically unfeasible tradition.

The fifth and final chapter brings all of these issues together and discusses how rice influenced the local culture. Rice cultivation held a prominent position on the landscape. The requirement of intense manipulation of the landscape was visibly impressive. Miles of dikes and canals, all dug and created by hand, left a lasting impression on anyone living in the Lowcountry. This persistent presence, along with the visually impressive system of structure, fell in line with Georgian ideals. The manipulation and control of the landscape in such a monumental way, along with the precision and complexity of rice cultivation, created a sense of empowerment among the rice planters. Social status was displayed through the ownership of plantations and by maintaining the planter tradition of the planter's ancestors. Not only was rice a commercial product, it was also a local food staple. Many traditions are focused around food, and the author demonstrates the effect rice had on local traditions in a variety of ways. Tuten discussed his own experiences of eating rice with every meal, as well as including stories of other families. This chapter really incorporates all of the main ideas the author is using to make his argument. Rice culture persisted in the Lowcountry because of its cultural influence.

The author does an excellent job in comprehensibly discussing the many aspects of rice culture from its historical development, its rejuvenation, and demise, as well as its adaptations and influences on society. This book is excellent in consolidating historical information concerning rice cultivation in South Carolina. Although written from a historical perspective, this book would be very useful for archaeologists working in the Lowcountry on historic sites. The detailed accounts and descriptions presented in this book, as well as the cultural implications discussed, would serve an archaeologist well in understanding a variety of historical settings in the South Carolina Lowcountry. I highly recommend this book to any archaeologist working in the Lowcountry, as it would greatly enhance their understanding of the cultural environment influenced by rice culture.

Joseph E. Wilkinson is a graduate student in archaeology at the University of South Carolina. His research interests include chipped-stone technologies, hunter-gatherer archaeology, landscape archaeology, and utilizing GIS technologies in studying prehistoric societies.

H. Thomas Foster II, Lisa M. Paciulli, and David J. Goldstein. Viewing the Future in the Past: Historical Ecology Applications to Environmental Issues. **2016. University of South Carolina Press, Columbia, South Carolina. ISBN-978-1-61117-586-8.**

Many of the researchers who contributed to *Viewing the Future in the Past: Historical Ecology Applications to Environmental Issues* came together at a conference hosted by the University of South Carolina titled "Field to Table." The work presented here investigates anthropogenic impacts on the environment throughout many geographic regions with diverse datasets. In taking this robust approach to understanding past environmental problems, the authors effectively argue for an anthropology that utilizes our current knowledge of the past as an important tool for tackling our modern environmental problems.

In their chapter entitled "How Archaeology and the Historical Sciences Can Save the World," Foster, Goldstein, and Paciulli open the volume with a study in West Central Georgia and Alabama that looks at long-term changes in the environment through the use of witness trees, archaeology, geographic information systems (GIS), and aerial photography. The government used witness trees as boundary markers in the late 17th and early 18th centuries. In this research, witness trees were used to estimate the historic landscape during Native American occupations alongside archaeological data and aerial photographs to observe changes in the landscape temporally. The authors close the chapter with an investigation of ecosystem management from Madagascar with an emphasis on how anthropological data can inform our stewardship practices.

In Morehart's chapter "Diversity, Standardization, and the State: The Politics of Maize Agriculture in Postclassic Central Mexico," he explores the standardization of Mesoamerican agriculture at Xaltocan. By measuring maize remains from three distinct archaeological components, the author observes a decrease in maize varieties over time. Similarly, as maize variation is reduced there is a reduction in other comestibles, indicating that maize standardization also leads to less time spent foraging for other species. Morehart concludes by highlighting that agrodiversity in both historic and modern contexts is largely driven by the demands of the state.

Whitley's "From Historical Ecology to Prehistoric Economy: Modeling the Caloric Landscapes of the Past" uses GIS models to better understand decisions concerning subsistence and other spatially significant activities. He approaches his analysis of coastal Native American groups using variants of optimal foraging theory as a basis for modeling caloric intake and expenditure throughout quotidian interaction with the environment. Whitley's closing argument centers on acknowledging that modern life brings about complex social pressures but argues that humanity at its most basic can be reduced to the pursuit of calories.

