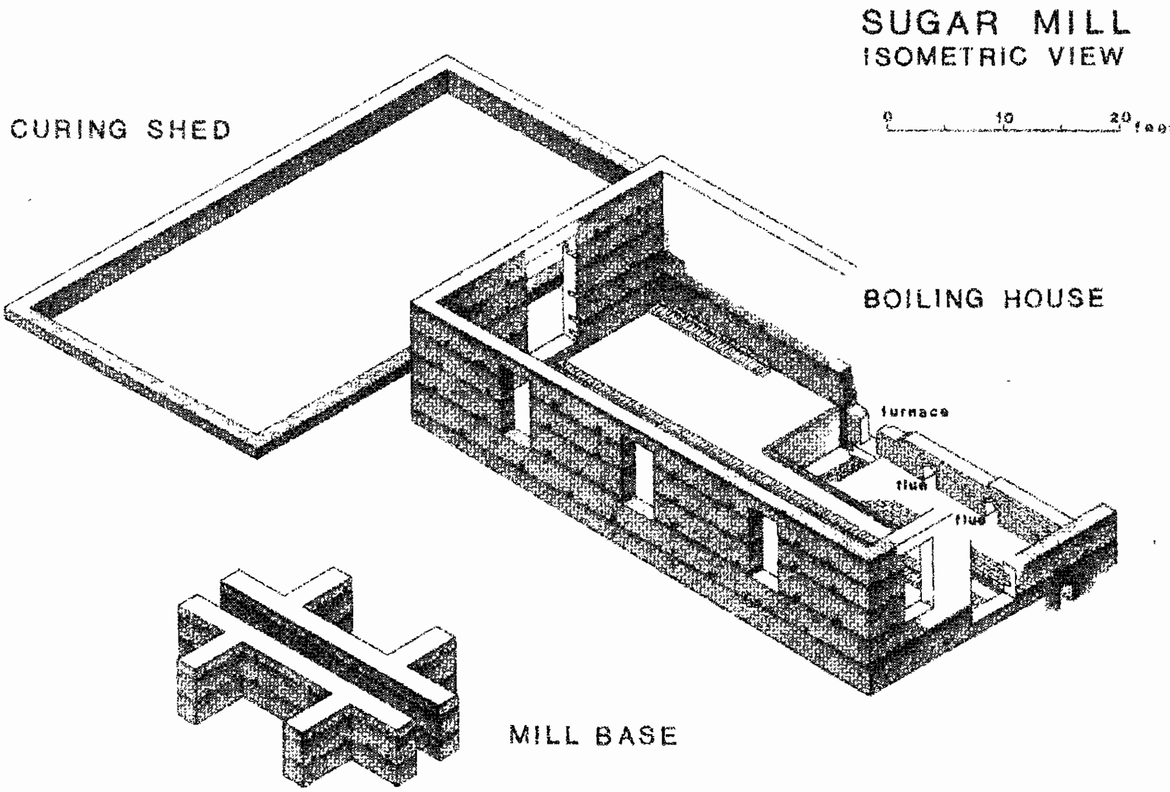
FURTHER INVESTIGATIONS OF PREHISTORIC AND HISTORIC LIFEWAYS ON CALLAWASSIE AND SPRING ISLANDS, BEAUFORT COUNTY, SOUTH CAROLINA



CHICORA FOUNDATION RESEARCH SERIES 23

FURTHER INVESTIGATIONS OF PREHISTORIC AND HISTORIC LIFEWAYS ON CALLAWASSIE AND SPRING ISLANDS, BEAUFORT COUNTY, SOUTH CAROLINA

RESEARCH SERIES 23

Michael Trinkley, Editor

Contributors:
Colin Brooker
Arthur D. Cohen
Mona Grunden
Debi Hacker
David Lawrence
Michael Trinkley
Jack H. Wilson, Jr.

Chicora Foundation, Inc.
P.O. Box 8664
Columbia, South Carolina 29202

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These riddles may be hard to read, but they do tell us plainly what we most need to know. They tell us that our future largely depends upon ourselves. We are not just at the mercy of an inerable fate.

--Arnold J. Toynbee
Civilization on Trial

ABSTRACT

This study provides further information on the prehistoric and historic archaeology of Spring and Callawassie islands in Beaufort County, South Carolina. Incorporated in this report is a discussion of the previous archaeological research on both islands, an intensive archaeological survey of the undeveloped portions of Callawassie Island, and excavations at five prehistoric sites.

The prehistoric sites investigated include 38BU19, a village area associated with a Late Woodland St. Catherines and Savannah phase burial mound; 38BU464, a second Late Woodland St. Catherines and Savannah phase village area possibly associated with the mound; 38BU1214, a late Early Woodland Deptford phase shell midden site on Spring Island; and 38BU1249 and 38BU1262, both shell midden sites on Callawassie Island which exhibit Early through Late Woodland occupation. Site 38BU1214 also contains a significant late eighteenth and early nineteenth historic period site consisting of an isolated, ephemeral domestic structure.

The investigations include a detailed discussion of the excavations, artifact categories, and site formation processes for the prehistoric sites. Of particular concern is the analysis of the cordage characterizing the late Early through Late Woodland Deptford, St. Catherines, and Savannah series wares. In addition, the study incorporated radiometric dating of several components, palynological excavation of the sites, analysis of shellfish remains, and a detailed discussion of the faunal and ethnobotanical materials recovered.

For Callawassie Island a detailed discussion of the tabby structures, including a sugar mill, slave settlement, and main settlement, has been incorporated. The Callawassie Island sugar mill is the only such structure reported for South Carolina, but is similar to others identified in Georgia. Unfortunately, all of the historic settlements on Callawassie Island are located in areas either currently developed or sold to private individuals.

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ACKNOWLEDGEMENTS

This work was funded under a series of three agreements, one from Callawassie Island Development Corporation for an archaeological survey of selected portions of Callawassie Island, a second also from Callawassie Island Development Corporation for data recovery excavations at four sites on the island (38BU19, 38BU464, 38BU1249, and 38BU1262), and the third from the Spring Island Development Corporation for data recovery excavations at 38BU1214 on Spring Island. I wish to thank the principals of the Callawassie and Spring Island Development Corporations, especially Mr. Jim Chaffin, Mr. Jim Light, and Dr. Peter LaMotte. The project coordinator for each of these projects was Mr. Glen McCaskey of Chernoff/Silver and Associates. I wish to thank him for his support, encouragement, and interest in the prehistory and history of the South Carolina lowcountry.

A number of individuals on Spring and Callawassie islands made life more pleasant for us during these projects, including Messrs. Gordon Mobley, Marion Cooler and Gerry Beaman, and Ms. Kathy Reap. Unfortunately, I do not know the names of all the individuals on Callawassie Island, including the maintenance crews, administrative staff, housekeeping, and security personnel, but they all went out of their way to ensure our comfort and convenience.

I also owe a deep debt of gratitude to my associates who worked on this project, including Ms. Natalie Adams, Mona Grunden, Liz Pinckney and Ruth Trocolli who worked in the field, and Ms. Debi Hacker who conducted the analysis and conservation of the artifacts. I am fortunate to have such dedicated and professional colleagues.

The authors of the various sections of this study, including Mr. Colin Brooker, Ms. Debi Hacker, Ms. Mona Grunden, Dr. David Lawrence, Dr. Arthur Cohen, and Dr. Jack Wilson, Jr. not only provided their expertise on a timely and professional basis, but worked very hard to ensure that as much as possible was revealed by the accumulated data. Ms. Mona Grunden and Mr. Colin Brooker have spent a considerable amount of their own time on the research associated with the Callawassie Island sugar mill and were gracious enough to provide their notes, times, and skills to ensure that this very important site was properly recorded and discussed.

There are several colleagues who deserve my appreciation and thanks. Mr. Keith Derting at the South Carolina Institute of Archaeology and Anthropology graciously assisted us in obtaining site numbers, working out the multitude of problems associated with the process, and worked with us to identify much of the lithic materials present from the sites. Mr. Michael Taylor, Director of The Environmental and Historical Museum of Hilton Head Island worked with us to ensure the professional curation of the collections and allowed us to use the museum for a presentation on the archaeology of Spring Island. I also wish to thank Dr. Linda Stine, past South Carolina State Preservation Office Archaeologist, for her assistance, guidance, and detailed review of the proposals, research, and draft report of this study. The study is certainly much better for her interest and deep concern. I also wish to thank Mr. Lee Tippett, also an archaeologist with the South Carolina Department of Archives and History for his attention to this project.

Peer review comments were provided by Mr. Mark Brooks. I appreciate his honesty, time, and interest in the project. The study has benefitted from his review, although I certainly accept responsibility for any errors or omissions which are present.

This project was begun under the review of Dr. Patricia Cridlebaugh, South Carolina State Historic Preservation Office Archaeologist. Her death leaves both a personal and professional void that is impossible to describe. I hope that the research discussed here would have met with her approval.

INTRODUCTION

Michael Trinkley

Background

In accordance with the Coastal Zone Management Act of 1977, the South Carolina Coastal Council, in consultation with the South Carolina State Historic Preservation Officer (S.C. SHPO), stipulated in its permitting process that an archaeological survey of the undeveloped portions of Callawassie Island should be conducted by the Callawassie Island Development Corporation. The purpose of the survey was to identify Geographic Areas of Particular Concern (GAPC) listed on, eligible for, or potentially eligible for listing on the National Register of Historic Places. As a result of this survey, a series of six sites were recommended as eligible for inclusion on the National Register and these assessments were accepted by the S.C. SHPO. Design considerations revealed that four of these sites could not be green spaced and data recovery excavations were necessary. In addition, data recovery excavations were also undertaken at one site on Spring Island, again in compliance with requirements of the Coastal Zone Management Act.

These investigations were conducted by Dr. Michael Trinkley of Chicora Foundation, Inc. for Callawassie and Spring Island Development Corporations (Mr. Glen McCaskey, Project Coordinator), developers of the two island resort communities. Spring Island, about 3500 acres in size, is situated about 13 miles southwest of Beaufort and 5 miles northwest of Hilton Head Island. Callawassie Island, only about 880 acres, is separated from Spring Island by Callawassie Creek. The two islands form a high ground "core" surrounded by the Colleton River to the south and southwest, the Chechessee River to the east and north, and Chechessee Creek to the northwest. The Broad River, which empties into Port Royal Sound, lies to the east of Spring and Callawassie islands (Figure 1).

The proposed development of Spring Island has been discussed by Trinkley (1990b:1) and will involve extensive land modification for golf courses, house lots, roads, and utilities. The previous survey identified 29 sites eligible for inclusion on the National Register. Data recovery excavations have been conducted on one previous site (Trinkley 1990b:53-69). Data recovery in this project included one additional site, 38BU1214.

Several phases of development on Callawassie Island have been completed, including the construction of about 9.5 miles of roads, an 18-hole golf course, underground utilities, and house

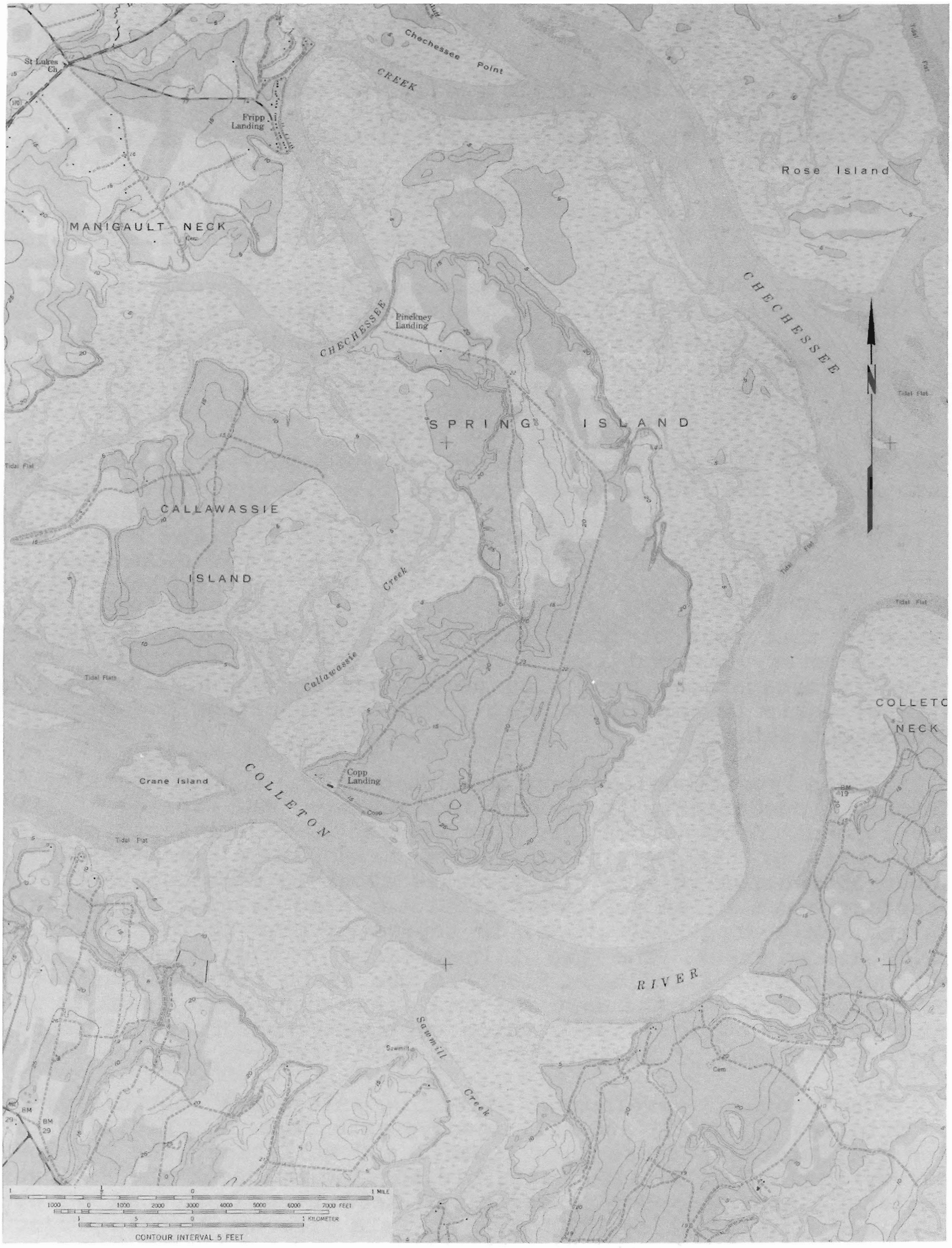


Figure 1. Callawassie and Spring Island area.

construction. The additional survey on Callawassie Island is limited to approximately 300 acres or 34% of the island. The portion of Callawassie Island incorporated into the survey includes three relatively large undeveloped tracts and a number of additional unsold, but subdivided, house lots.

The archaeological survey and evaluation of the Spring Island tract was conducted by Chicora Foundation in 1989 and 1990 (Trinkley 1990b). The initial work on Callawassie Island was a reconnaissance level survey conducted for a previous developer, the Three Fountainview Corporation, by the South Carolina Institute of Archaeology and Anthropology in 1981 (Michie 1982). At that time 88 sites were identified on the island, six of which were considered "significant" and presumably eligible for inclusion on the National Register. The survey, conducted at a reconnaissance level, was unfortunately unable to identify all of the sites on the island and failed to provide clear assessments for a number of "small" shell middens. Regardless, the Three Fountainview Corporation failed to pursue compliance with cultural resource protection requirements such as the Coastal Zone Management Act.

In 1982 the South Carolina Institute of Archaeology and Anthropology conducted test excavations at the Callawassie Island Burial Mound (38BU19), one of the sites previously identified by Michie as significant (Brooks et al. 1982). These investigations revealed the presence of a relatively intact burial mound and an associated village area.

In early 1984 Dr. Larry Lepionka began excavations at a historic site on Callawassie Island (38BU409), although it has not been possible to determine whether this work was related with an intent to comply with cultural resource protection regulations. This work extended over a year and resulted in the near complete excavation of the site. The results of this work have not been published nor have the artifacts and field notes been curated. Chicora Foundation understands that the field notes and artifacts are presently held by Dr. Lepionka, although he has no plans for completing the report (Glen McCaskey, personal communication 1990).

Chicora Foundation was contacted by Mr. Glen McCaskey in early 1990 with the request to prepare a proposal for the survey of those portions of Callwassie Island which had not yet been developed. Chicora submitted a proposal dated February 22, 1990 and an agreement to perform this work was approved by Callawassie Development Corporation on May 14, 1990. Subsequent to this work, Chicora was requested to prepare a proposal for data recovery at three sites on Callawassie Island. This proposal, dated August 6, 1990, was approved by the S.C. SHPO on September 5, 1990 (letter from Dr. Linda Stine to Mr. Glen McCaskey) and an agreement was signed on August 24, 1990.

Mr. McCaskey also requested that Chicora develop a proposal for data recovery excavations at 38BU1214 on Spring Island. A proposal for that work, dated February 10, 1990 was approved by the S.C. SHPO on March 1, 1990 (letter from Dr. Patricia Cridlebaugh to Mr. Glen McCaskey) and an agreement was signed on June 23, 1990.

The background and archival research specific to the work on Callawassie Island was conducted by Dr. Michael Trinkley, Ms. Mona Grunden, and Mr. Colin Brooker from August 13 through 17, 1990, although Ms. Grunden has previously compiled a great deal of historic research on Callawassie which she graciously provided to this project.

The field investigations on Spring Island at 38BU1214 were conducted by a crew of four from July 16 through August 10, 1990. A total of 594 person hours were spent in the field with an additional 94 person hours of field processing and laboratory time. The field survey of Callawassie Island, conducted by a crew ranging from two to five individuals, was conducted in two stages from May 21 through May 25 and June 25 through July 6, for a total of 448 person hours. Data recovery excavations on Callawassie were conducted by a crew of four from September 3 through November 2, 1990. A total of 707.5 person hours were devoted to the field work and an additional 96 person hours were spent on field processing and laboratory analysis.

The laboratory work and analyses for these projects began in August and were conducted on an intermittent basis through November 1990, with the work directed by Ms. Debi Hacker. Artifact conservation, necessary for only a small number of items from historic sites, was conducted at the Chicora Foundation laboratories in November 1990 by Ms. Hacker.

This research includes a complex mix of both survey, site assessment, and data recovery. The materials from Spring Island are included in this not simply because the Spring Island Development Corporation and the Callawassie Island Development Corporation have the same principals, but because the survey on Callawassie and the data recovery on Callawassie and Spring islands are intimately related. Together they provide a much clearer view of aboriginal lifeways than is possible in individual reports.

Goals

The primary goals of the Callawassie survey were, first, to identify the archaeological resources on the undeveloped portions of the island; and second, to assess the ability of these sites to contribute significant archaeological, historical, or anthropological data. The second goal essentially involves the sites' eligibility for inclusion on the National Register of Historic Sites, although Chicora Foundation only provides an opinion of National Register eligibility and the final determination is made by the S.C. SHPO at the South Carolina

Department of Archives and History.

Secondary goals were, first, to examine the relationship between site location, soil types, and topography, expanding the previous work by Brooks and Scurry (1978) and Scurry and Brooks (1980) in the Charleston area and Trinkley (1990b) on neighboring Spring Island; second, to examine prehistoric site settlement options and systems on Callawassie Island, particularly in comparison to adjacent Spring Island; and third, to explore the historic documentation surrounding sugar production in South Carolina and the specific architectural remains on Callawassie Island.

Once identified, all of the sites in the survey areas of Callawassie Island were evaluated for their potential eligibility for inclusion on the National Register of Historic Sites. It is generally accepted that "the significance of an archaeological site is based on the potential of the site to contribute to the scientific or humanistic understanding of the past (Bense et al. 1986:60). Site significance in this survey was evaluated on the basis of five archaeological properties: site integrity (which received the heaviest weighting); site clarity; artifactual variety; artifactual quantity (which received the lowest weighting); and site environmental context (Glassow 1977). These qualities stress properties of the archaeological record, rather than a site's ability or potential to assist in providing data to a limited, and possibly transient, research design. While Glassow's criteria for eligibility are qualitative, rather than quantitative, no better device for judging site significance has been developed by the archaeological community over the past 13 years.

Site integrity is given the greatest importance since without it, interpretation of the archaeological remains will be tenuous. Artifact quantity is considered the least significant of the properties since the quantity of remains will be entirely dependent on the site type and exposure. Sites which were occupied for longer periods, or which reflect a higher status occupation, or which are domestic, will naturally produce artifacts in greater numbers than sites of brief occupation, or sites of low status, or sites which reflect industrial or specialized activities. All of these sites, however, comprise the totality of the human record and must be examined if a synthesis of past lifeways is to be achieved. Likewise, quantity of remains will be affected by the percentage of cleared ground, the length of collecting time, the number of units excavated, and their placement. The remaining characteristics of artifactual variety, site clarity, and environmental context, are of intermediate value.

In addition, it was important to also evaluate sites for their potential to answer significant and substantive questions. Butler suggests that the only valid measurement of significance must be based on what he calls the "theoretical and substantive knowledge of the discipline" at any particular moment in time (Butler 1987:821). While the use of this approach over that developed by Glassow (1977) has been suggested, Butler himself acknowledges, "we cannot foresee future research questions, and we may not possess the theory to interpret and understand all that is present" (Butler 1987:822). At this point in time it seems essential to recognize the importance of asking the right questions at the right sites, not limiting the number of sites at which questions are asked, or what questions are posed. Clearly, asking the "right questions" at the "right sites" can be difficult and requires an understanding of the "theoretical and substantive knowledge of the discipline" (for a more detailed discussion of these questions, particularly relating to Woodland Period sites, see Trinkley 1990a:30-31).

The work begun on Spring Island to investigate prehistoric and historic site settlement locations are of considerable importance, not only because they have immediate use in directing future survey research, but also because they begin to unravel the underlying rationale for site locations. The continuation of this research on Callawassie Island is of importance in that it extends the rather localized level of previous research to an adjacent island. As research continues it will be possible to develop settlement hypothesis or models which can be used on a regional basis for predicting site locations more accurately.

The data recovery excavations on Spring and Callawassie islands eventually included portions of five sites (38BU19, 38BU464, 38BU1249 and 38BU1262 on Callawassie Island and 38BU1214 on Spring Island). All were recognized primarily as prehistoric sites (although research at 38BU1214 revealed a significant historic component) dating from as early as 500 B.C. (Deptford Phase) through A.D. 1200 (Savannah Phase). All of the sites were originally recognized by the presence of shell middens.

Several of the sites might have been previously characterized as "small" and "typical" and therefore unworthy of additional attention. In fact, one site, 38BU1214, was described by Lepionka as "typical of the region" and "too limited in extent, depth, and probably function" to be considered eligible for the National Register (Lepionka 1986:108). Had this recommendation been accepted by the S.C. SHPO, our information on Deptford settlement and subsistence, as well as our understanding of isolated, low status plantation sites, would have been greatly decreased.

When these types of sites have been investigated (see, for example, Trinkley 1981) they have been traditionally excavated and subjected to typical archaeological analytical techniques. The results of such studies largely demonstrate that "traditional" archaeological techniques and questions which emphasize the recovery of diagnostic cultural remains are largely unsuitable for anthropological reconstructions.

Such sites frequently fail to yield large quantities of pottery, diagnostic lithics, or other archaeological specimens. The sites may also fail to produce other objects of traditional archaeological investigation and interpretation, such as abundant pits or post holes. While these alone can be considered significant clues to the sites' functions, they must be coupled with a more intensive collection and analysis of subsistence remains. Of primary concern should be the collection of reliable subsistence information (including shellfish, ethnobotanical, faunal, and even palynological materials).

Consequently, the data recovery excavations at the four sites on Callawassie Island and the single site on Spring Island attempted to integrate a number of recent recommendations for Woodland Period research developed by Chicora for the South Carolina Department of Archives and History (see Trinkley 1990a:31-37). These include: typological and chronological analysis, subsistence studies, and settlement analysis.

The typological and chronological questions involved primarily the Deptford, St. Catherines, and Savannah phases. It was felt that none of these sites could provide any reasonable stratigraphic information, although temporally discrete features were sought for reliable radiometric determinations. While DePratter (1979) has provided useful and accurate information on the temporal periods along this part of the South Carolina coast, much of his synthesis is based on coastal Georgia data with little or no independent verification at South Carolina sites. Relatively little research has been conducted on the Middle Woodland pottery typology and ceramics, and research on the nature of the ubiquitous cord marking used as surface treatment is virtually absent. Consequently, the research was directed at providing a detailed assessment of both paste and cordage. It was hoped that this research, however tentative, might hold out hope for unraveling the confusion surrounding Middle to Late Woodland Period cord marked ceramics.

The subsistence questions involved the seasonality of the remains, the evidence they could provide regarding the habitats being exploited and the intensity of that exploitation, and the methods of collecting being used. While determining the importance of each resource to the diet was also recognized as an extremely important research goal, it was tempered by the recognition that many analytical techniques, such as biomass, diversity, and equitability determination, while relatively easily determined for faunal remains, are very difficult to apply to ethnobotanical and shellfish materials.

To ensure that subsistence materials would be intensively sampled in a uniform manner and comparable between sites, the use of certain similar methods, including the use of 1/8-inch mesh, the collection of flotation samples, and the collection of shell columns, was employed at each site. In addition, each shell midden was quantified by weight, providing shell/soil ratios.

The primary settlement question explored by this research involved the potential to discover intra-site patterning. To this end both midden and non-midden areas were intensively examined in the hopes of not only identifying specific activity areas, but also of locating structural remains.

When a historic component was discovered at 38BU1214, the research questions were broadened to seek information on the nature and function of this rather ephemeral and apparently low status site. Previous survey level investigations on Spring Island had revealed sparse evidence of such sites (see Trinkley 1989). It was noted that they probably:

> represent archaeological features occasionally mentioned in historical documents but rarely identified archaeologically. While few architectural details are present, the sites have yielded evidence of mortar wattle and daub fragments. The archaeological remains suggest low status, probably slave dwellings. Such isolated structurés probably served very specific functions, such as housing for rice gate tenders or those tending agricultural fields. Craton briefly discusses the function of "watchmen," who were:
>
>> set to live in a hut on the edge of the fields or provision grounds . . . . expected to be vigilant twenty-four hours a day, seven days a week (Craton 1987:214).
>
> These individuals watched over the crops, protecting them from invading birds, wild hogs, and theft (Trinkley 1990b:168).

Consequently, the investigations were designed to provide architectural details such as the size of the structure, its construction techniques, and form, as well as information on the items of material culture present at the site. These latter data were anticipated to provide information on the status of those living at the site and the site's possible function.

Although, as previously explained, we have no information on the archaeological excavations conducted at the Callawassie sugar mill complex (38BU409) by Lepionka, architectural analysis of the complex was undertaken by Colin Brooker. This work was intended to provide not only architectural documentation of the remains, but also a synthesis of the site and its relationship to sugar production in South Carolina. This study has also offered some suggestions for the long term preservation of the tabby and emphasized the importance of obtaining a comprehensive analysis and discussion of the accompanying archaeological data.

It is more than simply unfortunate that the archaeological investigations previously conducted at the Callawassie Sugar Mill have not been reported and that the collections have not been curated for the public good. The site represents the only archaeologically and architecturally documented sugar processing complex in South Carolina and is therefore unique. The comparison of the archaeological data from the Callawassie Sugar Mill to those excavated both in Georgia and in Caribbean is of exceptional importance in understanding the complex relationships of these industrial sites. A complete discussion of the site would also add tremendously to our knowledge of alternative economies on South Carolina's Low Country plantations.

This problem is compounded by the extensive damage which has occured to the Sugar Mill site since it was visited by Lepionka in 1984. While the Sugar Mill itself has been green spaced, no appropriate efforts have been undertaken to ensure the long-term preservation of the site and an attempt to repoint the mortar of the brick wall associated with the structure by the previous owners failed to implement common preservation standards (Mack et al. 1980). The surrounding complex, which included several slave structures and a possible overseer's structure, was never properly surveyed and excavations by Lepionka were apparently very limited. Today this associated complex is essentially destroyed. The loss to South Carolina's heritage has been tremendous.

Curation

Archaeological site forms have been filed with the South Carolina Institute of Archaeology and Anthropology and the South Carolina State Historic Preservation Office. In addition, archival copies of the site forms have been provided to The Environmental and Historical Museum of Hilton Head Island.

The field notes, photographic materials, and artifacts resulting from Chicora Foundation's investigations have been curated at The Environmental and Historical Museum of Hilton Head Island as Accession Numbers 1990.5 (Callwassie Island Survey), 1990.6 (data recovery at 38BU1214 on Spring Island) and 1990.7 (data recovery at 38BU19, 38BU464, 38BU1249, and 38BU1262 on Callawassie Island). The artifacts from the Callawassie survey have been cataloged as ARCH 2573 through ARCH 2798, those from the data recovery excavations at 38BU1214 have been cataloged as ARCH 2799 through ARCH 2914, and those from the data recovery excavations on Callawassie have been cataloged as ARCH 2915 through ARCH 3073 (using a lot provenience system). The artifacts have been cleaned and/or conserved as necessary. Further information on conservation practices may be found in the Research Strategy and Methods Section of this report. All original records and duplicate copies were provided to the curatorial facility on pH neutral, alkaline buffered paper and the photographic materials were processed to archival permanence.

NATURAL SETTING

Michael Trinkley

Beaufort County is located in the lower Atlantic Coastal Plain of South Carolina and is bounded to the south and southeast by the Atlantic Ocean, to the east by St. Helena Sound, to the north and northeast by the Combahee River, to the west by Jasper and Colleton counties and portions of the New and Broad rivers. The mainland primarily consists of nearly level lowlands and low ridges. Elevations range from about sea level to slightly over 100 feet above mean sea level (MSL) (Mathews et al. 1980:134-135). Spring Island is a sea island bounded by the Chechessee River and the Chechessee Creek to the north, the Chechessee and Colleton rivers to the east, the Colleton River to the south, and the Callawassie and Chechessee creeks to the west. The island measures about 4 miles north-south by 1.2 miles east-west. Elevations range from about 5 to 25 feet MSL. Callawassie Island, also a sea island, is bounded by the Chechessee Creek to the north, the Callawassie Creek to the east, the Colleton River to the south, and tributaries of Chechessee Creek and Colleton River to the west and northwest. Callawassie Island measures about 2.5 miles east-west by 1.8 miles north-south and elevations range from 5 to 16 feet MSL.

Topography on Spring Island tends to be level to slightly rolling in the vicinity of drainages. The west central and east edges are characterized by gradual to steep slopes to the saltwater marshes of Callawassie Creek and the Chechessee River respectively. There are only two areas on the island where high ground meets deep water -- at Pinckney Landing on the northwestern corner (adjacent to Chechessee Creek) and at the southwestern tip (adjacent to the Colleton River). The topography at the north end of the island tends to be low and flat. The interior of the island is characterized by low drainages running north-south and higher sandy ground on either side, forming what may be a remnant ridge and swale formation. On Callawassie Island the topography tends to be low and relatively level. No major sloughs or drainages are present, although several remnant drainages are characterized by areas of poorly drained soils. Elevations tend to be higher on the northern and northwestern portions of the island. The only deep water access on Callawassie Island is that found at the north edge of the island on a small tributary of Chechessee Creek.

Climate

In the early nineteenth century the Beaufort climate was described as "one of the healthiest" (Mills 1826:377), although Thomas Chaplin's antebellum journal describing life at nearby

Tombee Plantation on St. Helena Island presents an entirely different picture (Rosengarten 1987). In 1864 Charlotte Forten wrote that "yellow fever prevailed to an alarming extent, and that, indeed the manufacture of coffins was the only business that was at all flourishing" (Forten 1864:588). By 1880, however, Henry Hammond wrote that "the sea islands enjoy in a high degree the equable climate peculiar to the islands generally" and that the seasonal variation in temperature "destroys the germs of disease, as of yellow fever and of numerous skin diseases that flourish in similar regions elsewhere" (Hammond 1884:472). Of course, Hammond also mentions that, "doubtless the prophylactic use of quinine has had something to do with the apparently increased healthfulness of this section" (Hammond 1884:474).

The major climatic controls of the area are latitude, elevation, distance from the ocean, and location with respect to the average tracks of migratory cyclones. Callawassie's latitude of about 32°20'N places it on the edge of the balmy subtropical climate typical of Florida. As a result, there are relatively short, mild winters and long, warm, humid summers. The large amount of nearby warm ocean water surface produces a marine climate, which tends to moderate both the cold and hot weather. The Appalachian Mountains, about 220 miles to the northwest, block shallow cold air masses from the northwest, moderating them before they reach the sea islands (Landers 1970:2-3; Mathews et al. 1980:46).

Maximum daily temperatures in the summer tend to be near or above 90°F and the minimum daily temperatures tend to be about 68°F. The summer water temperatures average 83°F. The abundant supply of warm, moist and relatively unstable air produces frequent scattered showers and thunderstorms in the summer. Winter has average daily maximum and minimum temperatures of 63°F and 38°F respectively. Precipitation is in the forms of rain associated with fronts and cyclones; snow is uncommon (Janiskee and Bell 1980:1-2).

The average yearly precipitation is 49.4 inches, with 34 inches occurring from April through October, the growing season for most sea island crops. Nearby Hilton Head Island has approximately 285 frost free days annually (Janiskee and Bell 1980:1; Landers 1970). This mild climate, as Hilliard (1984:13) notes, is largely responsible for the presence of many southern crops, such as cotton and sugar cane.

Hilliard also points out that "any description of climate in the South, however brief, would be incomplete without reference" to a meteorological event frequently identified with the region -- the tropical hurricane. Hurricanes occur in the late summer and early fall, the period critical to antebellum cane, cotton, and rice growers. These storms, however, are capricious in occurrence:

> [i]n such a case between the dread of pestilence in the city, of common fever in the country, and of an

> unexpected hurricane on the island, the inhabitants . . . are at the close of every warm season in a painful state of anxiety, not knowing what course to pursue, nor what is best to be done (Ramsay, quoted in Calhoun 1983:2).

The coastal area is a moderately high risk zone for tropical storms, with 169 hurricanes being documented from 1686 to 1972 (0.59 per year) (Mathews et al.1980:56). The last Category 5 hurricane which hit this area was the August 27, 1893 storm which had winds of 120 miles an hour and a storm tide of 17 to 19.5 feet. Over 1000 people in South Carolina were reported killed by this storm (Mathews et al. 1980:55). Other notable historic storms have occurred in 1700, 1752, 1804, 1813, and 1885.

Geology and Soils

The Sea Island coastal region is covered with sands and clays originally derived from the Appalachian Mountains and which are organized into coastal, fluvial, and aeolian deposits. These deposits were transported to the coast during the Quaternary period and were deposited on bedrock of the Mesozoic Era and Tertiary period. These sedimentary bedrock formations are only occasionally exposed on the coast, although they frequently outcrop along the fall line (Mathews et al. 1980:2). The bedrock in the Beaufort area is below a level of at least 1640 feet (Smith 1933:21).

The Pleistocene sediments are organized into topographically distinct, but lithologically similar terraces parallel to the coast. The terraces have elevations ranging from 215 feet down to sea level. These terraces, representing previous sea floors, were apparently formed at high stands of the fluctuating, though falling, Atlantic Ocean and consist chiefly of sand and clay (Cooke 1936; Smith 1933:29). More recently, research by Colquhoun (1969) has refined the theory of formation processes, suggesting a more complex origin involving both erosional and depositional processes operating during marine transgressions and regression.

Cooke (1936) reports that the core of Callawassie Island consists of the Pamplico terrace and formation, with a sea level about 25 feet above the present sea level, while the bulk of Spring Island consists of this same formation. Colquhoun (1969), however, suggests that both Spring Island and Callawassie are more complex, representing both the Silver Bluff Pleistocene terrace with corresponding sea levels of from 8 to 3 feet above the present level and the Talbot Pleistocene terrace with a sea level about 40 feet above the present level.

Another aspect of Sea Island geology to be considered in these discussions is the fluctuation of sea level during the late Pleistocene and Holocene epochs. Prior to 15,000 B.C. there is evidence that a warming trend resulted in the gradual increase in

Pleistocene sea levels (DePratter and Howard 1980). Work by Brooks et al. (1989) clearly indicates that there were a number of fluctuations during the Holocene. Their data suggest that as the first Stallings phase sites along the South Carolina coast were occupied about 2100 B.C. the sea level was about 4.2 feet lower than present. Following that period there was a gradual fall in sea level to about 11.0 feet below current levels by 1850 B.C. Sea levels gradually increased during the Thom's Creek phase to a level within about 2.0 feet of the current stands by 1650 B.C. Following this was second lowering about 1250 B.C., to a level of 9.7 feet below that of today. The sea level increased through the late Thom's Creek phase to a high of about 2.8 feet below modern levels by 1050 B.C. Another low, about 9.7 feet, occured at 350 B.C., after which the sea levels tend to maintain a gradual rise to their modern levels. Quitmyer (1985b) does not believe that the lower sea levels at 2100 B.C. would have greatly altered the estuarine environment, although drops of 10 feet would have reduced available tidal resources. It also seems certain that such sea level fluctuations would have affected the drainage of coastal sites.

Data from the nineteenth and twentieth centuries suggest that the level is continuing to rise. Kurtz and Wagner (1957:8) report a 0.8 foot rise in Charleston, South Carolina sea levels from 1833 to 1903. Between 1940 and 1950 a sea level rise of 0.34 feet was again recorded at Charleston. These data, however, do not distinguish between sea level rise and land surface submergence.

Within the Sea Islands section of South Carolina the soils are Holocene and Pleistocene in age and were formed from materials that were deposited during the various stages of coastal submergence. The formation of soils in the study area is affected by this parent material (primarily sands and clays), the temperate climate (to be discussed later), the various soil organisms, topography, and time.

The mainland soils are Pleistocene in age and tend to have more distinct horizon development and diversity than the younger soils of the Sea Islands. Sandy to loamy soils predominate in the level to gently sloping mainland areas. The island soils are less diverse and less well developed, frequently lacking a well-defined B horizon. Organic matter is low and the soils tend to be acidic. The Holocene deposits typical of barrier islands and found as a fringe on some sea islands, consist almost entirely of quartz sand which exhibits little organic matter. Tidal marsh soils are Holocene in age and consist of fine sands, clay, and organic matter deposited over older Pleistocene sands. The soils are frequently covered by up to 2 feet of salt water during high tide. These organic soils usually have two distinct layers. The top few inches are subject to aeration as well as leaching and therefore are a dark brown color. The lower levels, however, consist of reduced compounds resulting from decomposition of organic compounds and are black. The pH of these marsh soils is neutral to slightly alkaline (Mathews et al. 1980:39-44). Historically, marsh soils have been used as compost or fertilizer for a variety of crops, including cotton (Hammond 1884:510) and Allston mentions that the sandy soil of the coastal region, "bears well the admixture of salt and marsh mud with the compost" (Allston 1854:13).

Only seven soils series occur on Callawassie (Table 1), compared to 19 on Spring Island (see Trinkley 1990b:11). Of those soils on Callawassie, three (Bladen, Coosaw, and Eulonia) account for 75% of the island. Table 1 reveals that 71.5% of the soils on the island are poorly to very poorly drained. This compares to only 55% of the soils on neighboring Spring Island. The remainder of the soils on both islands are moderately well to excessively well drained. Soil drainage may reasonably be expected to impact prehistoric and historic settlement patterns, as well as cultivation (and hence plantation wealth) during the antebellum period. Plants such as indigo and cotton require well drained

Table 1.
Soils found on Callawassie Island.

Soil	%	drainage
Bladen	22.7	poor
Chisolm	6.5	well/mod drained
Coosaw	31.1	poor
Deloss	3.3	very poor
Eddings	9.9	well
Eulonia	20.2	mod well
Tomotley	13.4	poor
Wando	1.7	excessive

soils, while rice requires flooding (and therefore soils capable of holding the water) (Hammond 1884; Hilliard 1975; Huneycutt 1949). A number of period accounts discuss the importance of soil drainage. Seabrook explained:

> subsoil so close as to be impervious to water; so that the excess of the rains of winter cannot sink. Nor can it flow off, because of the level surface. . . . The land thereby is kept thoroughly water-soaked until late in the spring. The long continued wetness is favorable only to the growth of coarse and sour grasses and broom sedge . . . acid and antiseptic qualities of the soil . . . sponge-like power to absorb and retain water . . . is barren, (for useful crops) from two causes - excessive wetness and great acidity. The remedies required are also two; and neither alone will be of the least useful effect, without the other also. Draining must remove the wetness - calcareous manures the acidity (Seabrook 1848:37).

Hammond expanded on this mentioning that:

> drainage . . . has of necessity always been practiced to some extent. The remarkably high beds on which cotton is planted here, being from 18 inches to 2 feet high, subserve this purpose. The best planters have long had open drains through their fields. These were generally made by running two furrows with a plow and afterwards hauling out the loose dirt with a hoe, thus leaving an open ditch, if it may be so termed, a foot or more in depth (Hammond 1884:509).

While large proportions of the land on both Spring and Callawassie islands appears to be unsuitable for most crops, it is clear that adequate drainage could be constructed to make the soils more agriculturally productive. There is still evidence of this on Spring Island (see Trinkley 1990b), although evidence for such activities on Callawassie Island has been almost completely destroyed by development (the most notable exception being the drainage or field ditch observed at 38BU464).

It has been suggested that in an effort to find a crop more suitable for the poorly drained soils on Callawassie, sugar cane was introduced (Lepionka 1984:2). This, however, is only partially true. Sugar cane, because of its broad leaves which present a large area for transpiring water, does require large amounts of water during the growing season -- up to 40 inches and it is reported that it performs best in soils able to hold up to 25% of their weight of moisture. Although the moisture requirements of cane are high, it is also essential that the soils are well drained and Duggar notes that "a stiff or poorly drained soil is unsuitable for this crop" (Duggar 1921:494). Duggar specifies that beds should be kept high, "water-furrows" established, and "quarter drains" constructed (Duggar 1921:499).

Thus, while the Callawassie soils can retain sufficient moisture for sugar cane, they are generally unsuitable without extensive drainage -- the same drainage required for cotton. Without this additional labor, sugar cane on Callawassie would have been as unsuccessful as cotton. In addition, sugar cane is even more exhausting to the soil than cotton, particularly for the macronutrients of nitrogen and phosphoric acid (Duggar 1921:271, 493). However, because sugar cane is a perennial, it is often possible to obtain two or three crops from a single planting (with successively greater reductions in yield). Consequently, it is possible to imagine a scenario where sugar cane is planted, but little care is given to fertilization. The first year's yield might be respectable, but the second and third could be disastrous.

Floristics

Callawassie and Spring islands today exhibits three major ecosystems: the maritime ecosystem which consists of the upland forest area of the islands, the estuarine ecosystem of deep water tidal habitats, and the palustrine ecosystem which consists of essentially fresh water, non-tidal wetlands (Sandifer et al. 1980:7-9).

Mathews et al. (1980) suggest that the most significant ecosystem on both islands is the maritime forest community. This maritime ecosystem is defined most simply as all upland areas located on barrier islands, limited on the ocean side by tidal marshes. On sea islands the distinction between the maritime forest community and an upland ecosystem (essentially found on the mainland) becomes blurred. Sandifer et al. (1980:108-109) define four subsystems, including the sand spits and bars, dunes, transition shrub, and maritime forest. Of these, only the maritime forest subsystem is likely to have been significant to either the prehistoric or historic occupants and only it will be further discussed. While this subsystem is frequently characterized by the dominance of live oak and the presence of salt spray, these are less noticeable on the sea islands than they are on the narrower barrier islands (Sandifer et al. 1980:120).

The barrier islands may contain communities of oak-pine, oak-palmetto-pine, oak-magnolia, palmetto, or low oak woods. The sea islands, being more mesic or xeric, tend to evidence old field communities, pine-mixed hardwoods communities, pine forest communities, or mixed hardwood communities (Sandifer et al. 1980:120-121, 437).

Robert Mills, discussing Beaufort District in the early nineteenth century, stated:

> [b]esides a fine growth of pine, we have the cypress, red cedar, and live oak . . . white oak, red oak, and several other oaks, hickory, plum, palmetto, magnolia, poplar, beech, birch, ash, dogwood, black mulberry, etc. Of fruit trees we have the orange, sweet and sour, peach, nectarine, fig, cherry (Mills 1826:377).

He also cautions, however, that "[s]ome parts of the district are beginning already to experience a want of timber, even for common purposes" (Mills 1826:383) and suggests that at least 25% of a plantation's acreage should be reserved for woods. On both Spring and Callawassie islands, it appears that those areas of poorest drained soils were never exploited for cultivation, but were left in woods. These areas were probably not opened for cultivation until the twentieth century, after extensive late nineteenth and early twentieth century logging.

The estuarine ecosystem in the vicinity includes those areas of deep-water tidal habitats and adjacent tidal wetlands. Salinity may range from 0.5 ppt at the head of an estuary to 30 ppt where it comes in contact with the ocean. Estuarine systems are influenced by ocean tides, precipitation, fresh water runoff from the upland areas, evaporation, and wind. The mean tidal range for Spring and Callawassie islands is 7.5 feet, indicative of an area swept by moderately strong tidal currents. The system may be subdivided into two major components: subtidal and intertidal (Sandifer et al. 1980:158-159). These estuarine systems are extremely important to our understanding of both prehistoric and historic occupation because they naturally contain such high biomass (Thompson 1972:9). The estuarine area contributes vascular flora used for basket making, as well as mammals, birds, fish (over 107 species), and shellfish.

The last environment to be briefly discussed is the freshwater palustrine ecosystem, which includes all wetland systems, such as swamps, bays, savannas, pocosins and creeks, where the salinities measure less than 0.5 ppt. The palustrine ecosystem is diverse, although not well studied (Sandifer et al. 1980:295). A number of forest types are found in the palustrine areas which attract a variety of terrestrial mammals. The typical vegetation consists of red maple, swamp tupelo, sweet gum, red bay, cypress, and various hollies. Also found are wading birds and reptiles. It seems likely that these freshwater environs were of particular importance to the prehistoric occupants.

PREHISTORIC AND HISTORIC OVERVIEW

Mona Grunden and Michael Trinkley

Prehistoric Archaeology

The Woodland Period archaeology of the coastal area of South Carolina recently has been summarized and briefly synthesized by Trinkley (1990a) and there is no need to provide extensive detail in this study (see Figure 2). DePratter (1979) should also be examined for additional background on the ceramic typology of the region, while Brooks et al. (1982) provides a detailed discussion of the excavations at the Callawassie Island Burial Mound. The work of Wilson (1982) will also assist in placing the Middle Woodland burial mound tradition in a better regional framework. It is necesary, however, to briefly discuss the major Middle and Late Woodland phases which have been identified in the work on Callawassie and Spring islands.

The Deptford culture takes its name from the type site located east of Savannah, Georgia, which was excavated in the mid-1930s (Caldwell 1943:12-16). Deptford phase sites are best recognized by the presence of fine to course sandy paste pottery with a check stamped surface treatment. This pottery is typically in the form of a cylindrical vessel with a conoidal base. The flat bottomed bowl with tetrapodal supports found at Deptford sites along the Florida Gulf coast (Milanich and Fairbanks 1980:79) is very rare in South Carolina. Other Deptford phase pottery styles include cord marking, simple stamping, a complicated stamping which resembles early Swift Creek, and a geometric stamping which consists of a series of carved triangles or diamonds with interior dots (see Anderson et al. 1982:277-293; DePratter 1979).

The Deptford technology is little better known than that of the preceding Refuge phase, which may provide the antecedent (Peterson 1971:328; cf. Milanich 1971). Shell tools are uncommon, bone tools are "extremely rare" (Milanich and Fairbanks 1980:77), and stone tools are uncommon on Coastal Zone sites. All of this indicates to some researchers that "wood must have been worked into a variety of tool types" (Milanich and Fairbanks 1980:75). One type of stone tool associated with South Carolina Deptford sites is a very small, stemmed projectile point tentatively described as "Deptford Stemmed" (Trinkley 1980a:20-23). This point is the culmination of the Savannah River Stemmed reduction seen in the Thom's Creek and Refuge phases. Similar points have been found at a variety of Deptford sites (see Milanich 1971:175-176; Stoltman 1974:115-116, Figure 20i-j, 40h-j). Also found at Deptford sites

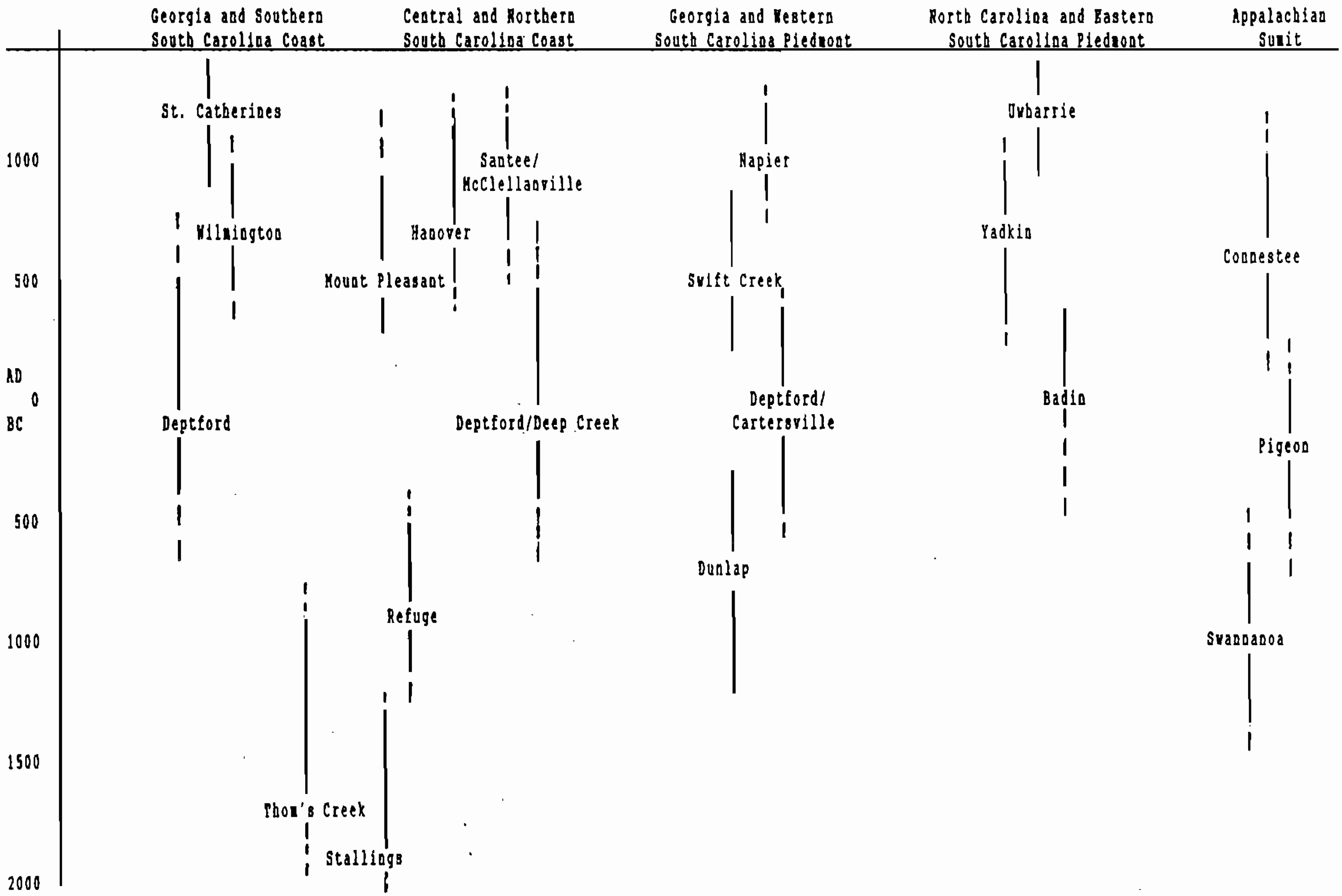


Figure 2. Woodland Period Phases in the South Carolina locality.

are "medium-sized triangular points," probably similar to the Yadkin Triangular point (Coe 1964:45, 47, 49; Milanich and Fairbanks 1980:75-76). In the Savannah River area Sassaman et al. (1989:156-157) report that Deptford pottery appears much more strongly associated with triangular projectile points (Badin and Yadkin types) than with the small stemmed points. They note, "small stemmed bifaces are attributed to the Early Woodland period with the recognition that they probably persisted into the subsequent period but were rapidly and thoroughly replaced by triangular forms by 2000 B.P." (Sassaman et al. 1989:157).

Perhaps of even greater interest is the co-occurrence of the larger triangular points (such as Badin and Yadkin) with smaller triangular forms (such as Caraway or Roanoke) traditionally attributed to the Late Woodland and South Appalachian Mississippian periods. This situation has been reported at Coastal Plain sites (Blanton et al. 1986:107), Savannah River sites (Sassaman et al. 1989:157), and Coastal Zone sites (Trinkley 1990b). Blanton et al. (1986) suggest that these point types were used at the same time, but perhaps for different tasks.

Milanich (1971:Figure 12) illustrates a generalized distribution of this series, which is divided into the Gulf and Atlantic subregions. This distribution, however, should extend to the South Carolina Fall Line and probably as far north as the Neuse River in North Carolina. Anderson (1975:186) has found Deptford wares distributed throughout the South Carolina Coastal Plain, with major sites at the mouths of the Santee and Savannah Rivers. The earliest date for Deptford, 1045±110 B.C. (UGA-3515), has been obtained from 38LX5 in Lexington County (Trinkley 1980b:11). The most recent date comes from St. Simons Island, Georgia, where a date of A.D. 935±70 (UM-673) was obtained. Milanich and Fairbanks (1980:60) suggest a tighter range of about 500 B.C. to A.D. 600, while Anderson et al. (1982:281) suggest a date range of about 800 B.C. to A.D. 500.

Deptford sites on the South Carolina coast are usually small, especially when compared to the earlier Thom's Creek middens, and they are usually multicomponent. Deptford Coastal Zone sites, while containing shell, do not represent massive mounds, but rather thin middens formed as series of small shell heaps which have been deposited adjacent to the marsh and gradually formed continuous masses. These heaps were the result of short periods of site use, perhaps as a base camp for shellfish collecting (see Milanich and Fairbanks 1980:72-73; Trinkley 1981). Results of soil chemical analyses from the Pinckney Island midden (Trinkley 1981:53-54) suggest less than intensive occupation. The chemical studies support Milanich's assessment that occupation was not on the shell piles, but adjacent to them (Milanich and Fairbanks 1980:72-73; Trinkley 1981:53-54).

Milanich (1971:192-198; see also Milanich and Fairbanks

1980:70-73) suggests that the Deptford phase settlement pattern involves both coastal (i.e., Coastal Zone) and inland (i.e., Coastal Plain) sites. The coastal sites, which are always situated adjacent to tidal creek marshes, evidence a diffuse subsistence system. The inland sites are also small, lack shell, and are situated on the edge of swamp terraces. This situation is similar to that found in South Carolina, although there are Deptford middens which exhibit a very focal subsistence emphasis (Trinkley 1990b). Sites such as Pinckney Island (38BU67 and 38BU168; Trinkley 1981) and Minim Island (38GE46; Drucker and Jackson 1984; Espenshade and Brockington 1989) evidence large Coastal Zone Deptford occupations, while sites such as 38BU747 (Trinkley 1990b) evidence only small, focal shell midden occupations. Sites such as 38BK984 (Roberts and Caballero 1988) provide evidence of Coastal Plain non-shell midden Deptford occupation.

At Pinckney Island the bulk of the calories came from shellfish while mammals played a relatively insignificant role (Trinkley 1981:57-60). A similar situation occurs at Minim Island, where late spring and summer occupation is documented with a reliance on fishing, with mammals being a secondary, if not minor food source. In the fall there is evidence of intensive oyster gathering and possible use of nearby hickory masts (Drucker and Jackson 1984; Espenshade and Brockington 1989).

Inland, sites such as 38AK228-W, 38LX5, 38RD60, and 38BM40 indicate the presence of an extensive Deptford occupation on the Fall Line and the Coastal Plain, although sandy, acidic soils preclude statements on the subsistence base (Anderson 1979; Ryan 1972; Trinkley 1978, 1980c). These interior or upland Deptford sites, however, are strongly associated with the swamp terrace edge, and this environment is productive not only in nut masts, but also in large mammals such as deer. Perhaps the best data concerning Deptford "base camps" comes from the Lewis-West site (38AK228-W), where evidence of abundant food remains, storage pit features, elaborate material culture, mortuary behavior, and craft specialization has been reported (Sassaman et al. 1989:96-98).