In their chapter entitled "Feeding History: Deltaic Resilience, Inherited Practice, and Millennial-Scale Sustainability in an Urbanized Landscape," Hritz and Pournelle illustrate how large-scale topographic changes can lead to "irredeemable environmental degradation." In the case of Southern Mesopotamia, however, they find that the deltaic system was supportive of human activity through the construction of agricultural niches.

In response to calls for a testable, model-based archaeology, Bocinsky and Kohler's "Complexity, Rigidity, and Resilience in the Ancient Puebloan Southwest" uses agent-based simulations to investigate ecological rigidity. Rigidity is defined as an ecological system where the actors' choices are ecologically constrained. They find that cyclical participation in a subsistence regime based largely on a diet of maize led to an increased reliance on turkey consumption, therefore creating a system of rigidity that increasingly suppressed the agents' behavioral options.

In the chapter entitled "Soil Textures and Agricultural Resilience in the Prehistoric Southwest: Farming on the Perry Mesa, Arizona" authors Spillman, Hall, Kruse-Peeples, Nakase, and Trujillo focus on soil texture as a point of manipulation for subsistence practices. Because the soils of the semi-arid Southwest are generally ill-suited for agriculture, new avenues of investigation were needed to make clear the decision-making processes of the inhabitants in this region. The authors found that Perry Mesa agriculturalists were able to shape soil textures by controlling water flow. However, the overall effect of their land management practices was minimal, and the Perry Mesa was soon abandoned in favor of more productive lands.

Quick's "Southern Slow Foods: Ecological Awareness Through Gourmet Heritage" uses interviews as a way to understand Anson Mills' business model. Anson Mills' philosophy is based in the slow foods movement and seeks to preserve both heirloom varieties associated with historic Southern cuisine and historic agricultural practices. The model employed by this local South Carolina business straddles a line between global and local interaction. While their products are utilized throughout a large geographic area, Anson Mills maintains local ties by working with seedsmen and farmers who use region specific agricultural practices that largely, though not entirely, grew from enduring practices.

In Brock's "Repairing the Damage; Reforestation and the Origins of the Modern Tree Farm," the author investigates the development of tree farms in the Pacific Northwest. She provides a brief history of tree farming and the motives that led to its development. The implementation of the Clemons Tree Farm Project had positive effects on the environment by curtailing soil erosion and by providing wildlife habitat where previous logging operations had not. Furthermore, these new practices married the interests of logging operations and forestry so that continued resource exploitation would not necessarily be detrimental to ecosystems.

Braun's chapter entitled "Sustainability, Resilience, and Dependency: The Great Plains Model," utilizes a resilience-based assessment of environmental degradation through a market economy lens. This chapter provides important insight into the sustainability of the Great Plains region. For example, Braun asserts that human interaction with the environment and resource exploitation are necessary. It is only when the market fails to properly value these resources that we find a system of sustainability has shifted to one of dependency. Braun demonstrates that what is believed to be a "free resource" is identified and exploited to unsustainable levels and the shifts required to maintain the unsustainable practices further degrades the ecosystem leading to collapse.

In the chapter entitled "A Good Place: Aesthetic Pleasure and Landscape Resilience," Tickner investigates landscapes. She identifies early ideals of what a garden should be and compares those preferences to their modern counterparts using changes in gardens over time. Furthermore, she argues that another metric beyond resiliency, sustainability, and longevity is simply satisfaction. While she acknowledges that satisfaction is a difficult metric to quantify, it nevertheless plays a role in perceptions of landscape quality.

Foster assesses biodiversity from the Georgia/Alabama border by locating catchments for human activity where chronosequences and diversity indices show that human occupations brought a greater degree of biodiversity. Further complimenting this finding is the discovery that the passage of time since human occupation brings a decrease in biodiversity.

The collection of authors who contributed to this volume brings together a broad set of perspectives and methodologies to underscore the importance of archaeological and historical data as a tool to better understand long-term anthropogenic impacts on the environment. While the academic community continues to seriously consider the enduring effects of human influence on the environment, opinions based in the denial of environmental change as a result of anthropogenic factors persist. *Viewing the Future in the Past: Historical Ecology Applications to Environmental Issues* offers thoughtful and informative discussions as we consider our responses to anthropogenic changes in the environment.

Walter A. Clifford IV works as an archaeologist and compliance coordinator for the Savannah River Archaeological Research Program (SRARP). His interests include paleoethnobotany, early colonial entanglements, GIS, heavy metal, and puppies.