Milanich observes that "this dual distribution . . . suggests a transhumant subsistence pattern," with inland sites occupied in the fall for the collection of floral resources and the hunting of deer (Milanich 1971:194; Milanich and Fairbanks 1980:72). While such a subsistence round may have been practiced, it cannot be documented from the available evidence. Some sites, such as Pinckney Island, were clearly occupied in the late winter (Trinkley 1981:60). Minim Island, however, was apparently occupied in the summer (Drucker and Jackson 1984), although a fall or winter occupation cannot be precluded. 38BU747 was likewise occupied during the spring and summer (Trinkley 1990b).

A similar situation is observed along the Savannah drainage, where Stoltman (1974:237) observed both floodplain and upland

Deptford sites. This duality, according to Stoltman, is "indicative of a gradually increasing dependence upon upland wild plant food" and eventually horticulture (Stoltman 1974:237), although no archaeological evidence supports this speculation. Hanson (1982:21-23) sees settlement locations becoming more diverse as population pressures require that new food sources be identified and exploited. While this is similar to the explanation offered by Stoltman, Hanson does not imply or suggest that the alternate food source must be horticultural.

This view of an estuarine Deptford adaptation with minor interior occupations must be re-evaluated based on the Savannah River drainage work of Brooks and Hanson (1987) and Sassaman et al. (1989:293-295) who suggest larger residential base camps and foraging zones along the Savannah River, coupled with smaller, household residences and foraging zones in the uplands along small tributaries. While it is not yet clear if these upland sites represent a perennial settlement pattern or a seasonal fissioning typical of the Late Archaic, it seems likely that the pattern was equally affected by demographic pressures and external socio-political influences (see Sassaman et al. 1989:303-304). Of considerable potential significance is evidence of trade between coastal and interior Deptford groups. For example, the Lewis-West site (38AK228-W) has produced evidence of sharks' teeth and whelk shells from the coastal region.

Although the Deptford phase is discussed as part of the Early Woodland, many authors place the phase intermediate between the Early and Middle Woodland (see, for example, Anderson et al. 1982:28, 250). Such an approach is not unreasonable, because Deptford exhibits considerable temporal range and cultural adaptations which are more characteristically Middle Woodland (see also Anderson 1985:53). The Deptford phase, however, is still part of the early carved paddle stamped tradition which is replaced by the posited northern intrusion of wrapped paddle stamping during the Middle Woodland.

The Middle Woodland in South Carolina is characterized by a pattern of settlement mobility and short-term occupation. On the southern coast it is associated with the Wilmington phase, while on the northern coast it is recognized by the presence of Hanover, McClellanville or Santee, and Mount Pleasant assemblages. Wilmington and Hanover may be viewed as regional varieties of the same ceramic tradition. The pottery is characterized almost solely by its crushed sherd temper which makes up 30 to 40% of the paste and which ranges in size from 3 to 10 mm. Wilmington was first described by Caldwell and Waring (Williams 1968:113-116) from coastal Georgia work, while the Hanover description was offered by South (1960), based on a survey of the Southeastern coast of North Carolina (with incursions into South Carolina). The Wilmington phase was seen by Waring (Williams 1968:221) as intrusive from the Carolina coast, but there is considerable evidence for the inclusion of Deptford traits in the Wilmington series. For example, Caldwell and McCann (1940:n.p.) noted that, "the Wilmington complex proper contains all of the main kinds of decoration which occur in the Deptford complex with the probable exception of Deptford Linear Checkstamped" (see also Anderson et al. 1982:275). Consequently, surface treatments of cord marking, check stamping, simple stamping, and fabric impressing may be found with sherd tempered paste.

Sherd tempered Wilmington and Hanover wares are found from at least the Chowan River in North Carolina southward onto the Georgia coast. Anderson (1975:187) has found the Hanover series evenly distributed over the Coastal Plain of South Carolina, although it appears slightly more abundant north of the Edisto River. The heartland may be along the inner Coastal Plain north of the Cape Fear River in North Carolina. Radiocarbon dates for Wilmington and Hanover range from 135±85 B.C. (UM-1916) from site 38BK134 to A.D. 1120±100 (GX-2284) from a "Wilmington House" at the Charles Towne Landing site, 38CH1. Most dates, however, cluster from A.D. 400 to 900; some researchers prefer a date range of about 200 B.C. to A.D. 500 (Anderson et al. 1982:276).

The best data concerning Middle Woodland Coastal Zone assemblages comes from Phelps' (1983:32-33) work in North Carolina. Associated items include a small variety of the Roanoke Large Triangular points (Coe 1964:110-111), sandstone abraders, shell pendants, polished stone gorgets, celts, and woven marsh mats. Significantly, both primary inhumations and cremations are known from the Mount Pleasant phase. Phelps notes that:

> [a] distinctive cultural feature of Middle Woodland age in the South Coastal region is the rather extensive distribution of low, sand burial mounds . . . . The high frequency of secondary cremation, platform pipes, and other objects in the mounds, and the fact that at least some of them seem to be placed away from their contemporaneous habitation sites, points to southern influence during this period (Phelps 1983:35).

Phelps goes on to note that, "[t]heir known spatial extent is limited . . ., and no comparable structures have been reported from . . . South Carolina. . . . Further research . . . is needed to determine relationships [of North Carolina mounds] with . . . those on the Georgia coast" (Phelps 1983:35).

Sand burial mounds have been known from the Georgia and southern South Carolina Coastal Zone since C.B. Moore's investigations in 1898. Recent studies include those by the American Museum of Natural History on St. Catherines Island, Georgia, which document the Early to Late Woodland use of sand burial mounds (Larsen and Thomas 1982; Thomas and Larsen 1979), as well as the re-investigation of the Callawassie Island burial mound

(38BU19) in Beaufort County, South Carolina (Brooks et al. 1982). The presumed burial mound gap between southern coastal South Carolina and southeastern coastal North Carolina has been filled by the 1983 excavations of the Buck Hall sites in Charleston County where Trinkley and Zierden were able to determine that the low sand mounds were covering poorly preserved secondary burials. Rathbun has also identified an ossuary (38HR36) from Horry County, South Carolina (see Conner 1985; Hyman 1983).

Consequently, it appears that both ossuaries and sand mounds are found along the entire South Carolina coast, although precise dating and thorough understanding of their cultural significance has yet to be achieved. As Wilson notes, "the sand burial mounds . . . cannot be associated with any one prehistoric physical type or aboriginal group," for in North Carolina they are found in the context of probable Iroquoian, Siouan, and Algonquin populations (Wilson 1982:172). The available information, however, suggests a relatively egalitarian society was common to all. Anderson suggests that, "these mound/ossuary complexes appear to represent principal burial areas for local lineages or other currently unrecognized social entities" (Anderson 1985:56).

These Middle Woodland Coastal Plain and Coastal Zone phases continue the Early Woodland Deptford pattern of mobility. While sites are found all along the coast and inland to the Fall Line, shell midden sites evidence sparse shell and artifacts. Gone are the abundant shell tools, worked bone items, and clay balls. Recent investigations at Coastal Zone sites such as 38BU747 and 38BU1214, however, have provided some evidence of worked bone and shell items at Deptford phase middens (see Trinkley 1990b and this report).

In terms of settlement patterns, several researchers have offered some conclusions based on localized data. Michie (1980:80), for example, correlates rising sea levels with the extension of Middle Woodland shell middens further up the Port Royal estuary. Scurry and Brooks (1980:75-78) find the Middle Woodland site patterning in the Wando River affected not only by the sea level fluctuations, but also by soil types (see also Trinkley 1980a:445-446). They suggest that the strong soil correlation is the result of upland sites having functioned as extraction areas, principally for exploitation of acorns, hickory nuts, and deer. Shell midden sites, they suggest, also represent seasonal camps and therefore exhibit small size, low artifact density, and infrequent re-occupation.

In many respects the South Carolina Late Woodland may be characterized as a continuation of previous Middle Woodland cultural assemblages. While outside the Carolinas there were major cultural changes, such as the continued development and elaboration of agriculture, the Carolina groups settled into a lifeway not appreciably different from that observed for the previous 500 to 700 years (cf. Sassaman et al. 1989:14-15). This situation would remain unchanged until the development of the South Appalachian Mississippian complex (see Ferguson 1971).

The Late Woodland on the extreme southern South Carolina Coastal Zone is characterized by the St. Catherines phase, first defined by Caldwell (1971) based on his St. Catherines Island, Georiga work. St. Catherines ceramics are characterized by fine clay tempering (obviously finer than the preceding Wilmington sherd temper) and by carefully smoothed or burnished interiors. Surface treatments include fine cord marked, burnished plain, and net impressed (DePratter 1979:119, 131-132), although sparse quantities of fabric impressed pottery are also observed from South Carolina (Trinkley 1981:82) and Georgia (Larsen and Thomas 1982:304-305). Caldwell viewed the St. Catherines pottery as a refinement of the Wilmington tradition of sherd tempering (Caldwell 1971:91), and sand burial mounds continue to be a significant aspect of the assemblage (Brooks et al. 1982; Larsen and Thomas 1982; Trinkley 1981:90-92).

While a number of St. Catherines burial mounds have been studied, only one midden area, Victoria Bluff (38BU347), in Beaufort County, has been even briefly tested (Trinkley 1981:73-78). At this site the economy was based on shellfish collection and there is substantial evidence of a winter-early spring occupation. There is, as yet, no documentation of a seasonal round, although some large St. Catherines sites have been found which suggest at least semi-permanent villages (Trinkley 1990b).

The St. Catherines pottery, previously given a terminal date of about A.D. 1150 by DePratter (1979:111), probably dates into the fourteenth century, based on the Victoria Bluff (38BU347) and Pinckney Island (38BU67, 38BU168) work where dates of A.D. 1380±75 (UGA-3516) and A.D. 1535±65 (UGA-3514) were obtained (Trinkley 1981). The tenacity of this simple lifestyle suggests that the effects of the Gaule intrusion was relatively minor in many ways, or they at least co-existed with the native inhabitants whose lives were generally unchanged.

There is only somewhat vague and tantalizing evidence of agriculture or the use of domesticated plants during this period in South Carolina. Investigations at 38AN8 have yielded carbonized gourd rind, as well as a very small sample of squash and corn pollen (see Wood 1986:106). Agriculture, however, cannot be documented in any meaningful way until the rise of the South Appalachian Mississippian period, either in the Piedmont or on the coast.

The Savannah phase is traditionally accepted as the beginning of the South Appalachian Mississippian along the Georgia and South Carolina coasts. The phase was defined by Caldwell and McCann (1941) from the work at the Irene Mound site in Georgia, although the Savannah ware was earlier described by Caldwell and Waring

(1939). Dates of about A.D. 1150 to 1300 have been suggested by DePratter (1979:111), although Anderson et al. (1982:308) would extend the date range to about A.D. 1400.

The diagnostic feature of this phase is the pottery, which is characterized by a fine sand to clay or silt paste with carefully smoothed interiors. Surface treatments include complicated stamped, check stamped, cord marked, and burnished plain. The pottery usually can be distinguished from the later Irene types by the abundant sand or grit in the latter. Although the Savannah pottery tends to be dominated by a variety of concentric circle stamp motifs, filfot, quartered-circle, and split diamond patterns are also found. Anderson et al. (1982:309) correctly note that the Savannah motifs grade into the following Irene/Pee Dee designs.

Both Caldwell and McCann (1941) and Cook (1966) provide some general information on the nature of coastal Savannah sites, although these studies have examined rather large sites with associated mounds and burials. The work by Larsen and Thomas (1982) at Marys Mound and Johns Mound on St. Catherines Island are of considerable interest since they document the presence of both St. Catherines and Savannah wares in the same stratigraphic context.

No Savannah period sites have been excavated in the Beaufort area, although Anderson notes that "classic Savannah Complicated Stamped pottery appears to be progressively uncommon to the northeast of the Savannah" (Anderson et al. 1982:311). The Savannah Check Stamped and Cord Marked types, while occasionally present as minority types, appear to also decline in frequency from Savannah northward to Charleston, South Carolina.

It is within this broad context of archaeological knowledge, speculation, and questions that the investigation of prehistoric sites on Callawassie and Spring islands was undertaken. The resulting research has offered some considerably new, and hopefully fresh, interpretations of the Woodland period along the southern South Carolina coast.

<u>History of Spring Island</u>

A detailed historical reconstruction of Spring Island has been offered in Trinkley (1990b) and that work should be consulted for more specific information. As a general summary, however, the earliest evidence available suggests that Spring Island was occupied as a plantation by James Cockran the Younger about 1738-1739. It seems likely that during this period the occupation was modest; it is equally likely that little evidence of this settlement will be present in the archaeological record because of the intensity of subsequent occupations. There is some evidence that George Barksdale also maintained a plantation on Spring Island, probably in the same location, if not the same house, as that used by Cockran. Barksdale's plantation was abandoned, and possibly burnt, during the Revolutionary War. The location of this settlement, based on a 1782 map, was in the vicinity of modern day Pinckney Landing (archaeological site 38BU5).

In 1791, Mary Edwards, the eldest daughter of George Barksdale, died on Spring Island. This indicates that between the Revolutionary War and 1791 a structure replacing the original Cockran house had been constructed. There is also evidence that George Edwards was living on Spring Island by 1800, and the archaeological evidence presented by Trinkley (1990b) suggests that a portion of the tabby ruins on Spring Island (38BU1) may represent the house constructed prior to 1791.

By 1801 George Edwards married Elizabeth Barksdale and apparently spent time living both in Charleston and on Spring Island. An 1812 map of the island indicates that there were four settlements on the island -- one at the north end of the island in the vicinity of the original Cockran house (identified archaeologically as 38BU5), one at the present tabby ruins (38BU1), one on the southeast edge of the island (38BU773), and a final settlement at the south end of the island at present day Copp Landing (38BU791).

In 1859 George Edwards died and the plantation was left to his son, George Barksdale Edwards. A 1873 map of Spring Island suggests that three settlements were present on the island during this time -- a slave row at Pinckney Landing (probably dating to 1812), a slave row at Copp Landing (also dating to 1812) and at the Edwards ruins (which includes two slave rows and the main plantation complex). This map indicates a total of at least 40 structures on the island and clearly reveals the wealth and extent of plantation activities.

The 1860 agricultural census clearly reveals the profitability of Spring Island. The plantation contained 2000 acres of improved land (up by 1000 acres from the 1850 census) and a reported value of $50,000. The value of machinery and implements was reported as $2000, while the value of slaughtered animals was $500. Agricultural production included 4000 bushels of Indian corn (up by 1600 bushels from 1850), 99 bales of cotton (down by 51), 250 pounds of wool (up by 150 pounds), 1000 bushels of peas and beans, 2000 bushels of sweet potatoes (an increase of 1000 bushels), 50 pounds of butter (down by 150 pounds from 1850), and 20 tons of hay.

History of Callawassie Island

The previous work conducted on Callawassie Island by Michie (1982) provides little historical background, relying on Baldwin's (1966) history of Spring Island for eighteenth century documentation of Callawassie and usually uncited sources for the nineteenth century. Although Lepionka conducted considerable research at historic sites on Callawassie Island only limited historical research was conducted and it is available only through the previous developer's promotional literature.

The first documented owner of Callawassie Island is James Cockran, Jr., heir of James Cockran, who included in his Memorial of 1733:

> Five hundred and ninety acres in Granville County on Callawassie Island, bounding to the East on Creeks and Marsh, and to the South & West on a Branch coming out of Port Royal Sound. Granted by Governor Gibbs the 16th day of June 1711 at the annual rent of 12d per hundred acres (South Carolina Department of Archives and History, Memorials, v. 3, p 165).

James Cockran, Sr., according to Baldwin (1966:6-9), was active in Colonial politics and owned tracts of land totalling 10,000 acres from Toogoodoo Creek to Daufuskie Island. Trinkley (1990b:28-29) expresses doubt that Cockran made any use of nearby Spring Island (inherited from Indian trader John Cockran) and it would appear that the same is true of Callawassie, there being no evidence to the contrary. James Cockran, Sr. died intestate between 1719 and 1724, his widow Mary also died intestate about the same time, and the administration of their estates was granted in 1724 to Joseph Russell and Joseph Bryan (Charleston County WPA Wills, Inventories, and Miscellaneous Records, v. 60, p. 145).

There are no records to indicate that James Cockran, Jr. took any more interest in Callawassie than his father before him, although Trinkley (1990b:29) reports that Cockran was paying for building construction on Spring Island by 1739. It seems unlikely that Cockran would have been constructing a settlement on adjacent Callawassie Island as well, although it is possible that he had slaves on the island or was otherwise engaged in agriculture or cattle raising.

James Cockran, Jr. died by April 1740 (Trinkley 1990b:29) and in a will dated December 1, 1739 named Richard Ash, Samuel Perroneau, and Hugh Bryan as executors of his estate. The will cannot be located, but the heirs to Cockran's property seem to have been the children of his sisters, Mary Ash and Elizabeth Perroneau (Starr 1984:31). According to Starr (1984:31) Cockran's property was divided equally among his heirs and the historical research of Spring Island supports this assumption (Trinkley 1990b:29). There is no clear statement of how the division of property was made, although it appears to have been essentially random (see Trinkley 1990b:25).

A 1757 Memorial filed by Daniel Heyward includes an unnamed tract of 550 acres of land in Granville County:

> . . . originally granted by the Lords Proprietors on the 6th day of June 1711 unto James Cockran, at the quit rent of 1/ Proclamation Money per hundred acres; which afterwards descended to and became vested in James Ash, who, in and by certain indenture of lease and release, dated the 15th and 16th days of June 1756, bargained sold and conveyed same to the Memorialist (South Carolina Department of Archives and History, Memorials v. 7, p. 159).

The original grant describes Callawassie as containing 590 acres, and while no further description of the tract is provided by Heyward, it is virtually certain that Callawassie was being claimed. A renunciation of dower filed by Anne Johnston, "widow and relict of James Ash," in 1762, states that in 1756 she did:

> consent to and join with her said late husband James Ash in conveying and assigning a certain Island containing five hundred and fifty acres of land commonly distinguished by the name of Calliwashy Island . . . together with all and singular its rights members and appurtenances unto Daniel Heyward (South Carolina Department of Archives and History, Renunciations of Dower, Book 8, p. 102-103).

Colonel Daniel Heyward, the father of Thomas Heyward, a signer of the Declaration of Independence, was a planter of considerable real and personal property. His will lists real estate in excess of 17,000 acres, most of which was in present-day Beaufort and Jasper counties. Included is a bequest of "one Tract of Land or Island called Cattlewashe, containing five hundred & fifty acres" (Charleston County WPA wills, v. 17, p. 609). The original will, dated June 7, 1776 gave Callawassie and several other parcels to this son, Daniel. This bequest included "Slaves, Stock & C," but does not itemize this property by plantation. A July 10, 1777 codicil revoked the earlier declaration, stipulating that "Callewashe with all the Slaves, Stock, & C that belong to it I give to my Son Benjamin, but in case he die without Lawful Issue then I give it to my Grand Son Daniel Heyward & His Heirs forever . . ." (Charleston County WPA Wills, v. 17, p. 695).

Daniel Heyward died in October 1777, and his son, Thomas, qualified as executor, making him responsible for the interests of those heirs who were minors (Desaussure 1817:96). Several deaths among the heirs and disagreements among the survivors, led to the filing of two lawsuits against Thomas Heyward. The first case, in 1802, questioned the disbursement of the slaves on Callawassie (Desaussure 1817:94-115). The second, in 1806, concerned the rightful ownership of the island itself. The court awarded ownership to Elizabeth M. Heyward, a minor, the granddaughter of Thomas, who had managed the island since his father's death (Desaussure 1817:422-434). Neither case, unfortunately, gives information regarding activities on the island.

A death notice related the 1809 death of Thomas Rhodes on Callawassie Island (Jervey 1932:68). Rhodes seems to have lived on the island as early as 1802, when his son George (a future signer of the Ordinance of Secession) was born there (Perry 1947:122; Peeples 1970:13). Michie (1982:26) speculates that Rhodes was either an owner or an overseer, favoring the former interpretation. However, it is clear that the island was owned by Elizabeth Heyward at the time of Rhodes' death and it is likely that he was the overseer of the plantation for Thomas Heyward.

The 1812 "Chart of the Bars, Sounds of Port Royal and St. Helena," prepared by Daniel Bythewood (National Archives, RG 77, I-4 sheet 3) shows two structures on Callawassie Island (Figure 3). The island is rather stylized on this map, but it is likely that these structures are the tabby remains know to exist on the north edge of the island and recorded as 38BU409. They may, consequently, represent the house of Thomas Rhodes and the adjacent sugar mill.

Elizabeth Heyward married James Hamilton (Governor of South Carolina 1830-1832) in 1813 (South Carolina Historical and Genealogical Magazine, v. 3, p. 44), and brought as a dowry several plantations, including Callawassie. According to a family descendant the Hamiltons lived on Callawassie early in their marriage, and one of their children was born there (Southern Historical Collection, University of North Carolina at Chapel Hill, James Hamilton, Jr. Papers). While the Heywards may have lived at one of the structures shown in Figure 3, it seems likely that a new settlement was begun about this time. In 1819 a marriage settlement was made, at which time James Hamilton states that he had sold the island that year to John A. Cuthbert (Southern Historical Collection, University of North Carolina at Chapel Hill, James Hamilton, Jr. Papers).

Cuthbert, a member of the South Carolina House of Representatives from 1784 through 1788 and Lieutenant Governor of South Carolina from 1816 to 1818, owned considerable property in Beaufort District, most of it in Prince Williams Parish (Bailey and Cooper 1981:166-167). A tax return filed in 1824 showed him owning 5000 acres of land and 25 slaves in St. Lukes Parish. The land tax was $3.75; that for the slaves was $18.75 (South Carolina Department of Archives and History, 1824 tax return). Cuthbert died at his home in Prince Williams Parish in May 1826 (REFERENCE), but it cannot be determined if he owned Callawassie at the time of his death. A will was filed in the Beaufort District Courthouse (Robert Smalls Library, College of Charleston, Cuthbert Family Papers), but all records there were destroyed by a fire in 1865.

Coast Chart 55, published in 1873 but based on surveys conducted from 1852 to 1872, depicts four structural loci on Callawassie (Figure 4). The first consists of a single structure at

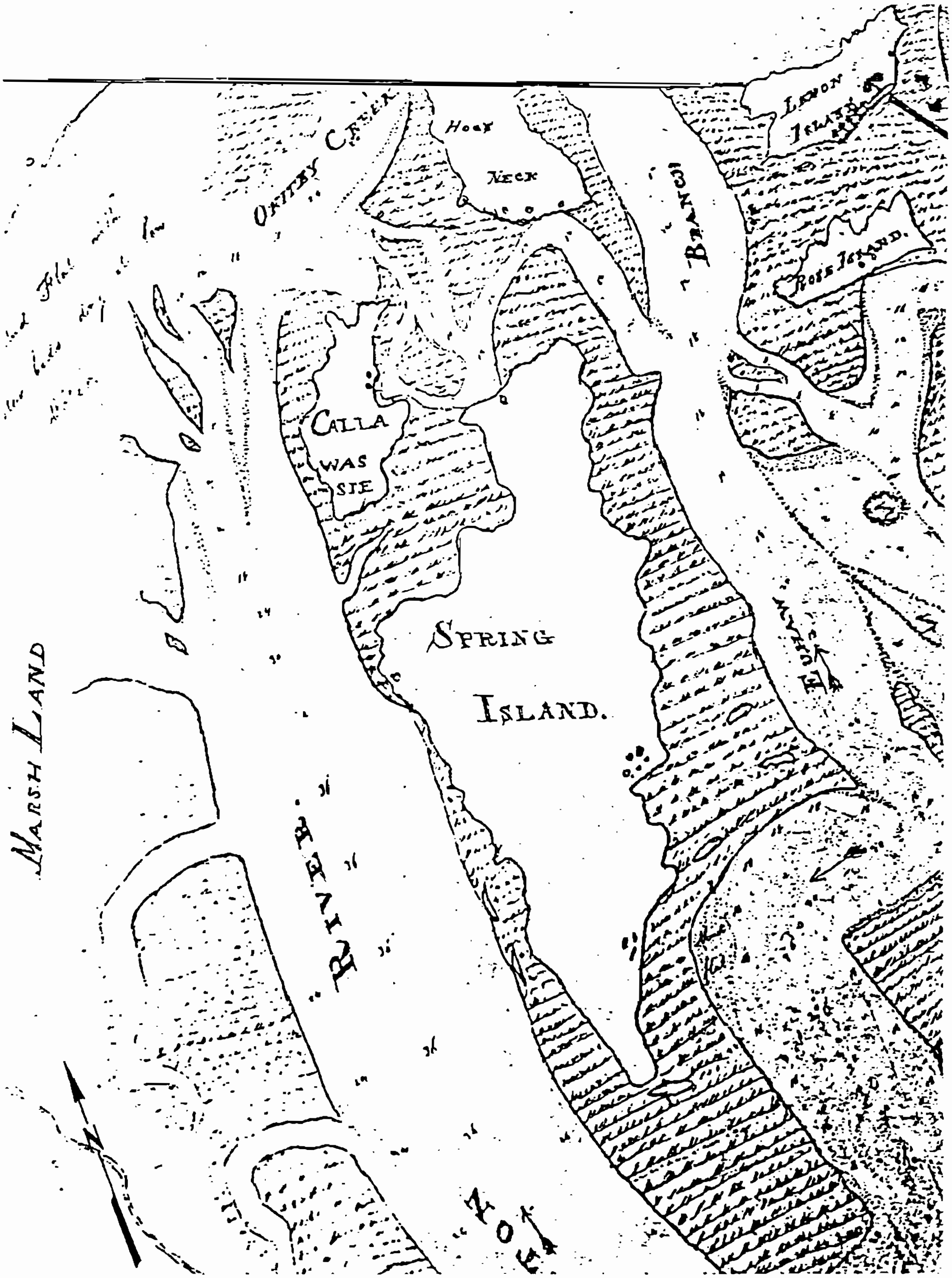


Figure 3. 1812 plan showing Callawassie Island.