ABOUT THE CONTRIBUTORS

Dan F. Morse is a retired archaeologist who worked for the Arkansas Archeological Survey for 31 years. His major research interests are primitive technology and prehistoric Native Americans, particularly Paleo-Indian.

Phyllis A. Morse is a retired archaeologist who worked mostly as a volunteer. Her major research interests are southeastern US historic complexes, particularly 16th-19th centuries.

Robert C. Costello earned his Ph.D. in Biochemistry from Stanford University in 1970. Since 1980, he has served on the faculty of USC Sumter, where he currently holds the rank of Professor of Chemistry. Since 2008, he has been involved in collaborative research in archaeology with Kenn Steffy, which has resulted in several presentations and publications. He received the 2011 ASSC Article of the Year Award for his *South Carolina Antiquities* article "Macroscopic Analysis of an Allendale Chert Flake Tool Assemblage from Northeastern Lake Marion."

Ronald W. Anthony has worked at The Charleston Museum as an archaeologist since 1989 and as an Adjunct Professor of Anthropology at the College of Charleston since 1990. Originally trained in Southeastern US prehistoric archaeology, his research has centered on the archaeological investigation(s) of Lowcountry Colonial and Antebellum Plantations since the late 1970s. Specifically, his research interests have focused on cultural interaction(s) among the myriad of Colonial and early Antebellum populations of the Lowcountry and how they are reflected materially.

Andrew A. White is an Assistant Research Professor at the South Carolina Institute of Archaeology and Anthropology, University of South Carolina. He is an anthropological archaeologist with interests in hunter-gatherers, lithic technology, human evolution, and complex systems theory. His research program focuses on combining archaeological methods and theory with ethnographic data and computational modeling to develop new ways to understand the social, cultural, and evolutionary aspects of the human past.

Christopher Judge is the Assistant Director of Native American Studies at the University of South Carolina Lancaster and directs the Native American Studies Center. He teaches anthropology and archaeology courses and conducts the weekly Kolb Site all-volunteer archaeology lab on Thursdays.

Chester DePratter is a Research Professor at the South Carolina Institute of Archaeology and Anthropology, Universty of South Carolina. He has been involved in tracing Spanish exploration routes since 1976. For the past 26 years he has worked at Santa Elena, the one-time capital of Spanish Florida located on Parris Island, South Carolina. His other recent research interests include coastal shell middens, Civil war prison camps, and the origins of the Yamasee Indians.

Val Green is a ninth generation South Carolinian, who grew up in Bishopville. Val has a Civil Engineering degree from Clemson and an Environmental Engineering degree from the University of Texas. He has worked as an environmental regulator, a private practice engineer, and a college professor. He is currently working with a non-profit organization on water and wastewater projects. Val lives on his mother's family farm in western Fairfield County and has 4 children and 12 grandchildren.