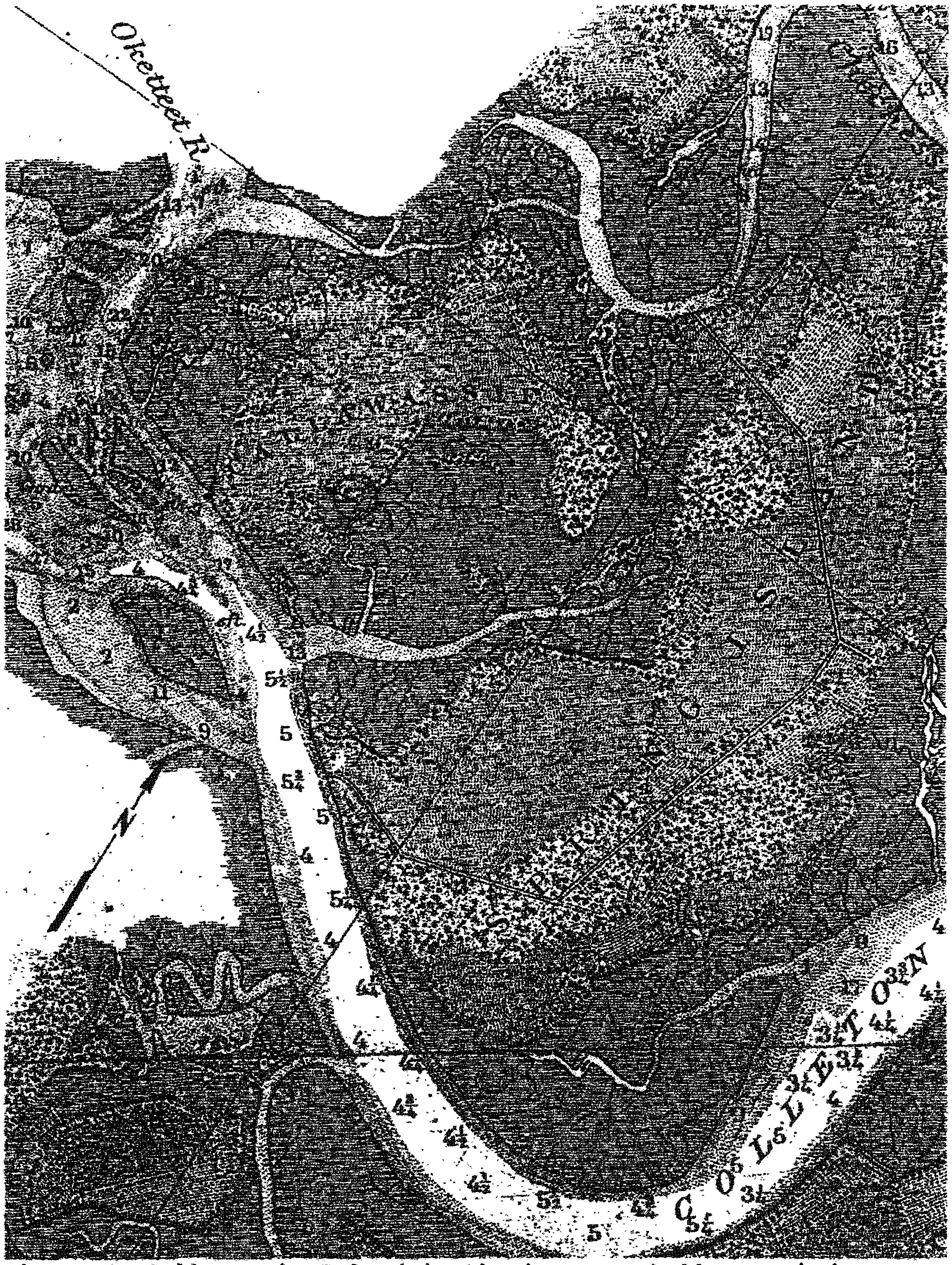


Figure 4. Callawassie Island in the late antebellum period.

the end of the point of land on the west edge of the island. This structure corresponds to the main house recorded as 38BU70. The second loci, also situated on this spit of land, consists of two parallel rows of 10 structures. These appear to represent a slave settlement, although Michie's (1982) survey failed to identify this site. The third loci is situated slightly west of the second and is found parallel to the edge of the island. It consists of an additional seven structures and may represent either a second slave settlement or associated plantation outbuildings. This loci was likewise not identified in Michie's (1982) survey of Callawassie Island. The fourth loci consists of an isolated structure on the south edge of the island (apparently identified by Michie [1982] as 38BU461). The sugar mill complex and near-by domestic structures (38BU409) do not appear on the map and the area is shown as wooded.

Sometime between 1819 and 1867 Callawassie Island became the property of Clarence Kirk. A typescript collection of family letters (South Carolina Historical Society, Kirk Family Correspondence) offers a few clues as to when the transfer took place. An editorial comment that "the name "Callawassie" appears from time to time" (South Carolina Historical Society, Kirk Family Correspondence) does not indicate if the name has appeared in previous letters that were not printed, or if the name begins appearing at that point. The first recorded mention of the island is in the summer of 1861, and mentions visiting Clarence on Callawassie.

The Kirks owned property in the Bluffton area in the antebellum period, and the family seat was Rose Hill Plantation, across the Okatie River from Callawassie. Clarence Kirk first appears on the 1860 census, which gives no age or occupation, but values his real estate at $36,680.00 and his personal estate at $50,000.00. The slave schedules for that year list 46 slaves in his possession. It is not known if Clarence Kirk purchased the property between 1850 and 1860, of if it was a family possession that was transferred to him in that decade. The agricultural census of 1850 for St. Lukes Parish lists John W., James, and R.H. Kirk, who had a combined total of 3,900 acres of improved land and 4,066 acres of unimproved land. None of the individual listings seem to describe Callawassie, although it is possible that the island was included with other holdings.

On Thursday, November 7, 1861 Union forces captured Hilton Head Island, and soon took possession of the neighboring sea islands. A letter written by John Kirk of Rose Hill one year after the invasion says that "the Yankees have entire possession of Calliwassee" (South Carolina Historical Society, Kirk Family Correspondence). The island was visited by at least one foraging party (Holahan and Anderson 1970:63), but its proximity to the mainland and small size probably caused it to remain an abandoned no-man's land for the duration of the war. The Kirks do not refer to it again until 1866 and Union sources do not record a permanent outpost there. The relative insignificance of Callawassie may be documented by the "Map of the Rebel Lines of Pocotaligo, Combahee & Ashepoo South Carolina" drawn in 1865 which fails to show any structures on the island (National Archives, RG 77, I53-1).

The end of the Civil War found sea island plantations in a state of gross neglect at best, and totally destroyed at worst. Not being the scene of troop activity, Callawassie most likely was in the former category. There is a vague indication that the U.S. Government had confiscated the island under the provisions of the Direct Tax law. John Kirk wrote his daughter in January 1866 that "Uncle Manning has rented the plantations of Mr. Charles Dupont, John Hassell and Calliwassee . . ." and states later that "Uncle Clarence is . . . living as best he can on Hilton Head without a thought or care for the future" (South Carolina Historical Society, Kirk Family Correspondence). A letter sent later that same month, however, referring to the proposed sales of confiscated properties to former slaves, comments that "the negroes will surely hold all of the Islands, excepting Spring and Calliwassee, owing to the delay of Congress" (South Carolina Historical Society, Kirk Family Correspondence). Kirk does not explain this belief, but Emma Edwards (as guardian of George Edwards, heir to Spring Island) applied for redemption of that island in December 1865, and the property was returned in 1866 (National Archives, RG 58). It may be that Callawassie was confiscated, a theory supported by the renting of the island, and was redeemed soon enough after the War to prevent its being sold in the later land sales. Arguing against this supposition is the failure to identify a redemption certificate in the Beaufort Register of Mesne Conveyance (RMC). In addition, while neighboring Spring, Daw, and Lemon islands are all shown as confiscated, there is no mention of Callawassie Island (Senate Documents, 1st Session, 47th Congress, volume 4, number 82, page 14).

The first RMC reference to Clarence Kirk as owner of Callawassie is in June 1866. At that time Kirk mortgaged the island to Alexander Burns for $5,000.00. The property is described as:

> all that messuage known as Callawassee Island in the District of Beaufort State of SC on the Island known as Spring Island . . . said to contain 1,000 acres (Beaufort County RMC, DB A, p. 153).

Presumably the jump from 550 acres to 1000 is the result of including surrounding marsh; there is no explanation for Callawassie becoming a "part" of Spring Island. An Article of Agreement was filed in April 1867 between Kirk and W.W. Burns in which Burns was to furnish to Alexander Burns "partner and financial manager of the Plantation" with $2,000 on Kirk's behalf (Beaufort County RMC, DB 1, p. 418). In May 1867 Kirk released his title to W.W. Burns. The property description remains the same, but there are assurances that Kirk owns the island in "a good sure perfect and absolute state of inheritance" and that Burns is legally entitled to everything on the island, including household goods and furnishings (Beaufort County RMC, DB 1, p. 419).

The 1873 "Map of Beaufort County" by Law and Kirk (Figure 5) identifies only one structure on Callawassie Island. Situated at the northwestern edge of the island it appears to represent the main house recorded archaeologically as 38BU70. This indicates that the antebellum plantation house was still standing as late as the last quarter of the nineteenth century.

The heirs of W.W. Burns, Mary Burns and Belle Magruder, sold Callawassie to Benedict Kuser in 1917 with the property description unchanged (Beaufort County RMC, DB 35, p. 370). Kuser sold 1/2-interest to his son John in 1928 (Beaufort County RMC DB 45, p. 883) and a life interest in the remaining 1/2 to Walter Kuser in 1933 (Beaufort County RMC, DB 51, p. 243). John Kuser released his interest to John Kuser, Jr. at the same time (Beaufort County RMC, DB 51, p. 244). All these transfers describe the island as having 1,000 acres and being part of Spring Island.

The Kusers sold the island in 1937 to a woman named Tennessee Thomas (Beaufort County RMC DB 53, p. 187). This sale is probably the source of Michie's mistaken belief that Tennessee Williams once owned Callawassie Island (Michie 1982:27). There is no mention of Spring Island, but the acreage remains the same and the deed

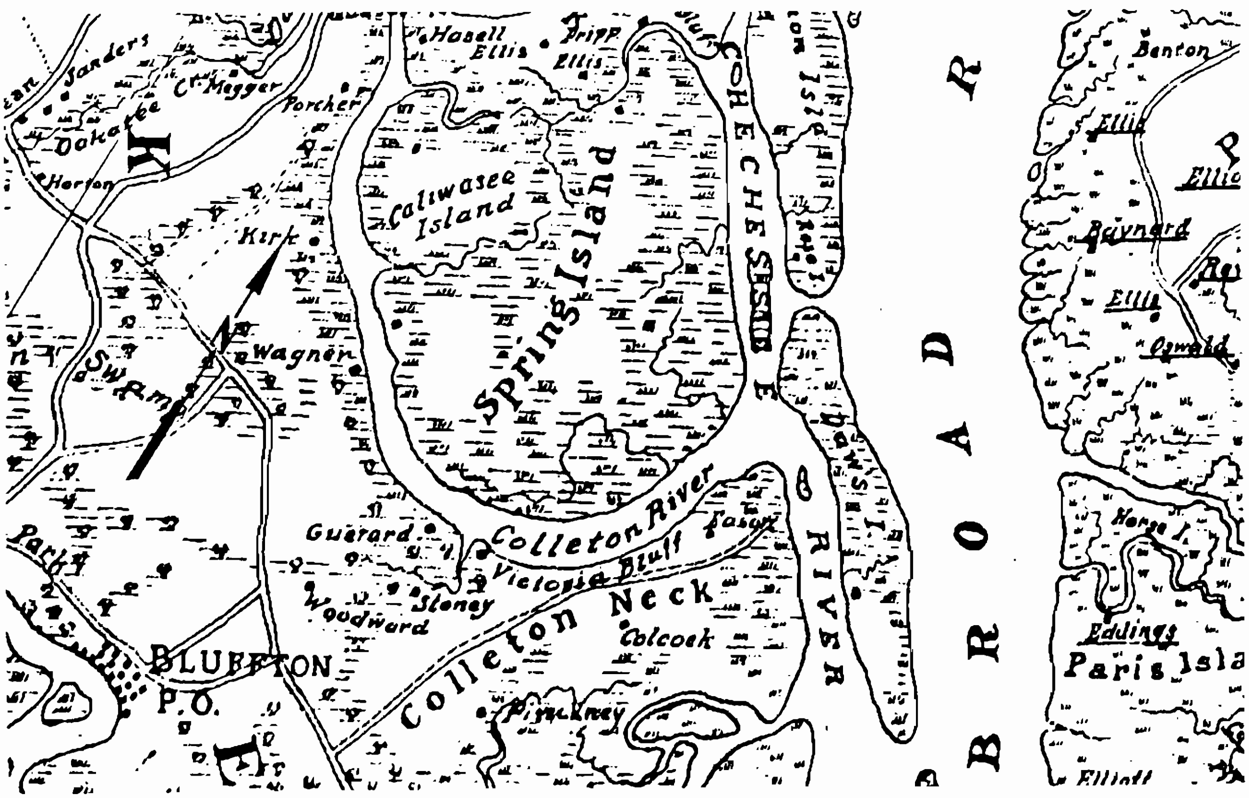


Figure 5. Callawassie Island in 1873.

includes the "frigidaire and lighting system now on the island" (Beaufort County RMC DB 53, p. 187). Thomas purchased the property with mortgages secured from Majorie and A.J. Drexel, who became owners within the year (Beaufort County RMC DB 53, p. 198; Beaufort County RMC DB 54, p. 55).

It is assumed that Callawassie was being farmed during this period. The 1943 USGS Okatie 15' topographic map shows five buildings, all on the western part of the island (Figure 6). The 1937 Beaufort County Highway Map merely outlines the island, making it appear devoid of inhabitants. This, however, was clearly not the case. In 1985 Lepionka interviewed two women who had been teachers on Callawassie Island during the first quarter of the twentieth century (Larry Lepionka, personal communication 1985), but the results of those interviews are not available. Discussions with maintenance personal on Callawassie revealed that the school building, in ruins by the early 1980s, was demolished during construction activities.

An undated typescript of a speech given to the Beaufort County Historical Society mentioned Callawassie as "now the property of Mr. Anthony Drexel" without elaboration; Spring Island belonged to "Mr. Lucas, who is engaged in lumber and cattle business" (Beaufort County Library, Bluffton and Okatie, typescript on file), indicating perhaps that there was little or no activity on Callawassie Island. A year latter Drexel sold Callawassie to the Southern Kraft Timber Land Corporation (Beaufort County RMC DB 60, p. 438), so at least part of the island must have been forested.

In 1949 the island was sold twice, both times to timber companies. International Paper bought it in February, selling it in November to the West Virginia Pulp and Paper Company (Beaufort County RMC, DB 60, p. 561, DB 70, p. 1). W.W. Frick bought it in 1961 (Beaufort County RMC DB 108, p. 18) and sold it to Energy Subsidiary, Inc., in 1969 (Beaufort County RMC DB 169, p. 212). The next transfer was in 1979 when it was purchased by Callawassie Associates for $2,000,000 (Beaufort County RMC DB 275, p. 404. Three Fountainview assumed the property and the mortgage on it in 1981 (Beaufort County RMC DB 319, p. 525) and in turn mortgaged the island to Callawassie Group Limited Partnership (Beaufort County RMC, Mortgage Book 351, p. 228), who sold it to the current owners, Callawassie Development Corporation (Beaufort County RMC, DB 518, p. 1828).

In summary, it seems likely that the earliest occupation on Callawassie Island occurred in the second half of the eighteenth century when the island was owned by Daniel Heyward. While it is certain that Heyward did not live on the island, there is evidence that he was farming the land and was housing slaves on Callawassie. No evidence of this early slave occupation, however, has been identified archaeologically.

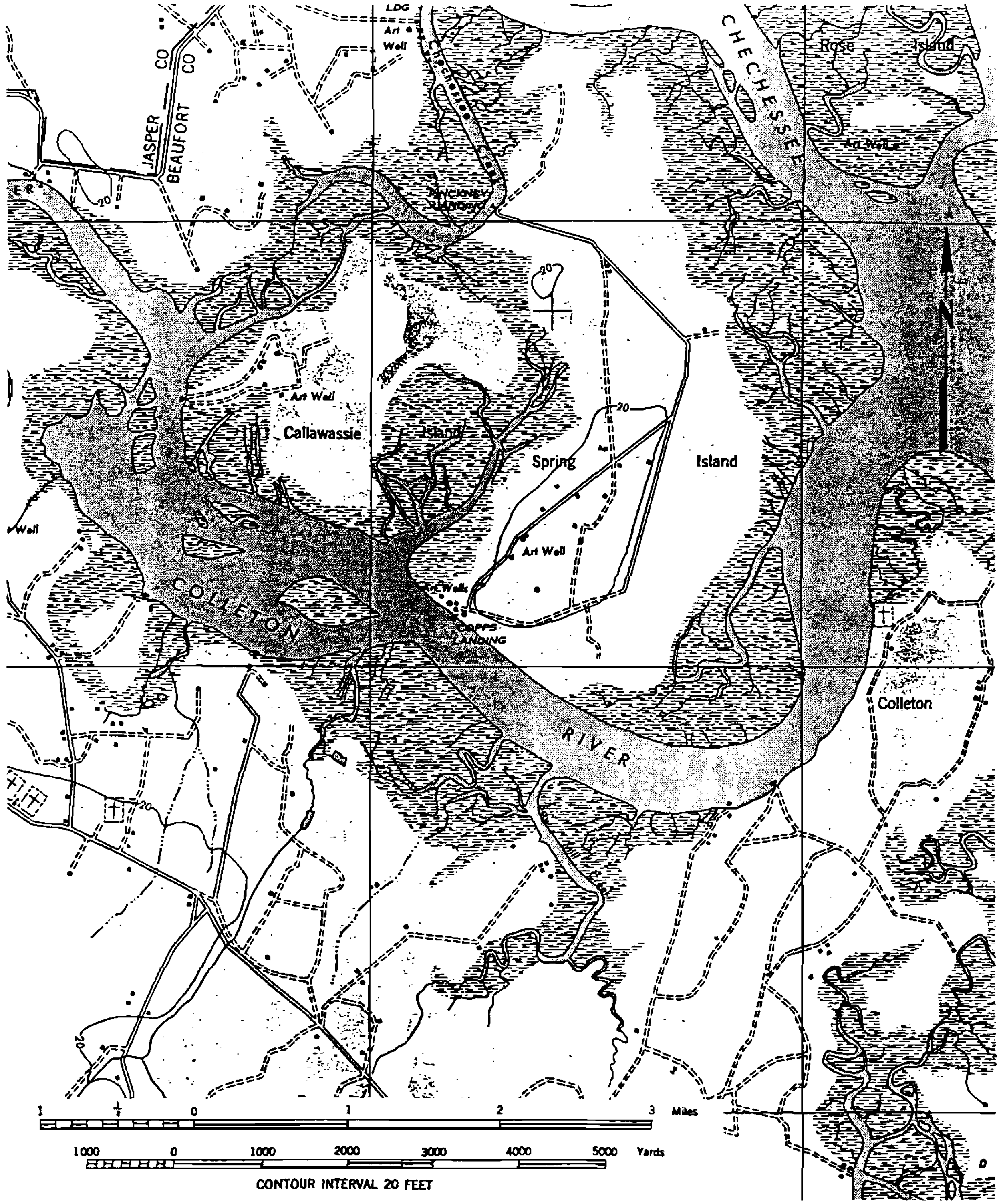


Figure 6. 1943 Okatie 15' Quadrangle showing Callawassie Island.

By 1802 Thomas Rhodes, an overseer for Thomas Heyward, was living on the island and the 1812 map of Callawassie suggests that he may have been living in the vicinity of the sugar mill, known archaeologically as 38BU409. Evidence of a tabby fireplace foundation is still present at the site (see Brooker's discussion of this site in a following section). It is unfortunate that the archaeological excavations conducted at this site by Lepionka have not been published.

James Hamilton owned Callawassie Island from 1813 to 1819. During this six year period it is likely that the main plantation house on the west edge of the island was constructed. It may also be within this broad time period under the ownership of either Thomas Heyward or James Hamilton that the Callawassie sugar works were productive. Again, it is impossible to use the archaeological evidence to refine these historical speculations since the excavations have never been published and the materials are not curated.

By the mid-nineteenth century the island was probably under the ownership of the Kirk family, perhaps Clarence Kirk, and the plantation consisted of the main house, a slave settlement of 10 structures, seven additional structures of unknown function, and an isolated structure on the south edge of the island. Unfortunately, the main house, although recorded as 38BU70, has never been examined archaeologically, the two larger settlements were never identified by either Michie's (1982) or Lepionka's work, and the isolated structure, identified by Michie (1982:40) as 38BU461 was not considered sufficiently significant to warrant preservation or investigation.

The Civil War appears to have affected Callawassie Island only slightly and the main settlement was standing at least as late as 1873. By the twentieth century the island had slipped into a new form of tenant, or more likely, wage labor agriculture.

RESEARCH STRATEGY AND METHODS

Michael Trinkley

Introduction

As was previously indicated, the primary goals of the Callawassie survey were to identify, record, and assess the significance of archaeological sites within the approximately 300 acres of the island not previously developed (representing 34% of the total island area). Secondary goals of the Callawassie survey included an examination of the soils and drainage as they affect the location of prehistoric sites, and to examine and refine the aboriginal settlement systems as previously observed in survey phase of investigations on adjacent Spring Island (Trinkley 1990b). No major analytical hypotheses were created prior to the field work and data analysis, although certain expectations regarding the secondary goals will be outlined in these discussions. The research design proposed for this study is, as discussed by Goodyear et al. (1979:2), fundamentally explorative and explicative.

The previous discussions regarding soils and drainage lead to the conclusion that prehistoric sites will be found in areas of moderately to well drained soils. Previous work, however, has suggested that a few, small prehistoric shell middens will be located on poorly drained soil. Further, the bulk of the site components will be Middle to Late Woodland, since the high sea level stands during these periods are thought to have restricted the dispersion of resources such as large mammals and forest products. Finally, sites are expected to be small and exhibit low artifact diversity since the use of extractive sites is brief, the sites represent a narrow range of activities, and group size was small (Brooks and Scurry 1978). Previous research has also clearly exhibited a non-random pattern to prehistoric site settlement. Even when vast areas of well drained soils are available for settlement, the sites tend to be found clustered around small tidal inlets and marsh areas (see Scurry and Brooks 1980:77 for Charleston County data, Trinkley 1987 and 1989 for Beaufort County data).

Based on these data, prehistoric sites on Callawassie Island were expected to occur on the better drained Chisolm, Eddings, Eulonia, and Wando soils, but were not anticipated in the areas of Bladen, Coosaw, Deloss, or Tomotley soils. Few prehistoric sites, however, were expected inland, away from marsh or tidal creeks. This situation was anticipated because of the "edge effect" where a variety of resources are brought into close proximity.

Consequently, it was anticipated that prehistoric sites would be found clustered in the well drain soil regions. Those sites occurring on the interior were anticipated to be major "base" camps.

Previous work at neighboring Spring Island has developed a scheme of classifying prehistoric sites based on size, features, and relationship to water. Type 1 sites represent fairly small, thin scatters of isolated midden immediately adjacent to the marsh. Type 2 sites consist of larger, more discrete heaps of shell found adjacent to the marsh or a major slough. Type 3 sites consist of shell middens found inland from the water 200 to 800 feet and may be characterized as "inland" in the sense that they are not directly oriented to a single, specific marsh or slough. Type 4 sites lack any evidence of shell midden deposits.

The work by Brooks et al. (1982) also reveal that at least one very significant site, 38BU19, occurs on the island. This site was recognized as a small, sand and shell burial mound with some indications of an associated village area. Previous excavations had revealed the presence of Native American burials and the mound fill appeared to consist of nearby village midden debris. This site, based on the evidence available from Brooks et al. (1982) did not immediately fit any of the previously identified site types.

Turning to historic site locations, previous research has suggested that the main house or major plantation complex will be situated in areas of "high ground and deep water," which incorporate the positive attributes of well drained soils and immediate access to water transport (Hartley 1984; South and Hartley 1980). As plantation crops and owners changed during the colonial and antebellum periods, it is possible that settlement areas might also change location. Additionally, it might be impossible to locate the plantation complex in an area which was healthful, centrally located, and adjacent to a deep water access. In such cases compromises on the ideal would be made, but the weight given to each of the various attributes is unclear. While the health and well-being of the owner's slave chattel was of considerable concern, slave rows were not commonly situated on the best land, and in some cases were located on very poorly drained soils (Singleton 1980; Zierden and Calhoun 1983).

The historic documentation, previously discussed, revealed the location of the earliest (eighteenth century) plantation complex, possibly built by Daniel Heyward. This site, recorded as 38BU409, is situated at an interface between moderately well drained Eulonia and poorly drained Bladen soils, adjacent to the deep water of Chechessee Creek. Such access was probably essential for the movement of supplies into and out of this location, Occupation, by an overseer and perhaps slaves, at this site continued until at least 1809. By about 1813 James Hamilton may have begun the construction of a new settlement on Callawassie. Known archaeologically as 38BU70, the main house was situated at the end of a point of land overlooking the junction of the Okatie River and Chechessee Creek to form the Colleton River. Situated on moderately well drained Chisolm soils, this location was not only well drained and healthful, but allowed consistent deep water access and an excellent view of the area. Although an isolated location on Callawassie, the main house was in a nearly perfect location for other features. The nineteenth century slave settlement was placed about 2000 feet west of the main house, although it too was built on the moderately well drained Chisolm soils.

The primary goals of the data recovery excavations at sites 38BU19, 38BU464, 38BU1249, and 38BU1262 on Callawassie Island and 38BU1214 on Spring Island included detailed examination of subsistence, settlement, and the associated cultural materials. The three sites span the Middle and Late Woodland, including the Deptford, St. Catherines, and Savannah phases. As previously discussed, these sites are incorporated together in these discussions since the results of the study assume greater significance when viewed as a cohesive assemblage.

The seasonality of the various remains found at these five sites was of considerable importance to the overall settlement reconstruction. Likewise, questions concerning the exploitation of different habitats within the coastal zone were significant to an understanding of site settlement choices. While this research could not be expected to explicate the entire range of subsistence and settlement, a careful examination of the five sites might offer some indications of areal patterning.

Also of major importance was a better understanding of the pottery produced by each of these groups. Previous typological studies have largely concentrated on Georgia assemblages (e.g., DePratter 1979) and have failed to examine variations in paste and cordage as significant elements in the typological descriptions. There were indications from the work of both Brooks et al. (1982) and Larsen and Thomas (1982) that the relationship between St. Catherines and Savannah wares may be more complex than previously thought.

<u>Archival Research</u>

The historical research for Spring Island had been previously assembled and should be consulted for additional information (Trinkley 1990b).

The Callawassie study incorporated a review of the site files at the South Carolina Institute of Archaeology and Anthropology. In addition, archival and historical research was conducted at the South Carolina Historical Society, the Charleston County RMC, the Thomas Cooper Library, the South Carolina Department of Archives and History, the Southern Historical Collection at the University of North Carolina at Chapel Hill, the National Archives, and the Beaufort RMC. Throughout this historical research an emphasis was placed on the primary, rather than secondary, sources as the appropriate level of initial study. While the historical research is not exhaustive, it does provide a clear background and is a sufficient base for future work in the project area. This historical and archival research was conducted by the authors of this study, with invaluable assistance from Mr. Colin Brooker.

Field Survey

The typical methodology for a compliance survey of a tract such as Callawassie Island is to establish a systematic intensive survey methodology which examines the entire acreage for archaeological and historical resources. Such an approach, although extremely labor intensive, was used on Callawassie since so little of the island remained undeveloped. Although Michie (1982) had conducted a reconnaissance survey, it was clear from a review of his methodology (which emphasized a survey of the island's marsh edges) that a number of archaeological resources were excluded from consideration. Dramatic evidence of this was provided during the historical research when it was discovered that the major nineteenth century slave settlement on Callawassie was not revealed by the survey and had been lost to development.

The initially proposed field techniques (discussed with and approved by Dr. Patricia Cridlebaugh, Staff Archaeologist with the South Carolina State Historic Preservation Office) involved the placement of shovel tests at 100 foot intervals along transects at 200 foot intervals through the island-wide study areas which exhibited well drained soils, with all fill being screened through 1/4-inch mesh. Each shovel test, measuring 1 foot square, would be numbered sequentially and would be excavated to a depth of at least 1 foot. All cultural materials would be collected, except for shell, mortar, and brick, which would be qualitatively noted in the field and discarded. Notes would be maintained for profiles at any sites encountered. All shovel tests would be flagged in the field for ease in future evaluations. If evidence of an archaeological site was identified, the testing interval would be decreased to 50 feet in order to more accurately establish boundaries.

In addition, Chicora would relocate and assess all previously identified sites within the survey boundaries (although as previously discussed, sites on developed or sold portions of the island were not incorporated into this study). These sites would also be subjected to shovel testing in order to establish site boundaries, site integrity, and assist in collecting temporally diagnostic materials.

At all sites, including those previously reported, Chicora would collect sufficient information to complete or revise the South Carolina Institute of Archaeology and Anthropology site forms, and would assess and justify site eligibility for inclusion on the National Register of Historic Places. The emphasis on shovel testing was felt to be required by the tract's extensive woods coverage, which was anticipated to severely restrict surface visibility.

These plans, however, were initially altered in order to provide Callawassie Development Corporation with immediate information on the nature of the archaeological remains present in the vicinity of the proposed golf fairways. Each fairway had been surveyed and staked in the field. These centerline stakes, placed every 100 feet, coupled with a detailed topographic survey at a scale of 1 inch to 200 feet, allowed generally accurate survey of theses isolated tracts. The interior, wooded, fairways were surveyed by conducting shovel tests along the centerline at 50 foot intervals. Additional tests were placed at 25 foot intervals to more accurately define site boundaries. The two previously cleared fairways were surveyed using visual inspection coupled with random shovel testing to examine for site depth and stratigraphic profiles. The four fairways adjacent to the marsh were not only shovel tested along their centerlines, but were also examined by walking the bluff edge. In addition, the dirt road running parallel to and about 25 feet inland from the marsh, also provided additional surface visibility. A total of 267 shovel tests were excavated in the vicinity of the various fairways, with an additional 36 shovel tests excavated in the vicinity of site 38BU19, which had been damaged by road construction prior to the survey.

During the second phase of survey on Callawassie, the original research strategy was implemented with only minor changes. Previously recorded sites were relocated using visual inspection, if possible. Shovel tests were placed at 25 foot intervals to determine boundaries. If a site could not be identified based on the initial visual inspection, shovel testing was conducted (usually as a transect parallel to the bluff) in the hopes of locating either shell middens or artifacts. Once located, additional shovel tests were conducted at 25 foot intervals to determine boundaries and assess site significance (see Figure 7).

The most significant change in the Phase 2 research design involved those areas where no sites had been previously located. Since archaeological sites were identified during the fairway study on poorly drained interior soils, making the original expectation that sites would be clustered on better drained soils invalid, the level of effort was significantly increased. Rather than limiting survey to areas of well drained soils, transects ranging from 50 to 200 foot intervals (depending on the area to be covered) with shovel tests at 25 to 50 foot intervals, were used to examine much larger areas than originally anticipated. This resulted in the identification of a number of sites which would have otherwise been missed. A total of 1273 shovel tests were excavated during the

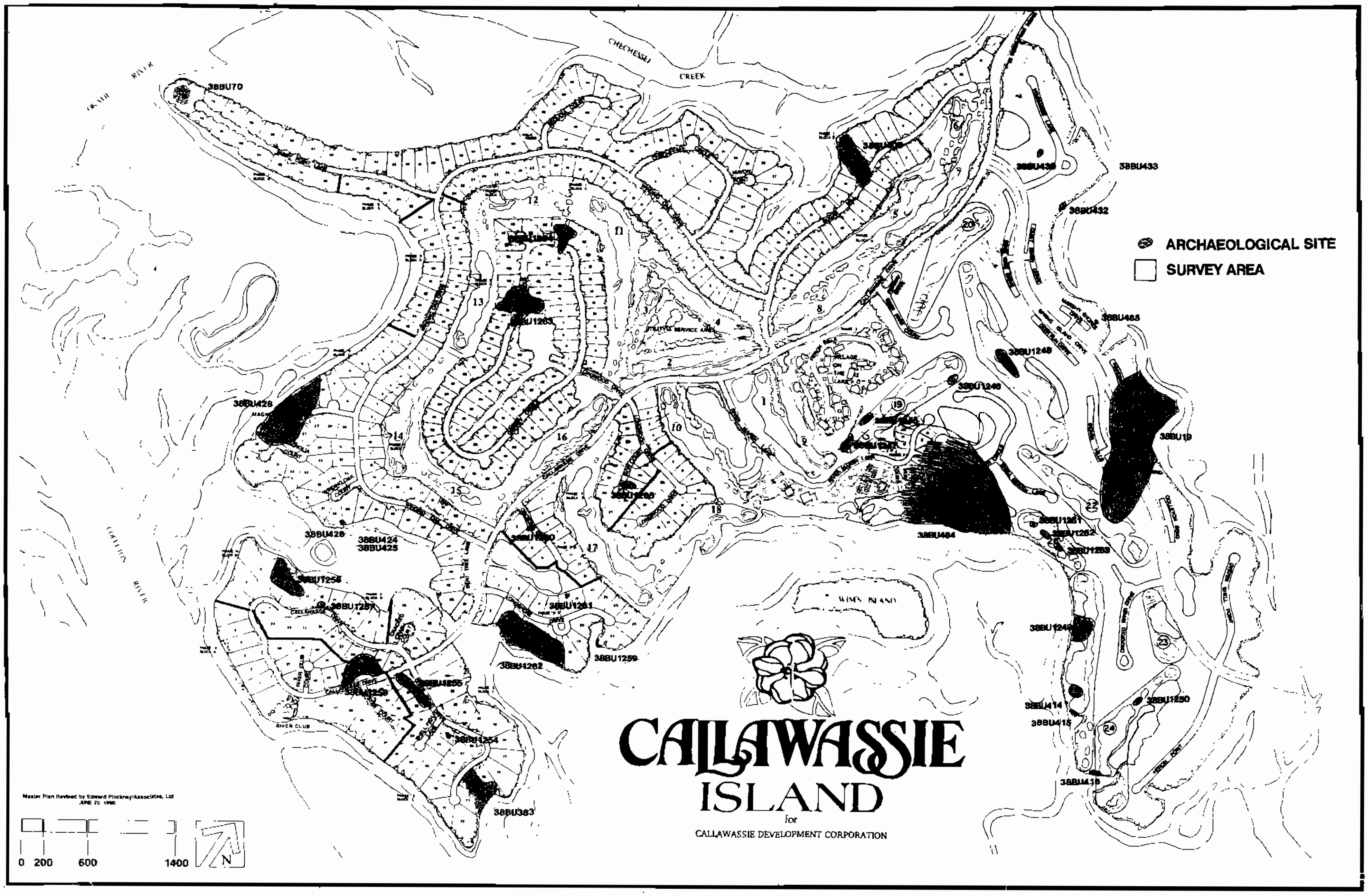


Figure 7. Callawassie Survey area.

phase 2 survey, bringing the number excavated up to 1576, or approximately 5.3 tests per acre.

Mr. Glen McCaskey requested a second change in the overall survey techniques. Since many of the survey tracts included lots currently on the market for sale, it was requested that only positive tests, rather than all shovel tests, be flagged. Consequently, in some areas only those tests yielding cultural material were flagged in the field. All site boundaries, however, were flagged in the field for the use of the development planners and the general site locations were recorded by Chicora on development base maps.

Surface collections were made from several of the sites, although generally ground visibility was too limited to make this approach a valid technique for boundary or artifact quantity studies. The surface materials, all from selective grab collections, are only able to provide some additional information on temporal periods.

Excavations

In order to allow comparisons to be valid between the five excavated sites, it was essential that field techniques, in so far as possible, were uniform. As previously discussed, it was also essential that the excavation techniques be developed to ensure that a wide variety of data, especially relating to subsistence, would be recovered. The data recovery investigations at 38BU19, 38BU464, 38BU1214, 38BU1249, and 38BU1262 were therefore designed and executed in a comparable manner. While the individual site sections will provide more detailed information, this discussion will generally outline the strategies used at all five sites.

At all sites but 38BU19 a grid was developed and tied into permanent development points (such as survey stakes or property markers which could be reconstructed if necessary) to allow horizontal control. A modified Chicago 10-foot grid was established, with each square designated by its southeast corner from a 0R0 point off site. Thus, square 800R200 would be located 800 feet north and 200 feet right (or east) of the 0R0 point. At 38BU19 a slightly different strategy was employed. The various units were laid out on a north-south orientation and were later tied into permanent points. While the units at this site are not, therefore, on a grid system, they do maintain the same degree of control. These units are also designated by their southeast corner.

At each site vertical control was maintained through a mean sea level elevation control point. This ensures that elevations between sites are consistent. In addition, the horizontal and vertical datums used by Brooks et al. (1982) during their earlier excavations at 38BU19 were tied into the current excavations at this site.

The placement of excavation units at each site was guided by either previously excavated close interval shovel tests or by tests excavated during the data recovery phase. The purpose of this work was to ensure that the excavations encountered both dense shell midden, as well as non-shell midden, site areas.

Stratigraphy at the sites tended to be very uniform and consisted of a brown loamy or humic sand overlying either tan subsoil or a shell midden (which in turn overlaid the subsoil). Consequently, the upper zone of brown soil was designated Zone 1, while the shell midden was designated Zone 2. This approach was varied somewhat at 38BU1214, where the thin, recent humus was designated as Zone 1, the underlying brown sand was designated Zone 2a, and the shell midden was designated Zone 2b. Consequently, it is appropriate to note that at 38BU1214, Zones 1 and 2a are the equivalent of Zone 1 elsewhere and Zone 2b is the equivalent of Zone 2 elsewhere.

Non-midden soils, that is Zone 1 (or Zone 1 and Zone 2a) soils, were dry screened through 1/4-inch mesh using mechanical sifters. Shell midden soils (Zone 2 or Zone 2b) were typically dry screened through 1/8-inch mesh also using mechanical sifters. The use of 1/8-inch mesh, while somewhat more time consuming, greatly increases the potential for the recovery of small faunal material. Wing and Quitmyer (1985:57) note that the percentage of fish, relative to other organisms, increases from 34% with the use of 1/4-inch mesh to 76% with the use of the finer 1/8-inch mesh. While ideally water screening through 1/16-inch mesh would be used for faunal recovery, this approach was not logistically feasible at the sites being investigated. The only exception to this strategy were several units at 38BU1262 where the very wet midden soils required the use of 1/4-inch mesh. This concession was made only after a sample of the midden soils was screened through 1/8-inch mesh without the recovery of items which would be lost by using 1/4-inch screens.

The shell from Zone 2 (or Zone 2b) soils was consistently weighted prior to being discarded in the field. Hand picked samples of left oyster valves were collected for additional analysis, as were any other unusual or suspect shell material. At 38BU1214 where a historic component was also identified, the mortar was also weighed prior to being discarded in the field. In addition, a column sample was collected from each unit which exhibited a shell midden component. These column samples varied from 2.25 feet square in a 10 foot unit to 1.1 foot square in a 5-foot unit, but were designed to provide a 5% sample of the midden.

Each column sample was removed and weighted prior to screening. All shell was then weighted and bagged for detailed analysis. The weight of total column minus the weight of the shell provided the weight of the soil in the column and allowed a shell/soil ratio for each midden to be calculated.

Soil samples were routinely collected from each zone. Several examples of shells filled with soil were retained from the various middens for pollen analysis. Units were troweled at the top of the subsoil, photographed in black and white and color, and plotted.

Features were plotted and photographed prior to excavation. Typically they were bisected, with the profile photographed and drawn prior to the excavation of the remaining feature. All feature fill, excepting a 5-gallon sample retained for water flotation, was dry screened through 1/8-inch mesh. Hand picked shell samples were retained for analysis. If shells with packed soil were found in the features, several examples were retained for possible pollen studies.

Laboratory and Analysis Methods

The cleaning of artifacts was begun in Beaufort during the field work and completed in Columbia. Cataloging of the specimens was conducted at the Chicora laboratories in Columbia intermittently from November 1990 through February 1991. All artifacts except brass and lead specimens were wet cleaned. Brass and lead items were dry brushed and evaluated for further conservation needs. Conservation treatments, limited to the historic materials recovered from 38BU1214, have been conducted by Chicora personnel in Columbia.

Brass items, if they exhibit active bronze disease, are being subjected to electrolytic reduction in a sodium carbonate solution with up to 4.5 volts for periods of up to 72 hours. Hand cleaning with soft brass brushes or fine-grade bronze wool follows the electrolysis. Afterwards, the surface chlorides are removed with deionized water baths and the items are dried in an acetone bath. The conserved cuprous items are coated with a 20% solution of acryloid B-72 in toluene. Ferrous objects are being treated in one of two ways. After the mechanical removal of gross encrustations, the artifacts are tested for sound metal by the use of a magnet. Items lacking sound metal are subjected to multiple baths of deionized water to remove chlorides. The baths are continued until a conductivity meter indicates a level of chlorides no greater than 1.0 ppm. The specimens are dewatered in acetone baths and given an application of 10% acryloid B-72 in toluene, not only to seal out moisture, but also to provide some additional strength. Items which contain sound metal are subjected to electrolytic reduction in a bath of sodium carbonate solution in currents no greater than 5 volts for a period of 5 to 20 days. When all visible corrosion is removed, the artifacts are wire brushed and placed in a series of deionized water soaks, identical to those described above, for the removal of chlorides. When the artifacts test free of chlorides (at a level less than 0.1 ppm), they are air dried and a series of phosphoric (10%) and tannic (20%) acid solutions are applied. The artifacts are air dried for 24 hours, dewatered in acetone baths, and coated with a 10% solution of acryloid B-72 in toluene.

As previously discussed, the materials have been accepted for curation by The Environmental and Historical Museum of Hilton Head Island as Accession Numbers 1990.5, 1990.6, and 1990.7 and have been cataloged using that institution's accessioning practices (ARCH 2573 through ARCH 3073). Specimens were packed in plastic bags and boxed. Field notes were prepared on pH neutral, alkaline buffered paper and photographic material were processed to archival standards. All original field notes, with archival copies, are also curated with this facility. All materials have been delivered to the curatorial facility.

Analysis of the collections followed professionally accepted standards with a level of intensity suitable to the quantity and quality of the remains. Prehistoric pottery was classified using common coastal Georgia and South Carolina typologies (DePratter 1979; Trinkley 1983). The temporal, cultural, and typological classifications of the historic remains follow Noel Hume (1970), Miller (1980, 1991), Price (1970), and South (1977).

SITES IDENTIFIED ON CALLAWASSIE ISLAND

Michael Trinkley

Introduction

Although previously discussed, it is important to emphasize that this current, intensive survey of Callawassie Island includes only 300 of the 880 acres on the island and includes only those areas not presently developed. Consequently, about 64% of the island is not included in this study. The survey area incorporates essentially seven loci on the island. The first includes a series of 33 lots at the south end of the island. The second includes 11 lots on the south-southwest edge of Callawassie. The third includes the entire area designated "Phase 6" on the development maps (located at the south-southeast edge of Callawassie). The fourth includes an interior area in the central portion of the island. The fifth incorporates 22 lots on the southeast edge of the island. The sixth is the entire marsh island known on development maps as "Wims Island." The last area is the large tract situated on the northeastern edge of the island (Figure 7).

These investigations identified a total of 32 archaeological sites on the portions of the island available for survey. Of these, 11 had been previously identified by Michie's (1982) survey, while 21 were previously unreported. Site forms for all of the investigated sites have been submitted to the South Carolina Institute of Archaeology and Anthropology, the South Carolina State Historic Preservation Office, and the curatorial facility.

An additional three sites (38BU424, 38BU425, and 38BU433) were originally reported by Michie (1982), but could not be relocated during this survey. In each case the site maps and descriptions available were insufficient to allow more than a general location to be determined. Even after extensive shovel testing for these sites no evidence of cultural materials could be found. It may be that the sites, all heavily eroded and found largely in roots or on the shore, have been completely destroyed.

This section provides detailed information on each of the archaeological sites identified within the survey areas. Brief mention will also be made of two sites, 38BU70 and 38BU409, which while outside the survey tract, are essential to an understanding of historic occupation on the island.

Identified Sites

Site 38BU19, also known as the Callawassie Island Burial

Mound, is situated on the northeast edge of the island. The central UTM coordinates of the site are E514540 N357720 and the site is found on poorly drained Bladen soils at elevations ranging from 8 to 16 feet mean sea level (MSL). Site dimensions, based on a series of 36 shovel tests excavated at 20 to 50 foot intervals on a series of seven transects, are 1400 feet north-south by 600 feet east-west. The site incorporates a Middle to Late Woodland (St. Catherines phase) burial mound which has been tested by the South Carolina Institute of Archaeology and Anthropology (Brooks et al. 1982) and a large village/midden area around the mound which had not been previously identified. The southern edge of the site will be impacted by the construction of Fairway 22, although the bulk of the site is in an area slated for residential construction (which includes the potential for damage through road and utility construction, house construction, and landscaping).

Ceramics recovered from shovel tests at this site include one Thom's Creek sherd (0.8%), 17 Deptford sherds (14.8%), two Mount Pleasant sherds (1.7%), 48 St. Catherines sherds (41.7%), 13 Savannah sherds (11.3%), one Irene sherd (0.8%), one Altamaha sherd (0.8%), four Catawba sherds (3.5%), and 28 unidentifiable sherds (24.3%). Also recovered were two chert flakes and one worked whelk. This assemblage reflects occupation from about 1800 B.C. through the protohistoric periods, although the major occupation appears to be during the St. Catherines phase, about A.D. 1000.

This site, considered a Type 2 midden with an extensive village development and a burial mound, is recommended as eligible for inclusion on the National Register of Historic Places at a national level of significance. The mound provides exceptional evidence of prehistoric mortuary patterns and the skeletal remains are useful for population and dietary studies. The surrounding village has the potential for providing equally important information on seasonality, settlement, and lifeways reconstructions. The total site complex is well preserved, exhibiting excellent site integrity. While development impacts to this site can be mitigated through data recovery, green spacing is the preferred alternative, particularly for the mound itself.

Additional information on this site is presented in the following sections on data recovery.

Site 38BU383 is situated at the southeast edge of Callawassie on what is known as "Famous Island." The central UTM coordinates are E513850 N3565220 and the site is situated on well drained Wando soils at an elevation about 5 feet MSL. Originally reported by Michie (1982) to be a small midden extending inland only 15 feet, this more recent work revealed that the midden, while thin on the marsh face, extends inland about 300 feet. The site originally extended to south perhaps 500 feet, but has been severely damaged by the construction of several houses on adjacent lots.

A series of 27 shovel tests on four transects at 25 foot intervals revealed a relatively thin scatter of shell with occasional denser middens. This represents a partially destroyed Type 2 midden. Recovered materials include 2 unidentifiable sherds and one Deptford Plain sherd.

This midden has been heavily impacted by both road and house construction. The small portion remaining does not appear to exhibit sufficient integrity to warrant further research and the site is recommended as not eligible for inclusion on the National Register.

Site 38BU414 was originally recorded by Michie (1982). It was reported to be a small shell midden on the bluff overlooking the Callawassie Creek marshes. Michie reported that the site was contained "within the root system of an eroding live oak tree" and that the site was "4-5 feet across" (38BU414 site form, South Carolina Institute of Archaeology and Anthropology). No materials were recovered from the site during Michie's survey. More recent investigations have relocated the site originally defined by Michie, as well as finding that the shell midden extends over an area about 50 feet north-south and 150 feet east-west. The central UTM coordinates are E514800 N3576600. A series of 11 shovel tests at the site have revealed that there are several isolated shell middens scattered across the site and inland from the marsh edge. Apparently Michie identified one of these shell piles eroding from the bluff edge. The soils are moderately well drained Eulonia sands and the site is at an elevation of 10 feet MSL. This site is within Fairway 25.

Materials recovered include one Deptford sherd, one Mount Pleasant sherd, and one unidentifiable sherd. These remains suggest sparse occupation during the late Early Woodland and the Middle Woodland periods.

The site is recommended as not eligible for inclusion on the National Register of Historic Places based on the degree of erosional disturbance, the low density of cultural remains, and the scarcity of midden deposits.

Site 38BU415 is a small eroding midden at the northeast edge of the island originally reported by Michie (1982:51). The central UTM coordinates are E514860 N3577560 and the site is situated on moderately well drained Eulonia soils at the edge of the bluff. Site vegetation if pine, palmetto, and oak and the elevation is 5 feet MSL. A series of six shovel tests were placed parallel to the shore in an effort to identify intact midden areas. None were found and no materials were recovered. The site is estimated to cover an area 10 by 15 feet.

This site exhibits heavy erosion with an absence of clear intact remains. It appears to represent a small, Type 1 midden which has been extensively damaged. The site is recommended as not eligible for the National Register.

Site 38BU416 is situated at the northeast edge of Callawassie Island on moderately well drained Eulonia soils. The central UTM coordinates of this Type 1 midden are E515000 N3576470. The site is at an elevation of 5 feet MSL and consists of a moderate amount of shell found for about 15 feet along the bluff edge, eroding into the marsh. A series of eight shovel tests have revealed that the midden extends inland a maximum of 10 feet. No artifacts were recovered from these tests. This site was originally identified by Michie (1982:51) as eroding from around tree roots in the bank.

This site is recommended as not eligible for the National Register based on the extensive damage caused by erosion, the low degree of site integrity, and the absence of artifacts.

Site 38BU426 is a Type 1 midden situated on the southwest edge of Callawassie Island adjacent to a tributary of Colleton River. The elevation of the site is 5 feet MSL and the soils are the poorly drained Coosaw series. The central UTM coordinates are E512720 N3575620. The site consists of a small, thin midden eroding into the marsh off a low bluff. Vegetation is typical maritime forest with oak and palmetto dominating. A series of 10 shovel tests failed to recover artifacts from the midden, which was found to be a maximum of 0.5 foot in depth. Shell is sparsely scattered over an area 50 feet along the bluff and about 10 feet inland. This site was originally identified by Michie (1982:40) based on a thin scatter of eroded shell.

This site is recommended as not eligible for inclusion in the National Register. Site integrity is very low and no intact midden areas were observed during this study.

Site 38BU428, also known as Magnolia Midden, is situated on the southwest edge of the island. The central UTM coordinates are E512640 N3575690. Soils in this area are the well drained Wando Series and the site is at an elevation of 10 feet MSL. This site represents a Type 2 midden adjacent to the marshes of the Colleton River.

The site was originally recorded by Michie (1982:41), who noted that the site was eligible for inclusion on the National Register. Site boundaries were originally placed at 800 feet along the shore by 220 feet inland. Subsequent to Michie's investigations, Larry Lepionka apparently opened at least one excavation unit in the site (Glen McCaskey, personal communication 1990), although there is no record this work or the recovered artifacts. A portion of this site has been green spaced by Callawassie Development Corporation, while other portions have been sold.

The current study included the excavation of 23 shovel tests at 25 foot intervals on three transects perpendicular to the bluff. These tests revealed dense midden to a depth of up to 1.5 feet. Materials recovered include 13 Deptford Cord Marked sherds, seven unidentifiable sherds, and one animal bone. Site boundaries of 800 feet along the marsh and up to 400 feet inland were based on these tests and examination of the road cut and adjacent disturbed property.

Although about half of this site has been sold or damaged by construction, the remaining portion exhibits a very high degree of site integrity. 38BU428 represents a dense Type 2 Deptford phase shell midden. The site is recommended as eligible for inclusion on the National Register of Historic Places. Every effort should be made to ensure the continued protection of this site. It is essential that a site preservation plan be developed which addresses the needs for public interpretation, monitoring to prevent vandalism, and eventually the recovery of artifacts previously excavated from the site.

Site 38BU430 is situated on the north interior end of Callawassie Island. Originally reported by Michie as "a small scatter of oyster shells observed in a road bed in the interior of the island" (38BU430 site form, South Carolina Institute of Archaeology and Anthropology; Michie 1982:50), only a very general location could be determined. Intensive shovel testing in this general area led to the discovery a small Type 3 midden an area of planted pines.

The central UTM coordinates are E513700 N3577650 and the elevation is 10 to 12 feet MSL. The site is situated on very poorly drained Deloss soils. A series 21 shovel tests indicated boundaries about 50 by 30 feet. Materials recovered include one Deptford Plain sherd, two Deptford Cord Marked sherds, and three unidentifiable sherds.

This site has been heavily impacted by previous cultivation (plow ridges are still visible in the area of planted pines) and the recent conversion of the field into timber production. The site exhibits very limited integrity and a very low density of plow disturbed artifacts. Consequently, the site is recommended as not eligible for inclusion on the National Register.

Site 38BU432 is situated the north edge of Callawassie Island on poorly drained Bladen soils. The central UTM coordinates are E513900 N3577650 and the site is at an elevation of 10 feet MSL. The site consists of a very sparse shell midden extending about 25 feet along the edge of the marsh bluff. A series of 10 shovel tests reveals that the midden extends inland a maximum of 10 feet. The maximum depth of the midden on the bluff is 0.5 foot, although the midden tapers to about 0.1 foot to the interior. The site was originally reported by Michie (1982:52) based on shells eroding into the marsh.

This Type 1 shell midden is recommended as not eligible for inclusion on the National Register. It has been heavily damaged by erosion and only limited integrity has been observed during this survey.

Site 38BU464 was also originally recorded by Michie in 1982. At that time Michie noted that the site, a shell midden up to a foot in depth, was situated in the interior of the island in a forest. The site was estimated to measure 50 by 80 feet and Michie recommended additional work at the site (38BU464 site form, South Carolina Institute of Archaeology and Anthropology). These current investigations have found that the site measures at least 700 by 650 feet (which suggests that Michie found only the portion of the site visible on the surface). Today about half of the Type 2 shell midden site has either been cleared for the construction of Fairway 27 or has been damaged through the construction of roads and tennis courts.

The central UTM coordinates are E514200 N3576800. Soils are classified as moderately well drained Eulonia sands and the elevation is about 14 feet MSL. The site is found on a sandy ridge overlooking the Callawassie Creek marsh. A series of 44 shovel tests have identified a series of discrete middens exhibiting integrity in the forested area on the east half of the site. Materials recovered two Stallings sherds (4%), eight Deptford sherds (16%), one Mount Pleasant sherd (2%), 21 St. Catherines sherds (42%), one Altamaha sherd (2%), one Catawba sherd (2%), and 14 unidentifiable sherds (28%). While the site was occupied from about 2000 B.C. through A.D. 1600, it appears that the most intensive settlement occurred during the Middle Woodland St. Catherines phase, about A.D. 1000.

This site is recommended as eligible for inclusion on the National Register of Historic Places, in spite of the damage caused by development construction and the clearing and grubbing associated with the golf course. The eastern half of the site exhibits intact middens and is capable of contributing information to settlement and subsistence questions surrounding the Middle Woodland. This site, in close proximity to 38BU19, may also provide information on the nature of the burial mound. Additional information on the site is provided in the data recovery sections of this study.

Site 38BU465 is located at the north end of Callawassie Island and consists of a very small Type 4 site. Michie originally reported sherds inland from the bluff in an area about 25 by 50 feet. This current study produced only one positive shovel test out of 20, yielding an estimated site size of 25 by 25 feet. The single artifact recovered is a Deptford Check Stamped sherd.

The site is situated on poorly drained Bladen soils at an elevation of 9 feet MSL. The central UTM coordinates are E514180 N3577360. Vegetation in this area is mixed hardwoods and pine. This site is recommended as not eligible for inclusion on the National Register based on the low density of materials and the absence of clear site integrity.

Site 38BU1245 is situated on the interior of the island; the central UTM coordinates are E513820 N3576840. This site consists of a thin scatter of shell in an area previously cleared for the construction of Fairway 19. More recently the site area has been extensively plowed and planted in rye. The soils are the poorly drained Coosaw series and the site is situated on a sandy ridge adjacent to an fresh water slough. Site dimensions, based on a series of five shovel tests and surface collections, are estimated to be 100 feet north-south by 50 feet east-west, although the extent of disturbance may boundary determinations difficult. This site may actually be much smaller than plotted, with the shell dispersed by clearing and plowing. Materials collected include one Stallings Plain sherd, one Deptford sherd with an unidentifiable surface treatment, one Savannah Complicated Stamped sherd, one Catawba Plain sherd, and one chert flake.

Although extensively damaged, 38BU1245 appears to represent a Type 3 midden. This site, however, is recommended as not eligible for inclusion in the National Register based on the extensive damage and absence of clear site integrity.

Site 38BU1246 is situated in the same cleared fairway as 38BU1245 and exhibits the same degree of disturbance. The soils are poorly drained Coosaw sands and the site, on a sandy ridge overlooking a low area, is at an elevation of 13 feet MSL. The central UTM coordinates are E513860 N3577040. Site boundaries, based primarily on the dispersion of shell midden, are 150 feet north-south by 50 feet east-west. A series of three shovel tests were excavated at this site to determine if evidence of intact soil profiles could be identified -- each test indicated through mixing to a depth of at least 1.0 foot and no intact midden areas could be identified. Materials recovered include two Stallings Plain sherds, one Deptford Plain sherd, and three unidentifiable sherds. This appears to represent the remnants of a Type 3 midden.

This site is recommended as not eligible for inclusion on the National Register of Historic Places based on the extensive clearing and grubbing, and subsequent plowing. No evidence of intact middens was found and the site exhibits a low degree of integrity.

Site 38BU1247 is also situated in the cleared and grubbed area of Fairway 19. A thin shell scattered was encountered on a sandy rise overlooking a interior slough with the site at an elevation of 10 feet MSL. The soils are the poorly drained Coosaw series and the central UTM coordinates of the site are E513830 N3576730. Two shovel tests were excavated to examine the soil stratigraphy. The disturbance at this site is identical to that observed at 38BU1245 and 38BU1246, although it appears to represent a Type 1 site. Site boundaries are estimated at 300 feet north-south by 75 feet east-west. Material recovered include one Stallings Plain sherd, one St. Catherines Plain sherd, and three unidentifiable sherds.

This site is recommended as not eligible for inclusion on the National Register. No evidence of site integrity could be identified and surface indications of the site were very sparse.