Purchase Back Issues of South Carolina Antiquities

Year	Volume	Editor	Contents	Cost
2015	47	Christopher R. Moore	General Issue: Early Archaic Cultural Landscape - J. C. Gilam; Topper Blade Core - R. C. Costello and K. Steffy; Excavations at Hitchcock Woods - C. Steen; Mid-Nineteenth Century Quilt - G. Wingard and D.Tritt; Settlement Patterns at Sampson Island - E. Mason, M. Banschbach, C. Curry, D. Day, S. Love, and D. P. Bigman; A Brief History of Yamasee War - J. B. Marcoux; The Routes of the Spanish in SC - V. Green.	$10.00
2014	46	Christopher R. Moore	General Issue: Paleoindian in COWASEE - A. C. Goodyear; Archaeology at the Rev. John Landrum Site - C. Steen; Prehistory at High Creek Plantation - A. C. Goodyear, and J. E. Wilkinson; Wyboo Chert Lithic Assemblage - R. C. Costello and A. C. Goodyear; Battle of Hobkirk Hill - T. A. Ghaffar and J. L. Smith; Material Quality and Tool Form at the Johannes Kolb Site - J. E. Wilkinson.	$10.00
2013	45	Jodi A. Barnes	Special Issue: The Life and Times of Leland Ferguson: From Mississippian to Moravia - A. Agha; J. Halsey and J. Reid; C. Judge; S. South; D. Babson; R. Anthony; N. Pope and R. Affleck; K. Barile; M. Posnansky; M. Hartley; L. Ziengenbein; G. Hughes; L. Ferguson	$10.00
2012	44	Jodi A. Barnes	General Issue: A Cache from Frierson Bay, Barnwell County SC - C. R. Moore, M. J. Brooks, J. K. Feathers & T. Charles; Settlement Indians of the South Carolina Lowcountry - C. Steen; Defining Wando - J. B. Marcoux & E. C. Poplin; A Belmont Neck Phase Ceramic Assemblage - J. A. Varnier; The St. Paul's Parsonage House - K. Pyszka; Archaeology of the Gullah Past - J. Barnes & C. Steen.	$10.00
2011	43	Jodi A. Barnes	General Issue: Revisiting the Ashley-series A - J. B. Marcoux, B. Lansdell, & E. Poplin; Alkaline Glazed Stoneware Origins - C. Steen; Archaeological Investigations, LiDAR Aerial Survey, & Compositional Analysis of Pottery in Edgefield - G. Calfas, C. Fennell; B. Kenline, & C. Steen; An Archaeological Assessment of the Historic Brattonsville Cemetery - C. Brooks, A. Temple, R. Ayers & A. Harris; Macroscopic Analysis of an Allendale Chert Flake Tool Assemblage from Northeastern Lake Murray - B. Costello; 'Integration took the people:' Atlantic Beach, Segregation & Cultural Landscape - R. Dobrasko	$10.00
2010	42	Jodi A. Barnes	General Issue: Geologic differences & the histories of North & South Carolina – J. J.W. Rogers & E. Steponaitis; Clovis Blade Technology at the Topper Site – D. Sain; Availability & Selection of Stone Tool Raw Materials in Relation to the Kolb Site - C. Young.	$10.00
2009	41	Carl Steen	The First 40 Years of *South Carolina Antiquities*, The Contributed Papers Concerning the Archaeology of South Carolina & the Southeast, 1968-2008 on DVD.	$25.00
2008	40	Natalie Adams	General Issue: Prehistoric Settlement & Land Use on Port Royal Island – B. Botwick; Postbellum Life on Hilton Head Island – P. H. Garrow; Archaeologically Testing the Tabby Point Ruin, Callawassie Island – S. A. South; Archaeological & Historic Context for South Carolina's Sawmill, Timber, & Lumber Industry – B. Southerlin; Camps Tolerably Well Policed: Artifact Patterns at the Florence Stockade – P. G. Avery; Presencing African Americans at the Seibels House - T. M. Weik; The Archaeology of Mann-Simons – J. D. Crockett.	$10.00
2007	39	Martha A. Zierden, Elizabeth J. Reitz, and J.W. Joseph	Special Issue: Supplying the Colonial Markets: Archaeological Investigations of Food Distribution in the Lowcountry Contributors: K. L. Orr & G. S. Lucas; J.W. Joseph; L. E. Raymer; L. D. O'Steen; M. A. Zierden; E. J. Reitz; J.W. Joseph & T. M. Hamby; H. R. Smith; G. S. Lucas	$10.00
2006	38	Natalie Adams	General Issue: Prehistoric Lifeways on the Coast as Reflected by Zooarchaeological Analysis – D. M. Reid; A History of the Phosphate Mining Industry in the Lowcountry - K. A. Shuler, R. Bailey & C. Philips; Place, Place-making, & African-American Archaeology - A. Agha; The Towne Before the City: The Caribbean Influence at 1760 Charles Town – M. J. Stone	$10.00