Site 38BU1248 is situated on a sandy rise at an elevation of 12 to 15 feet overlooking two interior depressions. The soils in the site area are poorly drained Coosaw sands and the central UTM coordinates are E5139760 N3577220. The site, within Fairway 21, is vegetated in second growth pine and furrows are still visible on the forest floor. A series of 15 shovel tests were placed in the site area, providing boundaries of 25 feet north-south by 300 feet east-west. These tests, however, revealed a very sparse distribution of material and evidence of heavy plowing. Materials recovered include one Deptford Plain sherd, one Deptford Cord Marked sherd, and one St. Catherines Cord Marked sherd.

This Type 3 site is recommended as not eligible for inclusion on the National Register of Historic Places based on the scarcity of remains, evidence of extensive plowing, and lack of intact midden areas. No further investigations are recommended at this site.

Site 38BU1249 is situated on Fairway 25, about 200 feet northwest of 38BU414. The site area is in a maritime forest with only minimal exposure along the Callawassie Creek shore. The soils in the site area are moderately well drained Eulonia sands and the site elevation is 5 to 12 feet MSL. The central UTM coordinates are E514720 N3576720. A series of 18 shovel tests were excavated, revealing site boundaries of 175 feet north-south by 200 feet east-west. The midden at this Type 2 site is unusual in that it appears to have a relatively high density of periwinkle. Materials recovered include four Deptford sherds and two unidentifiable sherds.

Site integrity is high and there is no evidence of site disturbances. The presence of a late Early Woodland periwinkle midden is unusual and deserve more careful investigation. This site is recommended as eligible for inclusion on the National Register of Historic Places. Additional information concerning data recovery excavations can be found in a following section of this study.

Site 38BU1250 is an interior Type 1 site situated adjacent to a fresh water wetland within Fairway 24. This shell midden is found on a sandy ridge at an elevation of 11 feet MSL. The soils in this area are poorly drained Bladen sands. The central UTM coordinates are E514950 N3576650. The site has been damaged by a bulldozer cut, perhaps for a survey line or a temporary road. Two shovel tests placed in the area of densest surface shell revealed midden to a depth of about 0.5 foot, although there was also evidence of recent disturbance. No materials were found during either the surface survey or the limited shovel testing.

This site is recommended as not eligible for inclusion on the National Register of Historic Places based on the extensive disturbance. No additional work is recommended at this site.

Site 38BU1251 is a very small, isolated Type 1 shell midden situated adjacent to the marshes of Callawassie Creek on moderately well drained Eulonia soils at an elevation of 12 feet MSL. The site is within Fairway 26. Shell was observed both on the surface and in a series of eight shovel tests. Central UTM coordinates are E514400 N3576900. The site area is in a maritime forest of live oak and palmetto. Site boundaries, based on the shovel tests and the surface scatter of shell in the roadway adjacent to the marsh, is estimated to be 50 by 50 feet. No artifacts were recovered from this midden.

The site is recommended as not eligible for inclusion on the National Register, based on the lack of cultural remains and the absence of clear site integrity.

Site 38BU1252 is situated about 100 feet east of 38BU1251 and is also within Fairway 26. The central UTM coordinates are E514440 N3576930 and the site elevation is 10 feet MSL. This small Type 1 shell midden is found on moderately well drained Eulonia soils overlooking the Callawassie Creek marsh. Vegetation in the area includes primarily live oak, palmetto, and cedar with a dense understory. A series of six shovel tests revealed light midden up to 0.5 foot in depth. The site is estimated to cover an area 50 feet north-south by 100 feet east-west. A single Thom's Creek Plain sherd was recovered.

This site is recommended as not eligible for inclusion on the National Register based on the limited degree of site integrity and the sparse artifact content. Adequate mitigation has been achieved through recordation of the site location.

Site 38BU1253 is situated about 50 feet east of 38BU1252 on a sandy ridge of moderately well drained Eulonia soils paralleling Callawassie Creek. The site elevation is 11 feet MSL and the central UTM coordinates are E513530 N3576890. This Type 1 midden was found within Fairway 26. Site boundaries, based on the excavation of eight shovel tests and the scatter of shell in the road bisecting the site, are 50 feet north-south by 75 feet east-west. No diagnostic remains were found in the shovel tests.

Sites 38BU1251, 38BU1252, and 38BU1253 are all discrete shell piles, although because of their proximity they may be related. Regardless, 38BU1253 is recommended as not eligible for inclusion on the National Register. The site failed to exhibit clear integrity and no cultural remains were identified either in the testing or in surface collections.

Site 38BU1254 is situated at the south end of Callawassie on "Famous Island." The central UTM coordinates are E513640 N3575440 and the site elevation is approximately 8 feet MSL. Soils in the site area are the excessively drained Wando series. This is a Type 3 midden with a very light scatter of shell about 700 to 800 feet inland from the marshes of Callawassie Creek and Colleton River.

A series of nine shovel tests were excavated at the site, with only two positive tests (which produced two unidentifiable sherds). The maximum site area, based on the distribution of shell, is about 50 by 50 feet. The site is recommended as not eligible for inclusion in the National Register based on the low degree of site integrity and the low density of recovered material.

Site 38BU1255 is situated at the south end of Callawassie Island on "Famous Island." The site consists of a series of thin middens following a sandy ridge. The site area is approximately 50 by 500 feet. The central UTM coordinates are E513400 N3575400 and the elevation is 10 feet MSL. Soils are the poorly drained Coosaw series and vegetation is mixed pine and hardwood.

A series of 46 shovel tests produced three Mount Pleasant Cord Marked sherds, two Deptford Plain sherds, one Savannah Plain sherd, one Savannah Cord Marked sherd, seven unidentifiable sherds, and one chert flake.

This Type 3 midden is recommended as not eligible for inclusion on the National Register based on the low degree of site integrity. The midden is shallow and appears to have been plowed.

Site 38BU1256 is a probable Type 2 midden situated on the north edge of Famous Island at the south end of Callawassie. The central UTM coordinates are E512990 N3575620 and the soils are poorly drained Bladen sands. The site elevation is about 8 feet MSL. The area is vegetated in a mixed pine and hardwood forest with some surface indications of plowing or other disturbance.

A series of 23 shovel tests yielded one Deptford Check Stamped sherd, one Savannah Cord Marked sherd, one Savannah sherd with an indistinct surface treatment, one Altamaha Complicated Stamped sherd, and two unidentifiable sherds. These tests produced evidence of a moderately dense shell midden with scattered shell over an area about 200 by 500 feet. The depth of the midden ranged from 0.3 to 0.9 foot, with occasional artifacts found to a depth of 1.1 foot.

This site is recommended as not eligible for inclusion in the National Register based on the damage cause by previous plowing or lot clearing and the failure to identify areas of clear integrity.

Site 38BU1257 is situated at the south end of Callawassie on "Famous Island" and the central UTM coordinates are E513360 N3575520. The elevation is 10 feet MSL and the soils are poorly drained Coosaw sands. Vegetation is similar to 38BU1256 and there is evidence of similar disturbance. In addition, it appears that a portion of the site was damaged by the construction of the adjacent road.

A series of 10 shovel tests produced one Deptford Check Stamped sherd, one Irene Complicated Stamped sherd, and two unidentifiable sherds, and yielded site boundaries of about 50 by 50 feet. Shell was uniformly thin throughout the tests, suggesting that the midden had been thoroughly disturbed. Consequently, this Type 1 midden is recommended as not eligible for inclusion on the National Register.

Site 38BU1258 is situated at the south end of Callawassie on "Famous Island." The soils are the poorly drained Coosaw series and the site is at an elevation of 10 feet MSL. This appears to be a Type 3 midden situated in the central portion of the island. UTM coordinates are E513300 N3575460. Site boundaries are placed at 400 feet north-south by 400 feet east-west. The entire area is characterized by sparse shell scatters which probably represented individual middens prior to plowing or other disturbances.

Materials recovered from the 25 shovel tests include one Thom's Creek Reed Drag and Jab sherd, one Refuge Random Punctate sherd, one Deptford Plain sherd, one Deptford Simple Stamped sherd, two Deptford Check Stamped sherds, two Savannah Plain sherds, one Savannah Check Stamped sherd, two Irene sherds, and 22 unidentifiable sherds.

This site is recommended as not eligible for inclusion in the National Register based on the low degree of site integrity.

Site 38BU1259 is situated on the Phase 6 tract on the southeast edge of Callawassie Island. The central UTM coordinates of the site are E513900 N3575900 and the soils are moderately well drained Eulonia sands. The elevation of the site is about 5 feet MSL. The site was first observed as a small shell midden about 50 feet in length eroding into the marsh. A series of eight shovel tests yielded a single unidentifiable sherd and revealed that the midden extended inland a maximum of 10 feet.

This Type 1 site is recommended as not eligible for inclusion on the National Register based on the extensive erosion and absence of clear site integrity.

Site 38BU1260 is situated on the Phase 6 development tract on the southeast edge of Callawassie Island. The central UTM coordinates of this Type 4 site are E513600 N3576100. Soils are the poorly drained Coosaw series and the elevation is 10 feet MSL. The site consists of a very low density artifact scatter situation in an interior area. A series of 10 shovel tests yielded three Deptford Plain sherds and one unidentifiable sherd. Site boundaries are estimated to be 75 by 25 feet based on these tests and the scatter of material.

This site is recommended as not eligible for inclusion on the National Register based on the very low artifact density and the failure to identify areas of clear site integrity.

Site 38BU1261 is situated on the Phase 6 development tract at the southeast edge of Callawassie Island. This Type 3 site is on poorly drained Coosaw soils at an elevation of 5 feet MSL. The central UTM coordinates are E513440 N3576040. Vegetation is a mixed pine and hardwood forest with a light understory. A series of 9 shovel tests revealed a light scatter of shell. Although no clear evidence was obtained, it appears that this area may have been plowed. Recovered materials include four unidentifiable sherds. The boundaries of the site have been placed at 100 by 50 feet, based primarily on the scatter of shell.

This site is recommended as not eligible for inclusion on the National Register. The site exhibits a very low degree of site integrity and a low density of both shell and artifacts.

Site 38BU1262 is a dense Type 2 midden situated at the marsh edge on the Phase 6 development tract. The soils are the poorly drained Coosaw series and the site elevation is about 5 feet MSL. The central UTM coordinates are E513420 N3575760. Initially a series of 8 shovel tests were excavated to reveal site boundaries 800 by 200 feet. Additional tests were placed at this site using transects spaced 25 feet apart with shovel tests at 25 foot intervals. A total of 170 shovel tests were excavated; this work revealed a series of moderate to dense middens scattered across the site. Materials recovered include one Deptford Plain sherd, seven Deptford Cord Marked sherds, one Deptford Check Stamped sherd, two St. Catherines Cord Marked sherds, three Savannah Plain sherds, two Savannah Cord Marked sherds, one Savannah Check Stamped sherd, one unidentifiable sherd, and one rhyolite flake.

This site is recommended as eligible for inclusion on the National Register of Historic Places. Site integrity is judged to be high. The intensive shovel testing revealed that there are a number of well preserved middens scattered across the site. Additional information on the site is available in the following section on data recovery.

Site 38BU1263 is located in an interior development area in the central portion of the island. The central UTM coordinates are E512820 N3576300. Soils are the poorly drained Coosaw sands and the elevation is about 10 feet MSL. This site is situated on a sandy ridge parallel to an interior slough which has recently (within the past 10 years) been dredged to create an active lagoon. Vegetation in the area is primarily hardwood with some pine.

The site covers an area about 250 by 250 feet, although portions of the site have been damaged by road construction. The 20 shovel tests revealed that the core of the intact site area is situated on development lot 44, with site density and integrity declining in the other directions. Recovered materials include two Deptford Plain sherds, one Deptford Cord Marked sherd, one St. Catherines Plain sherd, two St. Catherines Cord Marked sherds, two Savannah Plain sherds, one Savannah Check Stamped sherd, one Savannah Cord Marked sherd, and nine unidentifiable sherds.

This Type 2 site is recommended as eligible for inclusion on the National Register, based on its unique environmental context and the presence of an intact site area on lot 44.

Site 38BU1264 is situated in an interior development area in the central portion of Callawassie Island. Soils in the site area are the poorly drained Tomotley series and the elevation is about 10 feet MSL. The central UTM coordinates are E512820 N3576900. Vegetation is mixed pine and hardwoods. A series of 25 shovel tests were excavated, yielding two Deptford Cord Marked sherds, one St. Catherines sherd, six Savannah Plain sherds, three Savannah Cord Marked sherds, and two unidentifiable sherds. Site boundaries, based on these tests, are 300 feet north-south by 225 feet east-west.

These tests produced only sparse shell and artifacts, with evidence of disturbance from both road construction and probably plowing. Consequently, this Type 3 midden is recommended as not eligible for inclusion on the National Register.

Site 38BU1265 is situated at the southeast edge of Spring Island. The central UTM coordinates of the Type 4 site are E513700 N3576080. Soils in the area are the moderately well drained Eulonia series and the elevation is about 5 feet MSL. Vegetation consists of mixed pine and hardwood, with some evidence of plow disturbance. A series of 10 shovel tests yielded four unidentifiable sherds and one quartz flake. Based on this work the estimated site size is 25 feet in diameter.

This site is recommended as not eligible for inclusion on the National Register based on the apparent lack of clear site integrity and the low density of remains.

Two additional sites, although outside of the survey area, will be briefly mentioned because of their extraordinary importance to the history of Callawassie Island. The first, 38BU70, situated on a peninsula of well drained Chisolm soils at the northeast edge of the island was identified by Michie during his reconnaissance survey. Michie (1982:38) reports that he undertook a "testing program" at this site, although additional information concerning the nature of this work is not provided. He does, however, indicate that the site is significant and worthy of additional research (Michie 1982:58). Lepionka apparently visited this site only briefly, although no report of his work is available. Brooker provides some limited architectural data on the site (this volume), although clearly very little concerning the site is known. The historical research conducted for Callawassie strongly suggests that this was the main plantation house built by James Hamilton in the early nineteenth century. Consequently, this site is of particular importance to the region's cultural and architectural history. Currently the site is intact and is situated almost entirely on Lot 73.

Site 38BU409 was also identified by Michie (1982:46-49), although it was incorrectly interpreted as a domestic structure rather than a sugar processing site. Lepionka conducted extensive excavations at the site in the mid-1980s, although no report of this work has ever been published. Fortunately, Brooker is able to at least provide detailed architectural comments on this structure, even if the archaeological data are lost. This site complex includes not only features associated with sugar processing, such as the mill, curing house, and boiling house, but also a small slave settlement and a probable overseer's house. While the sugar mill structures are still standing, they have not received any preservation treatment and exhibit signs of deterioration. The associated structures are on adjacent, privately owned lots, and a portion of the site was destroyed by the construction of the paved road. These associated buildings, never thoroughly investigated and never reported, are now largely destroyed.

The slave settlement, identified in the historical research was never recorded by either Michie or Lepionka. The area of this settlement, which chronicles the heritage of African-Americans on Callawassie, is contained within a variety of privately owned lots (probably Lots 58-69).

<u>Summary</u>

The archaeological sites identified from the Callawassie survey are listed in Table 2. Previous investigations (e.g., Trinkley 1990b) have demonstrated the utility of characterizing the prehistoric middens into four broad "types." Type 1 sites are small, thin shell middens found on the shore edge in close proximity to a tidal slough or marsh. Type 2 sites are large heaps of shell, also found on the shore edge and in close proximity to the marsh. Type 3 sites are "inland" sites which are 200 to 800 feet from a water source, but which still evidence shell midden deposits. Type 4 sites are "interior" sites which fail to evidence any shell midden deposits.

There are 32 prehistoric sites recorded from this limited survey for Callawassie Island, 22 (69%) of which have produced diagnostic specimens. The remaining 10 sites are classified as prehistoric based on visual impressions (i.e., thin middens of

Table 2.
Summary of Surveyed Sites on Callawassie Island

Site	Type and Major Periods	Soil	Size	Eligibility
38BU19/466	Type 2/village - St. Catherines/Savannah	Bladen	1400 x 600	E
38BU383	Type 2 - Deptford	Wando	30 x 30	NE
38BU414	Type 2 - Deptford/Mount Pleasant	Eulonia	150 x 50	NE
38BU415	Type 1 - ?	Eulonia	10 x 15	NE
38BU416	Type 1 - ?	Eulonia	15 x 10	NE
38BU426	Type 1 - ?	Coosaw	50 x 10	NE
38BU428	Type 2 - Deptford	Wando	400 x 800	E
38BU430	Type 3 - Deptford	Deloss	50 x 30	NE
38BU432	Type 1 - ?	Bladen	25 x 10	NE
38BU464	Type 2 - Deptford/St. Catherines	Eulonia	700 x 650	E
38BU465	Type 4 - Deptford	Bladen	25 x 25	NE
38BU1245	Type 3 - Deptford/Savannah	Coosaw	50 x 100	NE
38BU1246	Type 3 - Stallings/Deptford	Coosaw	50 x 150	NE
38BU1247	Type 1 - Stallings/St. Catherines	Coosaw	200 x 75	NE
38BU1248	Type 3 - Deptford/St. Catherines	Coosaw	300 x 25	NE
38BU1249	Type 2 - Deptford/St. Catherines	Eulonia	200 x 175	E
38BU1250	Type 1 - ?	Bladen	50 x 50	NE
38BU1251	Type 1 - ?	Eulonia	50 x 50	NE
38BU1252	Type 1 - Thom's Creek	Eulonia	100 x 50	NE
38BU1253	Type 1 - ?	Eulonia	75 x 50	NE
38BU1254	Type 3 - ?	Wando	50 x 50	NE
38BU1255	Type 3 - Deptford/Mount Pleasant/Savannah	Coosaw	50 x 500	NE
38BU1256	Type 2 - Deptford/Savannah	Bladen	200 x 500	NE
38BU1257	Type 1 - Deptford/Irene	Coosaw	50 x 50	NE
38BU1258	Type 3 - Deptford/Savannah	Coosaw	400 x 400	NE
38BU1259	Type 1 - ?	Eulonia	20 x 10	NE
38BU1260	Type 4 - Deptford	Coosaw	75 x 25	NE
38BU1261	Type 3 - ?	Coosaw	100 x 50	NE
38BU1262	Type 2 - Deptford/St. Catherines/Savannah	Coosaw	800 x 200	E
38BU1263	Type 2 - Deptford/St. Catherines/Savannah	Coosaw	250 x 250	E
38BU1264	Type 3 - Deptford/St. Catherines/Savannah	Tomotley	300 x 225	NE
38BU1265	Type 4 - St. Catherines/Savannah	Eulonia	25 x 25	NE

Site Type: Type 1 - small midden adjacent to shore; Type 2 - large midden adjacent to shore or slough; Type 3 - interior shell midden at least 800 feet from water; Type 4 - interior non-shell midden.
Soils: Bladen, Coosaw, Deloss, and Tomotley are poorly drained; Eulonia and Wando are well drained.
Size: in feet.
Eligibility: E - eligible for the National Register; NE - not eligible for the National Register.

shell without artifacts) or have yielded eroded pottery which cannot be classified. Of the 22 sites with diagnostic material, 56 different archaeological components are recognized. This survey level data, however, does not allow statements to be made regarding the intensity of occupation at sites during any of the periods represented. Consequently, these discussions require that all components be given equal weight. In addition, since this survey did not incorporate the entire island it is difficult to assess the bias involved in the data collection. It seems, however, that the survey areas do provide general coverage in a variety of areas, representing a number of different environmental zones.

Stallings pottery occurs on four sites (18% of the total having diagnostic material), although it is found as a single component on none. Only one of the four sites occurs on well drained soils. Of these four sites two are Type 3 middens, while one each of the Type 1 and Type 2 sites was also identified. Compared to the data from Spring Island, the Stallings sites on Callawassie are generally similar -- they occur rather infrequently (see Figure 8) and tend to be situated back from the marsh edge. One noticeable difference is that 75% of the Stallings sites on Callawassie are situated on poorly drained soils, compared to 20% on adjacent Spring Island (Figure 9).

There is a decline in the number of Thom's Creek and Refuge sites on Callawassie Island. Thom's Creek material is found on only three sites (14%), while Refuge material is found on only one site (5%). One Thom's Creek site appears to be single component and a single Type 1, 2, and 3 site is represented. The single Refuge site is characterized as a Type 3 midden. This trend in the reduction of the number of Thom's Creek and Refuge sites parallels that found on Spring Island (Figure 8), although again the sites tend to be found on poorly drained soils (Figure 9). This decrease in site density and apparent population density has been previously suggested to be the result of Thom's Creek people forming larger base camps, thereby reducing the number of small seasonal encampments (Trinkley 1990b:161).

By the following Deptford phase there appears to be a dramatic increase in the Deptford population, or at least sites, on Callawassie Island. Deptford materials are found at 19 sites (86%) and are identified as single components at five. Nine of the 19 sites (47%) are Type 2 middens, while 7 (37%) are Type 3 middens. One is a Type 1 midden and the remaining two sites are classified as Type 4 middens. This expansion of Deptford sites is also seen on Spring Island, although it is not as startling as on Callawassie. In addition, on Spring Island the Type 1 and 3 middens account for the bulk of the sites. Perhaps more unexpected is that on Callawassie only 26% of the sites are found on well drained soils, compared to 67% on Spring Island (Figure 9).

The settlement pattern during the Deptford phase on both Callawassie and Spring islands is similar to that noted by DePratter (1978) during the Wilmington phase on Skidaway Island in Georgia. The number of sites increases significantly, previously unoccupied areas of the island are settled, many of the sites are situated further inland than previously, and discrete midden piles are noticed for the first time. The reason that these events appear to occur earlier on the South Carolina coast than further south in Georgia is not clear. While DePratter suggests a formative level of

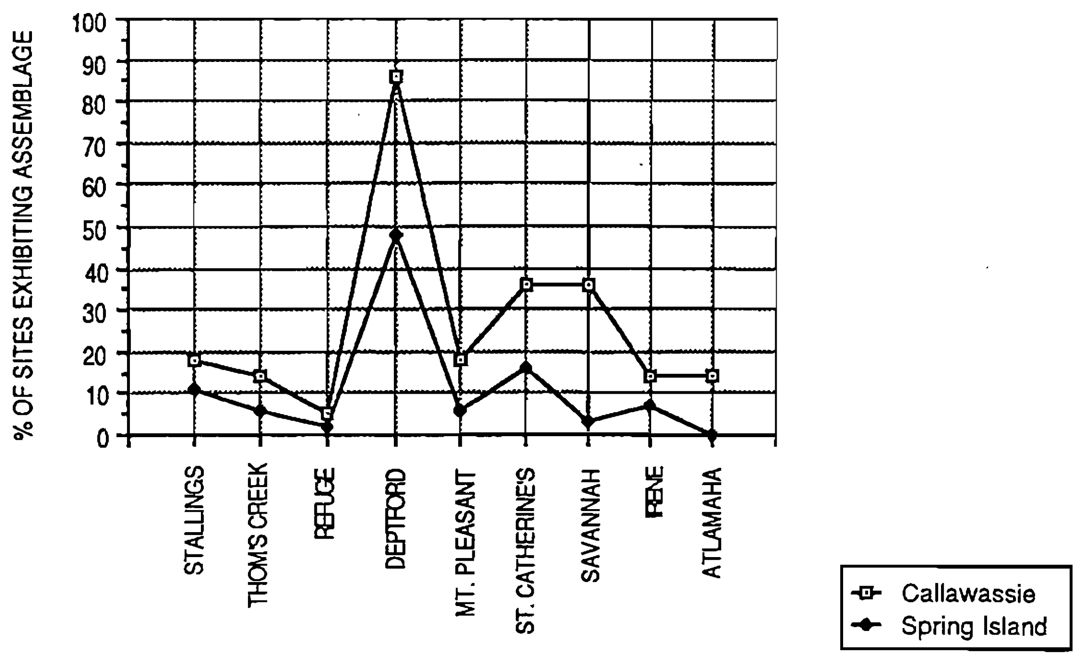


Figure 8. Percentage of sites of each time period on Callawassie and Spring islands.

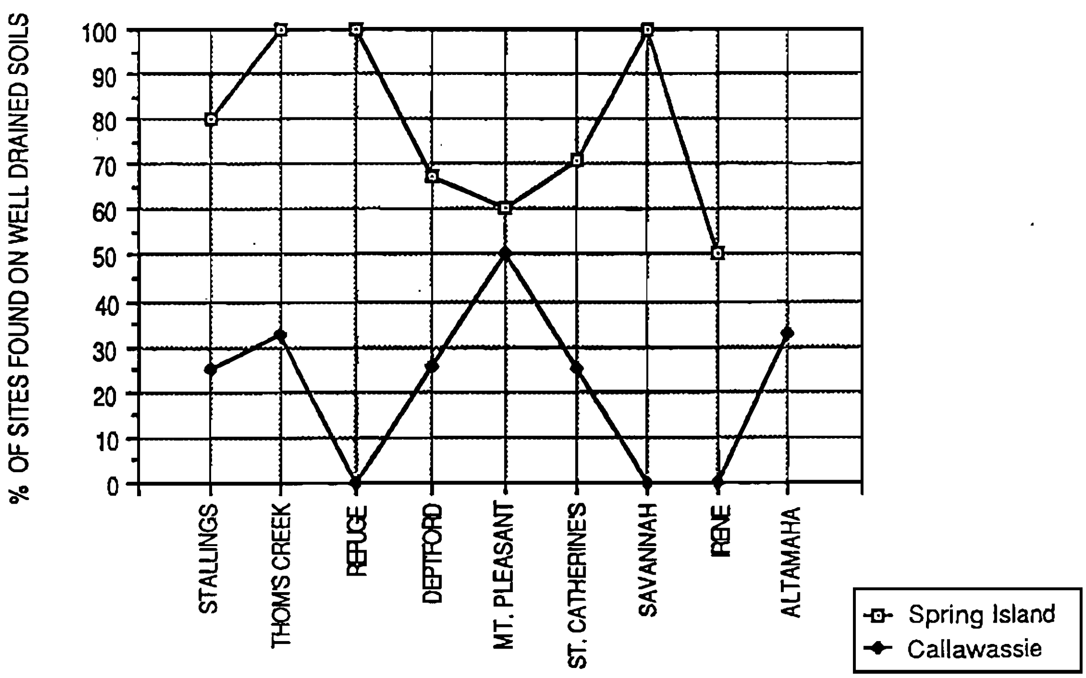


Figure 9. Percentage of Callawassie and Spring island sites found on well drained soils.

horticulture to account for this change, no evidence has been found to support this in either Georgia or South Carolina.

The following Mount Pleasant phase sites, which more closely correspond to the Wilmington time period in Georgia, reveal a significant decline in population from the preceding Deptford phase on both Callawassie and Spring islands (Figure 8). Four sites (18%) evidence Mount Pleasant wares on Callawassie, with three of these being Type 2 middens and the third being a Type 3 midden. Interestingly, 50% of these Callawassie sites are found on well drained soils; this phase has the strongest affinity for well drained soils of any identified on the island (Figure 9).

Material diagnostic of the St. Catherines phase is found at eight sites (36%), although none are single component. Of these five are Type 2 middens, two are Type 3 middens, and one is a Type 1 midden. This increase in population from the low levels of the preceding Mount Pleasant phase is observed on both Callawassie and Spring islands (Figure 8), although on Spring Island the bulk of the St. Catherines sites are identified as Type 3 middens. On Callawassie Island only 25% of these sites are situated on well drained soils, compared to 71% on Spring Island. It seems likely that the small St. Catherines sites are "outliers" representing a seasonally dispersed settlement pattern.

On Callawassie Island eight sites (36%) were identified with Savannah components, compared to only 3% on adjacent Spring Island. This is largest difference between the settlement pattern observed on the two islands (Figure 8). On Callawassie all of these sites are multicomponent, with four representing Type 2 middens and four representing Type 3 middens. It is apparent that there is some difference between the settlement pattern of the earlier St. Catherines population and the later Savannah peoples. The population appears to hold steady between the St. Catherines and Savannah phases, although none of the Savannah sites on Callawassie Island were located on well drained soils.

Irene phase pottery occurs on three sites (14%), evenly divided between Type 1, 2, and 3 middens. This distribution is almost identical to that found on neighboring Spring Island (Trinkley 1990b:163). Like the preceding Savannah phase sites, none of the Irene sites on Callawassie Island are situated on well drained soils (Figure 9). The following Altamaha phase is likewise characterized by three sites (14%), although all three are Type 3 middens. No Altamaha sites were found on Spring Island.

Two features of this study are worthy of special attention. First, the frequency of the various assemblages on Callawassie and Spring island, as shown in Figure 8, is very similar, excepting the striking increase in the number of Savannah sites. This suggests that the patterns observed are essentially typical of at least the immediate Beaufort area. The increase of Savannah sites on

Callawassie may be related to the burial mound, or other factors not currently understood.

The second feature worth additional attention is the large number of Callawassie sites found on poorly drained soils, especially when compared to Spring Island (Figure 9). Of course, at least part of this is explained by over 71% of the soils on Callawassie being poorly drained. However, this does not explain the failure to more intensively utilize the 25% of the island with well drained soils, or the intensity of Savannah phase occupation on poorly drained soils. These data tentatively suggest that previous assumptions concerning aboriginal settlement patterns in the coastal area are mistaken -- that there can be rather significant occupation on poorly drained soils. It also suggests that something, other than simple unavailability of well drained soil, was attracting occupation.

It is appropriate, however, to caution that these results are tentative and require more detailed examination. As Mark Brooks (personal communication 1991) has suggested, poor drainage on sites today may be a post-occupational phenomenon resulting from the indirect effects of rising sea levels on unconsolidated sandy sediments. This concern will require geoarchaeological research far beyond the scope of this current study.

PREHISTORIC ARCHAEOLOGICAL INVESTIGATIONS

Michael Trinkley and Debi Hacker

38BU19

Excavations

The work at 38BU19 involved the excavation of 14 5-foot units systematically placed across the site area (Figures 10 and 11) in order to investigate both shell middens and non-midden areas. These units were all laid out with a magnetic north orientation after the site had been bush hogged. Each unit was tied into the fairway center line for permanent horizontal control. A vertical datum was established at the northwest edge of the site, immediately outside the fairway construction zone, using a nail at the base of a pine tree with an elevation of 16.59 feet MSL.

In order to incorporate the previous work conducted by Brooks et al. (1982), the burial mound at 38BU19 was cleared of vegetation. The mound datum (situated immediately off the mound to the southwest) was found to be intact and was remarked using three PVC witness posts, each about two feet from the datum. The mound datum was then tied into the fairway centerline survey. Based on Brooks et al. (1982:8-10), the mound datum had been assigned an assumed elevation of 0.00 meters. This datum is now recognized as having an elevation of 9.19 feet MSL.

Two of the 14 tests (units 1 and 4) were placed in dense shell middens, one test was placed in an area of dense, but plowed, midden (unit 5), and the remaining 11 tests were placed either in areas of no visible midden (units 3, 6, 9, 11, 12-14) or areas adjacent to midden deposits (units 2. 7, 8, and 10). This strategy was intended to not only gather subsistence information from middens, but to investigate areas around the middens which might yield architectural information.

Each test unit was excavated in natural stratigraphic zones. These included Zone 1, a brown loamy sand, and Zone 2, a dense shell midden. Zone 1 varies in depth from 0.4 to 1.0 foot, while Zone 2 varies from 0.6 to 0.9 foot in depth. Underlying Zones 1 and 2 is a tan to yellow sandy subsoil, although one unit (2) also evidenced the dense, natural clay subsoil typical to much of Callawassie Island.

Zone 1 soils were screened through 1/4-inch mesh, while Zone 2 midden was screened through 1/8-inch mesh. In addition, a 1.1 foot square sample of midden from units 1, 4 and 5 (representing a

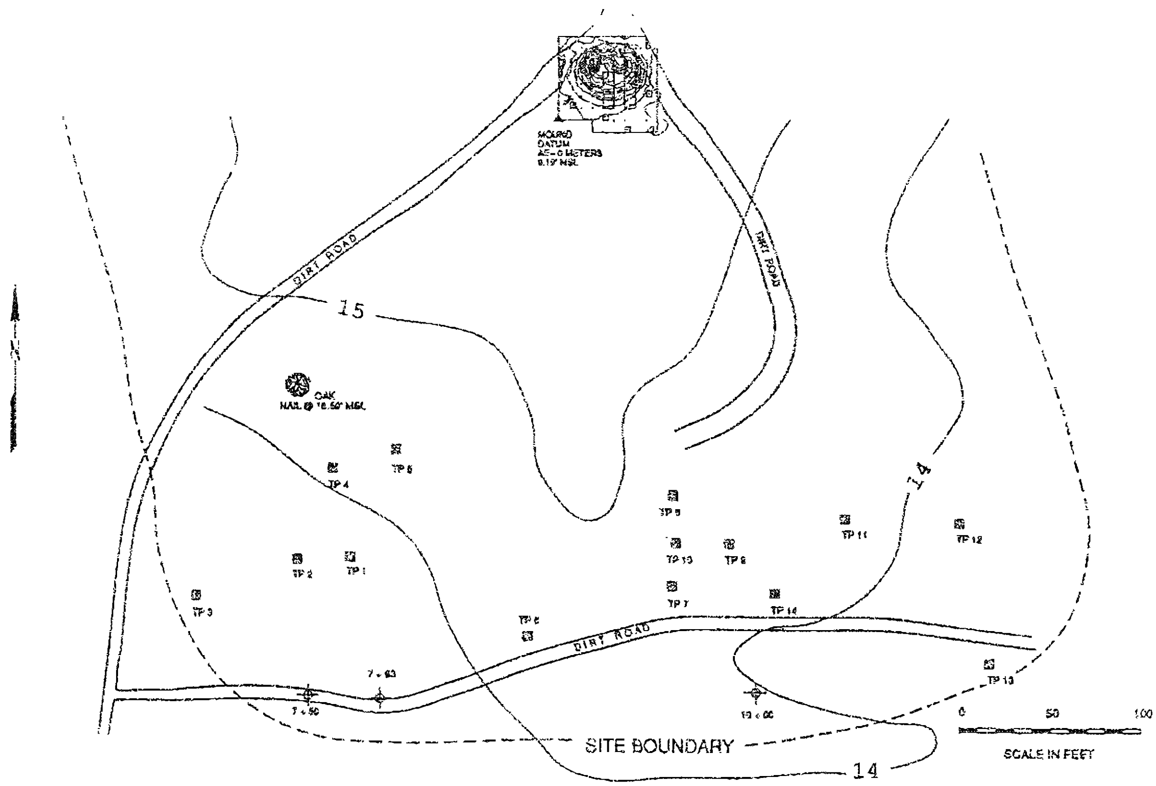


Figure 10. Site 38BU19.

Figure 11. View of the southern edge of 38BU19, looking west.

5% sample of each unit) was weighed prior to sifting and the shell, collected for analysis, was weighed after screening. This provided a quantified statement of shell density for each of the middens (with shell/soil weight ratios of 1:0.9 in both of the undisturbed middens; in comparison the single plowed midden investigated contained a shell/soil ratio of 1:2.9). Total shell weights in these units were 473 pounds for Unit 1, 630 pounds for Unit 4, and 161 pounds for Unit 5. Unit 10, placed at the toe of a midden yielded 115 pounds of shell, although no distinct midden was present, and Unit 14 yielded 117 pounds of shell, almost entirely resulting from a push pile of shell which overlaid the unit.

A portion of the two column sample from the intact midden deposit of Unit 1 was sorted by species, revealing that 96.7% of the sample by weight represents oyster, 2.2% by weight represents periwinkle, and 1.1% by weight represents clam. Rare examples of ribbed mussel, stout tagelus, whelk, mud dog whelk, and land snails were also encountered. Ribbed mussel and stout tagelus may be deceptively infrequent because of their fragile shells. Regardless, the low numbers of these species suggests that they were incidentally collected during oyster gathering.

The quantity of animal bone was found to be highly variable from midden to midden, but was virtually absent from the non-midden Zone 1 soils. Ethnobotanical remains appear to be sparse, although charred hickory nutshell fragments are present.

These excavations revealed three features and three post holes in four units. All were excavated during this project. All three of the features represent shell pits (Feature 1 in Unit 1, Feature 2 in Unit 2, and Feature 3 in Unit 4) and the three post holes (two in Unit 1 and one in Unit 4) are well defined. The features are found either under or at the edge of shell middens, while the post holes are found either at the edge of middens, or in non-midden areas. The most distinguishing feature of the features and post holes is that several produced relatively large quantities of daub.

All three of the features are similar, ranging from about 4 to 5 feet in diameter and 0.6 to 0.7 foot in depth. They are essentially bowl-like with gradually insloping sides. The stratigraphy in each feature is simple -- the upper 0.5 to 0.6 foot is dark brown sand and shell overlying a thin band of yellow sand and shell. This lower zone probably represents mixing of the feature fill with the underlying sterile soil through time. While occasional flakes of charcoal are present in the fill, there is no clear indication of fire, either as bands of charcoal or evidence of burning on the walls of the pits. The features are typically poor producers of artifacts, largely containing only shellfish remains. Feature 1 yielded two probable St. Catherines sherds and daub, Feature 2 produced three Savannah sherds, and Feature 3 yielded one St. Catherines sherd, one Savannah sherd, and daub. Shellfish remains from Feature 1 totaled 106.0 pounds and included oyster, periwinkle, ribbed mussel, stout tagelus. A total of 54.0 pounds of shell were recovered from Feature 2, with only oyster and periwinkle recognized during excavation. Feature 3, being the shallowest of the three features, yielded only 34 pounds of shell, including oyster, ribbed mussel, clam, and periwinkle. Although it is tempting to identify these features as "shellfish steaming pits," the absence of clear evidence makes such a statement speculative.

These excavations revealed that a large area of the site had been plowed, although this plow disturbance appears to be very minimal north of Units 1, 2, 9, and 10. In addition, the maximum depth of plowing recorded during this study was 0.8 foot. The site boundary, originally established on the basis of limited shovel testing appears accurate, with the density of remains greatly decreasing south of Unit 6. In a very general sense, it appears that the site core identified in these investigations can be correlated with the topography (Figure 10).

The previous assessments regarding the village location for 38BU19 appear to be at least partially in error. While it may still be that the densest occupations occur to the north and east of the mound, it is clear that the village area (based on the presence of middens, features, post holes, and daub) extends south of the mound into the fairway area. These investigations have not only documented the existence of a village associated with the mound, but also reveal that the integrity of the village area is exceptionally high.

Radiocarbon Dating

A single date was obtained from oyster shell collected from Feature 1 in Test Pit 1. As previously discussed, this pit appears to be associated with the St. Catherines village activity in the vicinity of the mound and contained a small quantity of pottery and fired clay daub. The shell yielded an age of 1200 ± 70: A.D. 750 (Beta-42578).

The St. Catherines phase has usually been given an initial date of about A.D. 1000 (e.g., DePratter 1979:111), and additional dates from the site, especially using carbonized material, are clearly necessary. This date, however, does not seem unreasonable given the apparent absence of a clearly defined Wilmington phase. The excavations on Spring Island (discussed below) suggest that the Deptford phase extended rather later than previously thought and there seems to be no reason that it could not have co-existed with the St. Catherines tradition. The work by Thomas and Larsen (1979) on St. Catherines Island also suggests that the St. Catherines morturary complex has its roots in the Early Woodland Deptford phase.

This date suggests that the village settlement in the vicinity of the burial mound began sometime in the Middle Woodland Period, perhaps as early as A.D. 750. Its terminal date, however, has not been established.

Artifact Analysis

The dominant artifact recovered from this site is pottery, with a total of 718 sherds collected from the excavations. Of these 213 (42.2%) are over 1-inch in diameter and have been examined in this study. Essentially four series have been identified from the work at this and other sites on Callawassie Island: Deptford, St. Catherines, Savannah, and Irene

Type definitions of Deptford are offered by Caldwell and Waring (1939) and more recently by DePratter (1979). The paste of the Deptford series pottery exhibits considerable variation, but tends to be gritty, with varying amounts of small rounded quartz inclusions present. Interior surfaces are only roughly smoothed. Exterior surface treatments include check stamping, cord marking, simple stamping, net impressed, and plain.

The St. Catherines wares are formally described by DePratter (1979) and briefly discussed by Caldwell (1971). The ware is characterized by the inclusion of finely crushed low-fire clay fragments. These investigations have not identified any sherds with exhibit "crushed sherd" tempering, although they may exist in other St. Catherines collections (e.g., DePratter 1979:131). In addition, these studies have failed to identify any pottery which is within the range of Wilmington's large sherd temper inclusions (see DePratter 1979:129). The interior of the St. Catherines pottery is roughly smoothed. Surface treatments include cord marking, net impressing, fabric marking, and plain. Brooks et al. (1982:22) also discuss the presence of fabric impressions on St. Catherines pottery, although this is not a previously defined type.

The Savannah wares are formally described by Caldwell and Waring (1939), and Caldwell and McCann (1941). The ware is characterized by fine grit tempering consisting of small (coarse sand) rounded quartz inclusions. The gravel inclusions noted in previous type descriptions are not found at the Callawassie or Spring Island sites, although Caldwell and Waring (1939) do note that they found considerable variation, including an admixture of both grit and crushed clay. Interior surfaces are carefully smoothed and frequently burnished. Exterior surface treatments include check stamping, cord marking, complicated stamping, and plain. No vessels were identified from these investigations which exhibited decorations such as notching or tooling.

The Irene wares are also formally described by Caldwell and Waring (1939), and Caldwell and McCann (1941). The ware is characterized by heavy grit tempering consisting of coarse to very coarse quartz inclusions. Interior surfaces are well smoothed or burnished. Exterior surface treatments include complicated stamping or plain. Occasional examples of rosettes or reed impressed fillet appliques are noted in the Callawassie collections as decorative elements.

Deptford pottery (n=78) accounts for 36.7% of the examined collection at 38BU19, St. Catherines pottery (n=96) accounts for 45.1% of the collection, Savannah pottery (n=30) accounts for 14.1%, and Irene pottery (n=9) accounts for 4.2% of the examined collection. These wares are uniformly mixed within the shell midden and village midden contexts, with no clear stratigraphic separation.

The Deptford wares at 38BU19 include cord marked (n=50, or 64.1% of the collection), check stamped (n=6, or 7.7%), and plain (n=22, or 28.2%). The St. Catherines wares include cord marked (n=73, or 76.0% of the collections), fabric impressed (n=2, or 2.1%), and plain (n=17, or 17.7%). The surface treatment on the remaining four sherds was unidentifiable. The Savannah wares at 38BU19 include complicated stamped (n=1, or 3.3%), cord marked (n=15, or 50.0%), and plain (n=2, or 6.7%), with the surface treatment on the remaining two sherds being unidentifiable. Both Irene Complicated Stamped (n=6, or 66.7%) and Irene with an unidentifiable surface treatment were found at 38BU19.

Throughout this work it is important to realize that there are two ways of describing cordage twists: either as they appear in the impression (which is a negative image) or as they appear in a cast made from the impression (which is a positive image). These, of course, are mirror images of each other. In this work all cordage descriptions are based on a positive image made using plasticine clay. Examination of the cord marked wares at 38BU19 revealed that the Deptford Cord Marked type consists largely of a Z or left twist (81.6%, n=31). By measuring the diameter of the cordage and the twists per centimeter, it is possible to establish the tightness of the twist (see Hurley 1979:5-7). In the Deptford collection the bulk of the cordage was loosely or softly twisted (89.5%, n=34), regardless of whether a Z or S twist was used. Correlation of temper and cordage twist suggests that the Z twisted cordage was more commonly applied to pottery with a medium paste than the S twisted cordage, which tended to be applied equally to vessels with medium and coarse inclusions.

The preference for soft, Z twisted cordage continues into the St. Catherines period, where 65.3% of the examined sherds (n=47) exhibit this pattern. The next most common pattern is a soft, S twist (15.3%, n=11), followed by a hard or tight Z twist (13.9%, n=10). Of the 13 Savannah sherds suitable for examination, eight or 61.5% also exhibit this pattern of a soft, Z twist cord. Following this in frequency is the soft, S twisted cordage (23.1%, n=3).

At 38BU19 there is very little to distinguish the three wares based on cordage twist or description. In all three cases the cordage diameter ranged from 1.0 to 4.0 mm, with 1.0 mm being the most common. Likewise, a softly or loosely "Z" or left twisted cord was the most common. Even when an S twist was used, the cordage was still softly twisted. The analysis also revealed that two sherds exhibit a mixture of St. Catherines finely crushed low-fired clay particles and Savannah medium to coarse sand inclusions.

A total of nine lithic specimens were recovered from the excavations at 38BU19. These include seven flakes, one fragmentary biface, and one ground stone pestle. Raw materials for the flakes include Coastal Plain chert and siltstone (Keith Derting, personal communication 1991). Six of the seven flakes (85.7%) are classified as either bifacial thinning or non-cortical flakes, while the remaining specimen is recognized as a secondary flake which is partially covered with cortex.

This lithic assemblage is very similar to that found by Brooks et al. (1982:32-33) in the 38BU19 mound fill. The materials are expected to be locally available, although of generally poor quality. The debitage present at the site appears to strongly support resharpening of existing tools, rather than initial reduction activities.

The only other artifact type present at 38BU19 is the daub recovered primarily from feature and post hole excavations. As previously noted by Brooks et al. (1982:26-27), daub is common at the site and is interpreted to represent structural remains. Fragments of daub with fiber impressions are common, although none recovered in these excavations appear burned.

Other analyses, however, include the examination of faunal materials, shellfish analysis, and pollen studies. The results of this specialized work is included in following sections of this study.

<u>38BU464</u>

Excavations

Work at the site was begun during the survey phase through the excavation of a series of shovel tests on a 25-foot grid pattern over the site area (Figure 12). The purpose of this testing was to identify specific midden areas. The 25-foot interval was selected since previous work suggested that the shell middens tended to be 20 to 25 feet in diameter. On the basis of this testing, which covered an area 250 by 600 feet (approximately one-half of the total site -- the remainder having been previously heavily damaged by clearing and other development activities) it was possible to select areas for more intensive archaeological investigations.

The grid, established N50°E, parallel to the marsh, was tied

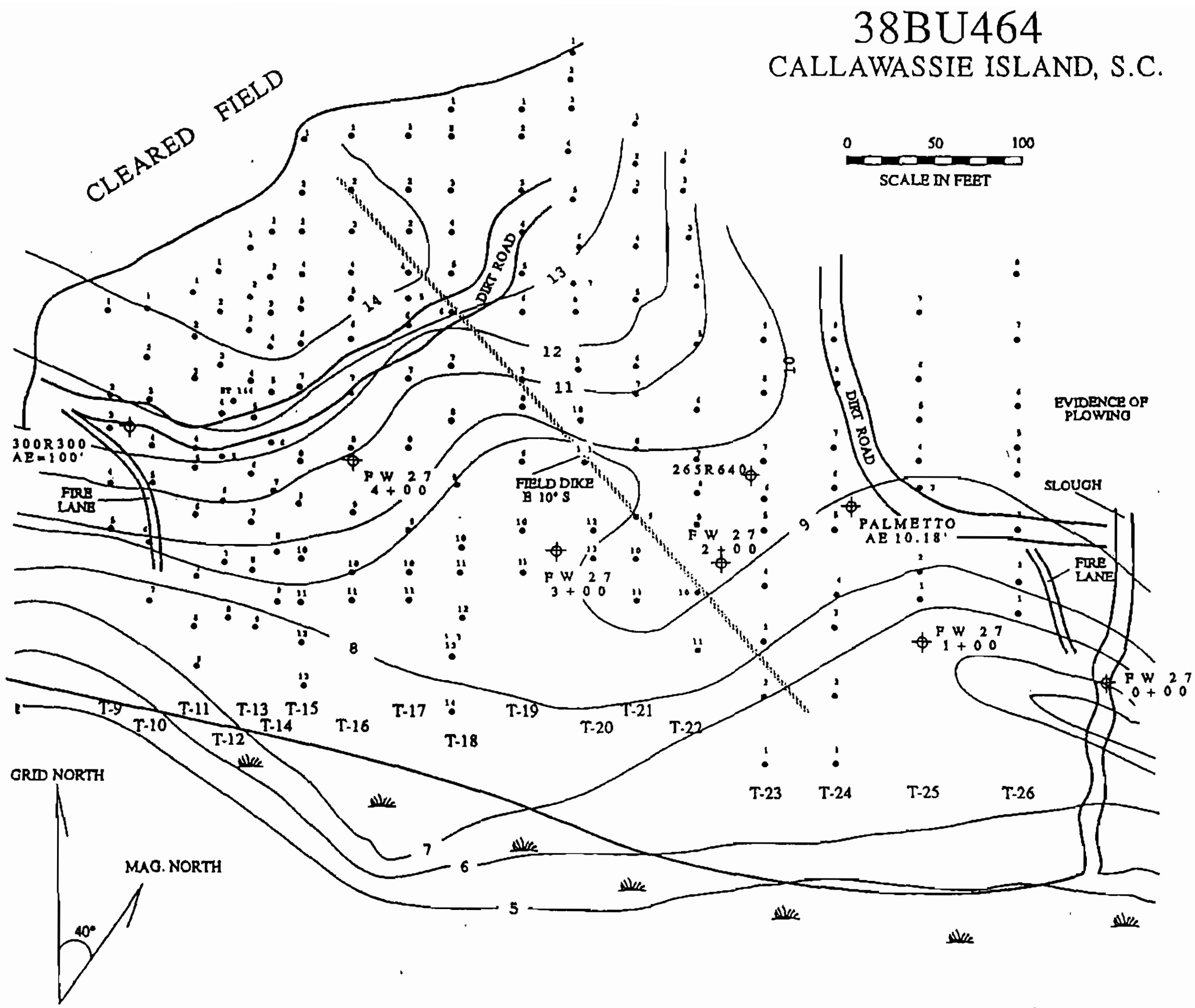


Figure 12. Shovel testing at 38BU464.

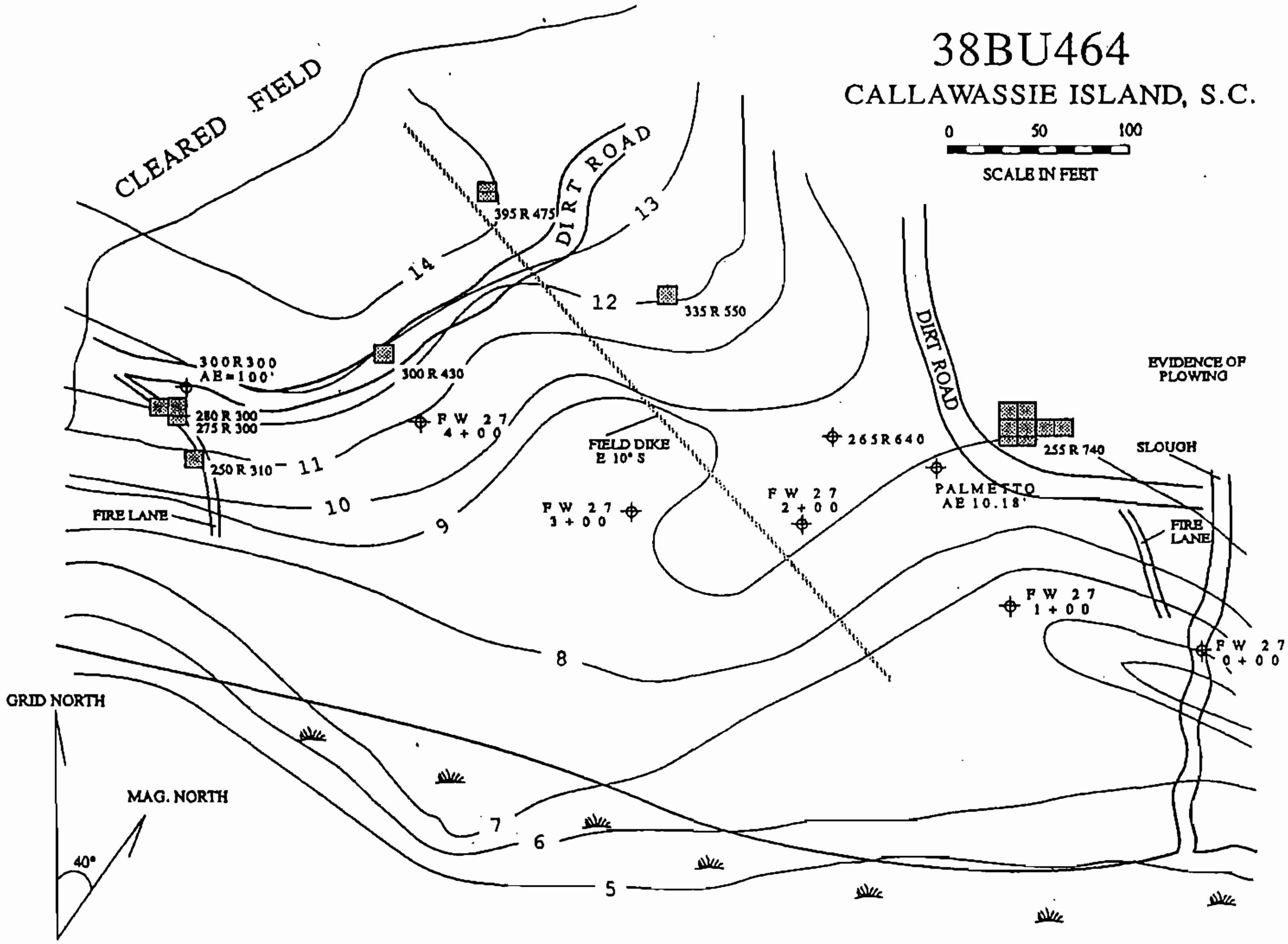


Figure 13. Excavations at 38BU464.

into several surveyed golf fairway center line points in order to maintain long-term horizontal control. This base line established along the edge of the marsh is considered grid east-west. Although the site will be heavily impacted by golf fairway construction, two permanent points were established for the grid system (both along the base line, one at 300R300 and the other at 300R500). Vertical control was initially maintained through the use of an assumed elevation datum (the top of the iron rebar marking grid point 300R300, with an AE of 10.00 feet), but was later correlated with known vertical control points in order to establish an elevation of 12.52 feet MSL (Figure 13).

The investigations at 38BU464 involved selecting four middens for the excavation of one 10-foot unit in each. An attempt was made to select middens in different site areas, although two middens were relatively close to one another for comparative purposes. These four middens include:

1. 250R310 (excavation of 100 square feet)

2. 280R290-300, 275R330 (excavation of 250 square feet)

3. 300R430 (excavation of 80 square feet)

4. 250, 255-265R730; 250, 255-265R740; 255R750-760 (excavation of 700 square feet).

In addition, two areas of seemingly dense midden were excavated at 335R550 and 395-400R475 (each excavation area totaling 100 square feet). These areas, however, were discovered to represent plowed middens and are correlated with an old field (Figure 13).

Stratigraphy across the site appears to be similar. Zone 1 consists of 0.2 to 0.5 foot of humic brown sand with only a small quantity of shell. Zone 2 is shell midden varying in depth from 0.3 to 1.0 foot. The subsoil at the site is a tan to yellow sand. Based on the perceived density of the shell midden in the plowed areas these were excavated as Zone 2.

One midden area (250, 255-265R730; 250, 255-265R740; 255R750-760) was selected for more intensive investigation. This included opening additional units around the midden, as well as exposure of approximately 75% of the extant midden (a portion of which had been destroyed by the construction of a dirt road). This midden is estimated to have originally been about 20 feet in diameter with a maximum depth of 1.0 foot.

Soil from the midden excavations was dry screened through 1/8-inch mesh using mechanical sifters. In addition, a 2.25 foot square sample of each midden was weighed prior to sifting and the shell, collected for analysis by Lawrence, was weighed after screening. This provided a quantified statement of shell density for each of the middens (with shell/soil weight ratios ranging from 1:0.1 to 1:2.7, in comparison the plowed middens contained shell/soil ratios of 1:2.8 and 1:3.4, see Table 3).

The qualitative field assessment suggested that the middens were 99% oyster, with only very small quantities of clam, periwinkle, ribbed mussel, razor clam, and whelk. A series of four column samples, however, were sorted by shell species. These revealed that oyster comprises 42.4 to 74.6% of the shell by weight. Periwinkle comprises from 3.4 to 7.3% of the samples by weight. Clam, razor clam, ribbed mussel, cockle, and mud dog whelks were also identified (Table 4). The low numbers of these species suggests that they were incidentally collected during oyster gathering. Further information on the shellfish analysis is provided in a following section by Lawrence.

The quantity of animal bone was found to be highly variable, both from midden to midden, and also within different areas of the same midden. The faunal remains, based on field assessments include quantities of fish and small mammals, but relatively few large mammals (see Wilson's examination of these remains in a following section). Ethnobotanical remains are sparse, although charred hickory nutshell fragments are common throughout the site.