2005	37	Natalie Adams	General Issue: Archaeology & Geology of the Zorn Sites, Bamberg County – K. E. Sassaman, P. G. Nystrom, & S. Zorn; The English Style in Charleston: Analysis of Ceramic Tea Wares – B. Botwick; Wando Series Ceramics: Behavioral Implications of a Local Ceramic Type - E. C. Poplin; The Relationship Between Professional & Avocational Archaeologists - E. Heimbrook; Provenance of Lithic Artifacts at Wilson Pond, Aiken County – W. Kubilius & K. Stephenson.	$10.00
2004	36	Natalie Adams	General Issue: The Archaeology of Plantation Landscapes & the Landscape of Plantation Ideology in the Lowcountry; J.W. Joseph; Using Archival Collections to Understand Historic Properties - P. J. McCawley; The History of SC Plantation Archaeology & the Archaeologists Who Practice It – L. F. Stine & N. P. Adams; Archaeology of Our Frontier Past – D. C. Crass & M. Zierden; The Charleston Judicial Center Site Colonoware Production and Typology - J.W. Joseph.	$10.00
2003	35	Carl Steen & Chris Judge	Special Issue: Archaeology at Sandstone Ledge Rockshelter	$4.00
2002	34	J. Christopher Gillam	General Issue: Toys in the Attic: The ATTIC Project - S. South; Ceramic Analysis of the Ed Marshall Site, Edgefield County - T. Braje; An Examination of Paper Reuse in the Mountains of Western North Carolina - M. Harmon; Periwinkle Punctation: Paucity or Preponderance? - B. D. Tucker & R. Saunders; Indigo, Cotton & Slaves: The Antebellum Period on Parris Island, C. L. Shumpert.	$4.00
2001	33	J. Christopher Gillam	General Issue: Science & Art in Archaeology: From Potsherds to Public Interpretation - S. South; Ceramics on the Northern Coast: Cooter Creek - C. O. Clement; Web-based Archaeological GIS - H. M. Gillam; Ceramic Taphonomy, Prehistoric Technology & Site Formation in the Carolina Sandhills - J. M. Herbert.	$4.00
2000	32	Chris Judge & Carl Steen	Special Issue: The Daw's Island Volume: A Tribute to the Career of James L. Michie	$4.00
1999	31	Rebecca Barrera & Natalie Adams	The Bear Creek Site: Paleoindian & Archaic Occupation in the Lower Piedmont of SC - L. O'Steen	$4.00
1998	30	Lisa R. Hudgins	General Issue: A Paleoindian Site in the Piedmont – C. J. Rinehart; Mississippian Ceramics in Beaufort County – C. M. Huddleston; 'Jug Well' Cisterns – S. A. South; Population Increases & the Domination of Maize in the Late Prehistoric Diet in the Eastern US - D. Reid; The Telescopic Boom Hydraulic Excavator - S. A. South.	$4.00
1997	29	Kenneth Sassaman	General Issue: Bioarchaeological Investigation of Late Archaic Stallings Culture – K. J. Wilson; Settlement Organization & Resource Use in the Sandhills - T. McMakin & E. C. Poplin; Clovis Origins – B. McAmis.	$4.00
1996	28	Kenneth Sassaman	General Issue: Shell Tool Production in Charleston County – W. L. Koob; 'They Worked Their Own Remedy': African-American Herbal Medicine and the Archaeological Record - M. D. Grover & T. E. Bauman; Pre-Clovis: A Review of the Evidence and Implications for the Paleoindian Colonization of the Americas - B. McAmis; Material Characteristics of Operator and Tenant Farmsteads in the Aiken Plateau, 1875-1950 - M. A. Cabak & M. M. Inkrot.	$4.00
1992	24	Kenneth Sassaman	General Issue: Copperhead Hollow: Middle Holocene Upland Conditions in the Piedmont– J. D. Gunn & J. E. Foss; Cemetery Hill Archaeological Project: John C. Calhoun's Pre–Emancipation African Americans - C. Cowan-Ricks; Slaves and Textile Manufacture: Archaeology of the Howell Site, Richland County - M. D. Groover; The Struggle for the Frontier: History & Archaeology at New Windsor Township - D. C. Crass & B. R. Penner	$4.00
1991	23	Kenneth Sassaman	General Issue: Investigations at the Federal Correctional Institution, Estill, Hampton County - C. H. LeeDecker & B. Resnick; Barbacoas and the Importance of Food and Tribute Storage in the Late Mississippian - C. Judge; Adaptive Flexibility in the Morrow Mountain Phase of the Middle Archaic - K. E. Sassaman; Early Research on Alkaline-Glazed Pottery - S. South	$4.00
1990	22	Kenneth Sassaman	General Issue: A Large Biface from the Phil Neeley Site, Bamberg County – A. C. Goodyear; A Point-Bar Site on the South Edisto River in the Upper Coastal Plain: Depositional History and Environmental Implications - M. J. Brooks; Biotrubation and Gravity as a Potential Site Formation Process: The Open Area Site, Georgetown County - J. L. Michie.	$4.00

Order online at: www.assc.net/publications/back-issues-for-sale