Zone 1 soils were screened through 1/4-inch mesh. The increase in mesh size for these zones was based on our belief that small bones, absent the alkaline environment of the shell midden, would not be preserved in the naturally acidic soils. In those areas not associated with middens, and in the plowzone middens, bone was, in fact, very uncommon and the use of the larger screen size appears appropriate.

These excavations revealed at least 12 potential features (not including post holes), 8 (67%) of which were excavated (including

Table 3.
Shell/Soil Ratios for 38BU464 Middens

Midden		Shell/Soil Ratio
250R310, Zone 2		1:1.1
250R740, Zone 2,	Level 1	1:0.1
	Level 2	1:0.6
	Level 3	1:1.3
255R740, Zone 2		1:1.9
280R300, Zone 2		1:2.7
300R430, Zone 2		1:1.6
Plowed Middens:		
335R550, Zone 2		1:3.4
395-400R475, Zone 2		1:2.8

Table 4.
Components of Selected Column Samples

	250R740			255R740
	Lv. 1	Lv. 2	Lv. 3	
Oyster	42.4	58.3	76.4	63.4
Periwinkle	6.0	7.3	3.4	4.8
Clam	<1.0	1.2	<1.0	4.8
Ribbed Mussel	<1.0	2.3	1.7	2.4
Stout Tagelus	<1.0	1.6	<1.0	0.6
Cockle	<1.0	0.0	0.0	0.0
Unidentifiable	48.9	29.3	20.2	24.0

calculated as % by weight

Features 1 through 8). Six of these are shell pits (Features 1, 2, 3, 5, 6, and 8) with variable degrees of use and complexity. All of these features, however, are found at the edges or under the shell midden deposits.

Feature 1 consists of a shell pit partially exposed in unit 250R310. The size of the exposed feature is 2.9 by 2.9 feet, although the estimated size is 2.9 by 4 feet. The pit has insloping walls and a maximum depth of 0.2 foot. The dominant shell in the

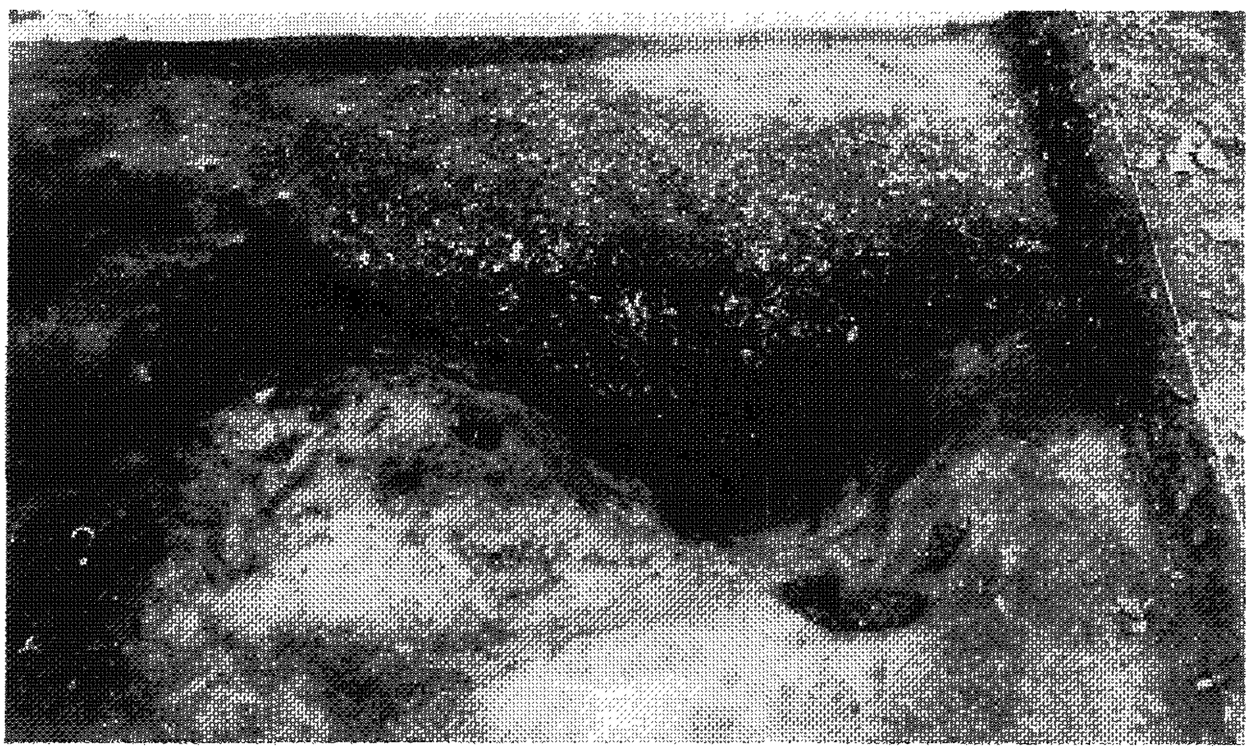


Figure 14. South half of Feature 3 excavated, view to the north.

fill was oyster, with minor quantities of clam, periwinkle, and ribbed mussel; the total weight of excavated shell was 27.0 pounds. No diagnostic artifacts were recovered from the pit.

Feature 2 is a similar, although larger and deeper, shell pit partially exposed in unit 300R340. The size of the exposed feature is 5.5 by 3.1 feet, although the total size is estimated to be 5.5 by 5.0 feet. The pit has steeply insloping walls and an irregular base which varies in depth from 0.2 to 1.0 foot. Part of this variability may be the result of two features blurring together or being intrusive. A total of 163 pounds of shell were recovered, with the dominant species being oyster. Minor amounts of periwinkle, stout tagelus, and ribbed mussel were also present. The feature contained one recognizable Deptford Cord Marked sherd.

Feature 3 is one of the better pits identified in these excavations. Partially exposed by unit 335R550, it measured 4.0 by 4.5 feet, with an estimated total size of 4.5 by 4.5 feet (Figure 14). Total depth of the pit was 1.5 feet, with the side steeply insloping. The profile of this feature revealed that a large quantity of small branches were placed along the walls of the pit and ignited. The density of the resulting charcoal, however, indicates that the burning took place in a reducing atmosphere. Above this lens of charcoal is a thick zone of brown sand and shell. A total of 120 pounds of shell was recovered from the feature, 92 pounds or 77% coming from the upper zone. Species diversity was low, with only oyster, periwinkle, and ribbed mussel being recovered. All of the pottery recovered is classified as St. Catherines. This feature provides clear evidence of shellfish steaming, with the fire laid in the pit smothered to allow steaming rather than roasting.

Feature 5 was found within 255R740 and consisted of an oval pit about 3.0 by 2.2 feet with an depth of 0.4 foot. This basin shaped feature contained 23 pounds of oyster, periwinkle, and ribbed mussel. No diagnostic materials were recovered.

Feature 6, a circular pit measuring 2.8 by 2.6 feet and 1.2 feet in depth, was found in 250-255R740. The walls were steeply sloping and the fill was a mixed black sand and shell. A total of 141 pounds of shell were recovered, with oyster, periwinkle, stout tagelus, and ribbed mussel identified. Two St. Catherines sherds were recovered.

Feature 8 was found in 250R730-740 and consisted of a shell pit measuring 4.5 by 6.0 feet. The cone-shaped pit had steeply insloping sides and a depth of 2.1 feet. This is the most complex feature identified from the site. In profile it revealed a basal zone of tan sand and sparse shell, while to the side was a large mass of primarily whole oyster shell. Overlying these zones was a lens of red clay. Overlying the clay was a thin lens of brown sand and a lens of burnt and crushed shell. A total of 120 pounds of shell was recovered from the pit, including oyster, periwinkle, ribbed mussel, and stout tagelus. Twelve St. Catherines sherds were recovered. This feature also appears to be a steaming pit, with the shells from a previous discard being raked to the side of the pit. The clay lens may represent the remains of the "cap" placed over the pit while the oysters were being steamed.

Feature 4 represents a burnt and crushed shell lens within one of the middens and based on context is probably associated with the Deptford occupation at the site.

At the base of the 250R730-740, 255-265R730, 255-265R740, 255R750-760 St. Catherines and Savannah midden evidence was found of an earlier, Deptford phase, structure. This structure, consisting of five post holes and a trench (Feature 7), was apparently preserved from adjacent plowing by the overlying midden. The structure is attributed to the Deptford phase, rather than the St. Catherines and Savannah phases, based on the occurrence of only Deptford pottery in the associated post holes and yellow subsoil sand within and immediately adjacent to the structure (Figure 15). The post holes and trench outline about 50% of a roughly circular structure 15 feet in diameter. No Deptford phase pits were

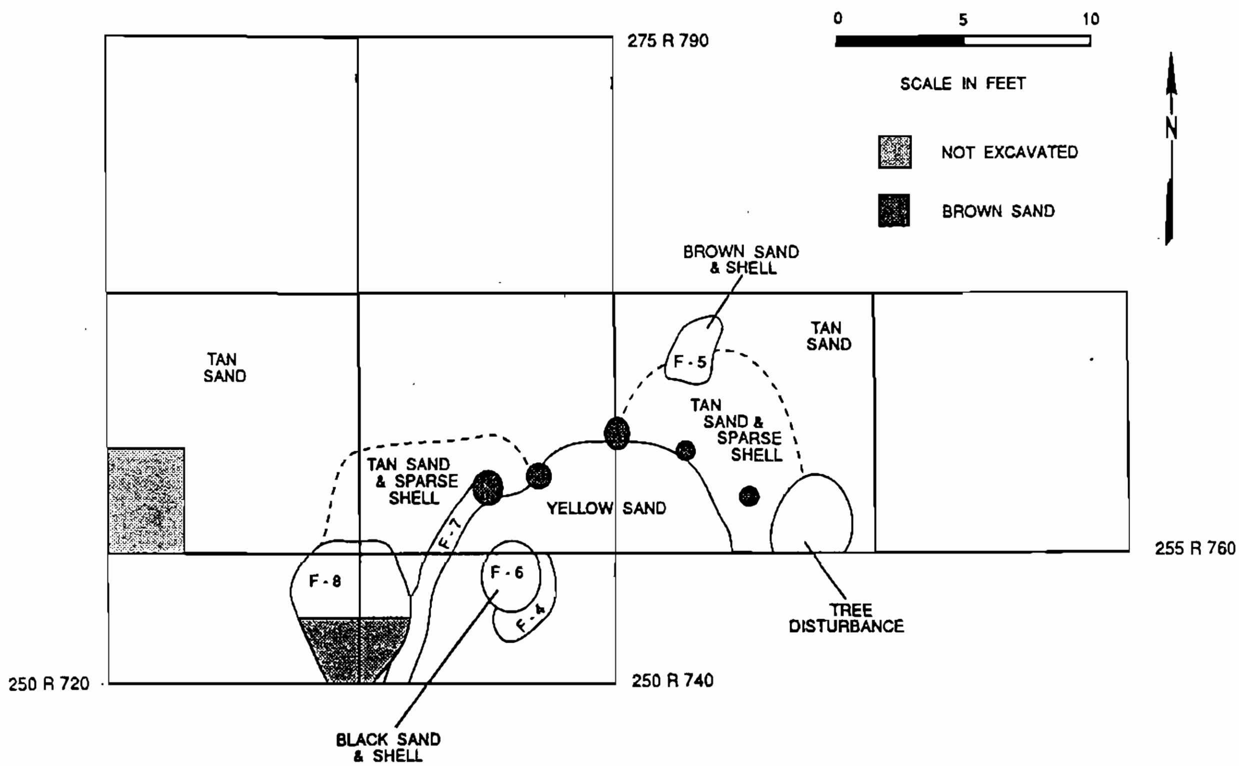


Figure 15. 250R730-740, 255-265R730, 255-265R740, 255R750-760 block excavations.

identified in the structure area, although Deptford pottery was common in the sand within the structure.

This site appears to represent a rather large, but dispersed St. Catherines/Savannah phase occupation. The middens, while not clearly associated with structures, appear to represent short-term depositional episodes such as would be expected with small family occupations. The failure to identify structures, or to find structural evidence such as daub (recovered from nearby 38BU19), may indicated that 38BU464 served essentially extractive purposes with use limited and occupation concentrated around the mound at 38BU19. The earlier Deptford occupation, however, appears less intensive, but more "permanent," with at least one substantial structure being constructed. In effect, this may suggest that the dispersed settlement of the Deptford phase became nucleated around the mound in the St. Catherines phase.

Radiocarbon Dating

A single date was obtained from charcoal found in association with St. Catherines pottery within Feature 3, a shell pit identified at the base of 335R550. The charcoal yielded an age of 970 ± 60: A.D. 980 (Beta-42579).

While over 200 years later than the date obtained from oyster shell at 38BU19, even this date is relatively early for the St, Catherines phase (see DePratter 1979:111). It, coupled with other Beaufort County, South Carolina dates for St. Catherines, begins to suggest that this phase has a relatively longer period of development in South Carolina than has been previously thought. It also suggests that the St. Catherines and Deptford phases overlapped, a situation clearly consistent with the findings of the artifact analyses conducted at sites on Callawassie and Spring islands.

Artifact Analysis

A total of 4028 sherds were recovered from 38BU464, with 24.5% (n=986) over 1-inch in diameter. Of these large sherds (which were suitable for analysis) five (0.5%) are Stallings, two (0.2%) are Thom's Creek, 351 (35.6%) are Deptford, 506 (51.3%) are St. Catherines, 92 (9.3%) are Savannah, and 30 (3.0%) are Irene.

The Deptford wares are dominated by Deptford Cord Marked (64.4%, n=226), followed by Deptford Plain (31.1%, n=109), Deptford Check Stamped (n=14), Deptford Simple Stamped (n=1), and what appears to be a single net-impressed Deptford sherd.

Of the 197 Deptford Cord Marked sherds suitable for cordage analysis, 173 (87.8%) exhibit a Z or left twist and 156 (79.2%) exhibit a Z twist using a softly twisted cord. While only 24 examples of an S or right twist are identified, all of these exhibit softly twisted cordage. The use of hard and very hard twisted cordage is found on only 17 sherds, all having a Z twist.

The use of temper in these Deptford ceramics is heavily weighted toward medium sand, although 18.7% (n=37) exhibit coarse sands up to 1.0 mm in diameter. None were found with very coarse (1.0 to 2.0 mm) sand inclusions.

The most common St. Catherines ware is cord marked, accounting for 75.1% (n=380) of the collection. St. Catherines Plain is the next most common type (22.3%, n=113), while 13 examples of what appear to be St. Catherines sherds with clear fabric impressions were identified (2.6%). While several of these fabric impressions may be the result of using the edge of the paddle, most appear on side-wall sherds and exhibit a consistently repeating weft and warp pattern typical of fabric marking.

Of the 333 St. Catherines Cord Marked sherds suitable for cordage analysis, 295 (88.6%) exhibit a Z or left twist. Of these Z twist examples, 90.3% (n=266) indicate a softly or loosely twisted cord. Of those exhibiting an S or right twist (n=38), 84.2% are also loosely twisted. Taken together, hard to very hard cordage impressions are found on only 10.5% (n=35) of the collection.

Of the 92 Savannah series sherds, 49 (53.3%) are Savannah Burnished Plain, while 39 (42.4%) are Savannah Cord Marked. The remaining four sherds are Savannah Check Stamped. Of the cord marked examples 34 (87.2%) exhibit a Z twist with 85.3% (n=29) of these also using a soft twisted cord.

There seems to be very little difference between the cordage used by the Deptford, St. Catherines, and Savannah groups at 38BU464. All preferred softly Z twisted fabrics.

A total of 30 lithic specimens were recovered from 38BU464. The 26 flakes include 15 examples (57.7%) of Coastal Plain chert, nine (34.6%) examples of local siltstone, one example of a poor grade jasper, and one quartzite. Only one secondary flake (of quartzite) was recovered. Seven examples of non-cortical flakes were recovered (three coastal plain chert and four siltstone). The largest sample (n=18) consists of flakes of bifacial retouch. Of these 12 are Coastal Plain chert, five are siltstone, and one is jasper. While a very small sample is present, this assemblage is strongly indicative of a population primarily engaged in resharpening existing tools, rather than manufacturing new items.

One fragmentary siltstone biface was recovered, as well as two Coastal Plain chert projectile points. Both of these points are small triangular points. An intact specimen measures 19 mm in length, 20 mm at the base, and is 4 mm in thickness. The fragmentary specimen measures 20 mm at the base, is 6 mm in thickness, and is estimated to have been 33 mm in length. Although such points are often referred to as the Yadkin Large Triangular Point (Coe 1964:45), they better fit the Roanoke Large Triangular type description (Coe 1964:110). Coe (1964:111) observes a gradual diminution of this type through time, but recognizes that the point is associated with the Late Woodland (ca. A.D. 500 - 1500) Vincent and Clements pottery in North Carolina. It does not, therefore, seem unusual to find similar projectile points associated with the St. Catherines phase along the southern South Carolina coast.

The last lithic specimen recovered from 38BU464 consists of a quartz cobble which exhibits wear on one end.

38BU1214

Excavations

The grid for 38BU1214 on Spring Island, established 56° west of north, parallel to the marsh, was tied into several surveyed lot points in order to maintain long-term horizontal control. This base line established along the edge of the marsh is considered grid east-west (Figure 16). Although the site is expected to be heavily impacted by residential construction, two permanent points were established for the grid system (both along the bluff edge, one at 100R0 and the other at 100R400). Vertical control was maintained through the use of an assumed elevation datum (the top of the iron rebar marking grid point 100R400). This point was later identified as 20.1 feet MSL.

Work at the site was begun by excavating a series of shovel tests on a 25-foot grid pattern over the site area. Since the purpose of this testing was to identify specific midden areas, these tests were not screened, but were simply recorded as positive (i.e., shell midden was present) or negative (i.e., shell midden was not encountered). The 25-foot interval was selected since previous work suggested that the shell middens tended to be 20 to 25 feet in diameter. On the basis of this testing, which covered an area 300 by 300 feet (approximately one-half of the total site -- given the limited amount of time available at the site, our goal was not to map each midden present at the site, but rather to obtain a representative sample for future investigations), a series of 12 middens were recorded and numbered sequentially 1 through 12. During the course of the excavations an additional five middens were recognized, bringing the total number to 17.

The next phase of investigations at 38BU1214 involved selecting three middens for the excavation of one 10-foot unit in each. Middens 4, 5, and 6 were selected. All were in the same general area, bordered the marsh edge, and appeared to be approximately the same size. This approach was selected over a more random strategy, again, because of the limited time available for the study and our desire to control for as many variables as possible (such as distance from the marsh).

Stratigraphy across the site appeared to be similar. Zone 1

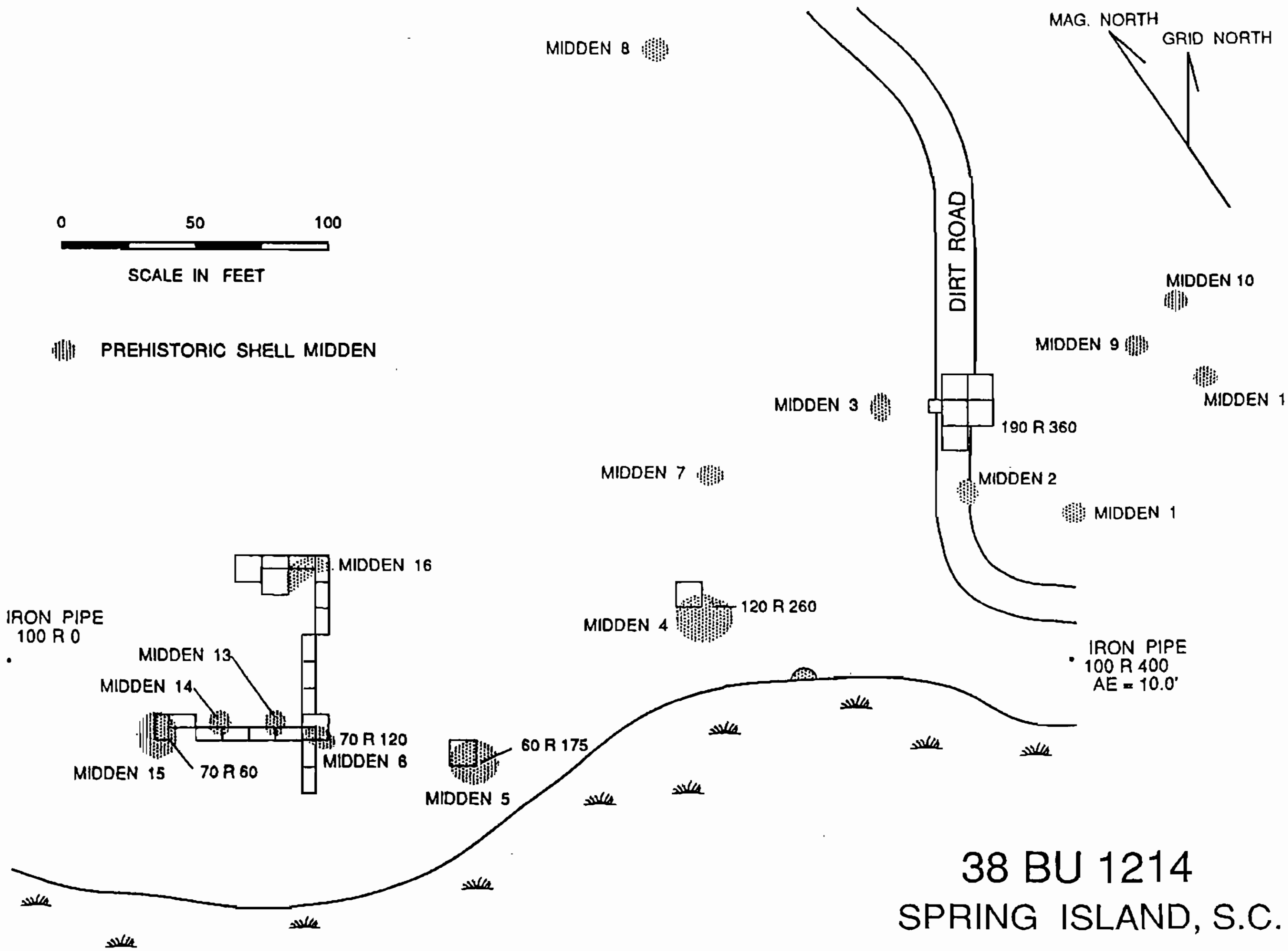


Figure 16. Excavations at 38BU1214 on Spring Island.

consisted on a recent humic root zone up to 0.2 foot in depth. Underlying Zone 1 was either a brown to tan sand (termed Zone 2a) which graded into yellow sand subsoil or shell midden (termed Zone 2b) which overlaid yellow sand subsoil. Zone 2a typically was 0.5 to 0.8 foot in depth, while the shell middens ranged from 0.3 to 0.6 foot in depth.

The units excavated in this phase of the study included 120R260, 60R175, and 70R120. Because of the need to avoid large trees, while still obtaining an adequate midden sample, units 60R175 and 70R120 were 75 square feet in size, rather than 10-foot square units.

After the three middens were investigated, one (Midden 6) was selected for more intensive investigation. This included opening additional units to the south (toward the marsh), to the north, and to the west. No additional units were placed to the east. This work was combined with the use of 5 by 10 foot trenches to further explore different localized site areas. Eventually trenches 60 feet to the north, 20 feet to the south, and 55 feet to the east of Midden 6 were excavated (Figure 17).

As previously mentioned, the excavations revealed a series of four additional middens, ranging in size from 5 to 15 feet in diameter, along the west arm of the excavations. These middens, numbered 13 through 15, are similar to those identified in shovel testing except they are smaller. Although this work is limited, the density of middens adjacent to the bluff appears quite high, with a density of perhaps one midden every 25 feet. Inland the midden density declined rapidly, although two additional middens (Middens 16 and 17) were found 50 feet north of Midden 6. The north arm of the trench revealed that the density of animal bone, pottery, and lithics increased dramatically inland from the shoreline middens. In the south arm (i.e., toward the marsh) evidence of occupation almost immediately declines.

This site density information is of considerable importance since it begins to provide clues concerning activity areas and site patterning. While Deptford pottery is found consistently scattered across the site, it is clustered in two areas -- in unit 90R115 and in units 125R105, 130R95, and 135R105 (Figure 18). Lithics are also concentrated in the 125R105, 130R95, and 135R105 units, but are absent from the western excavation area (Figure 19). The St. Catherines pottery is found in essentially only two areas: again in units 125R105 and 70R90. The concentration of Deptford pottery in 90R115 appears to be associated with Feature 9, a probable living floor discussed below. The concentration of materials in the northern part of the site is more difficult to explain, although it seems clear that both Deptford and St. Catherines peoples preferred to conduct their more domestic activities inland away from the marsh edge.

Soil from the midden excavations was dry screened through 1/8-inch mesh using mechanical sifters. In addition, a 2.25 foot square sample of each midden was weighed prior to sifting and the shell, collected for analysis by Lawrence, was weighed after screening. This provided a quantified statement of shell density for each of the middens (Table 5). The qualitative field assessment suggests that the middens are 99% oyster, with only very small quantities of clam, periwinkle, ribbed mussel, stout tagelus, and whelk. The low numbers of these species suggests that they were incidentally collected during oyster gathering.

It is clear from Table 5 that the middens at 38BU1214 exhibit a low shell to soil ratio (averaging 1:3.3). Even within a single midden there is clearly a great diversity; midden 16, for example, evidences a mean shell/soil ratio of 1:4.1 and a relatively high standard deviation of 1.2.

It would be helpful if these middens could be related to specific occupational episodes. Unfortunately, this is not possible at 38BU1214. Although the bulk of the collections dates from the

Table 5.
Shell/Soil Ratios for 38BU1214 Middens

Midden	Shell/Soil Ratio
#4, 120R260, Z. 2b	1:1.3
#5, 60R175, Z. 2b	1:1.5
#6, 60R115, Z. 2b (edge)	1:3.9
#6, 70R120, Z. 2b	1:2.0
#13, 70R110, Z. 2b	1:3.0
#14, 70R80, Z. 2b	1:7.6
#15, 70R60, Z. 2b	1:1.1
#16, 125R105, Z. 2b (edge)	1:5.0
#16, 130R120, Z. 2b	1:4.8
#16, 135R115, Z. 2b	1:2.4

Deptford phase (as discussed below), only middens 6 and 15 have only Deptford materials associated with them and they exhibit a mean shell/soil ratio of 1:2.5 with a standard deviation of 2.2, even higher than for midden 16 (the coefficients of variation are 0.29 and 0.88, respectively). The remaining middens include both Deptford and a minor amount of St. Catherines pottery (although midden 4 also includes a minor Irene component).

This variation is also observed in the general size, shape, and quantity of shell within each of the middens (Table 6). It is clear that there is a tremendous amount of variability with these deposits; it seems likely that this variability is the result of the cultural factors responsible for their deposition rather than

Table 6.
Comparison of the Middens at 38BU1214

Midden	Total Estimated Size	Excavated Area (%)	Excavated Shell Weight	Total Estimated Shell Weight
4	20' dia. 314 ft^2	49 ft^2 (15.6%)	906 lbs.	5808 lbs.
5	20' dia. 314 ft^2	68 ft^2 (21.6%)	710 lbs.	3287 lbs.
6	10' dia. 79 ft^2	42 ft^2 (53.5%)	190 lbs.	355 lbs.
13	10' dia. 79 ft^2	33 ft^2 (42.0%)	226 lbs.	538 lbs.
14	5' dia. 20 ft^2	10 ft^2 (51.0%)	38 lbs.	75 lbs.
15	15' dia. 177 ft^2	46 ft^2 (26.0%)	698 lbs.	2685 lbs.
16	irreg. 75 ft^2	24 ft^2 (32.0%)	167 lbs.	522 lbs.
17	irreg. 70 ft^2	30 ft^2 (43.0%)	121 lbs.	281 lbs.

any environmental variables. Perhaps the simplest explanation is the individual Deptford middens represent accumulations associated with a single episode of oyster gathering, although that episode might involve several days or several weeks.

Non-midden units were screened through 1/4-inch mesh. The increase in mesh size for these units was based on our belief that small bones, absent the alkaline environment of the shell midden, would not be preserved in the naturally acidic soils. This was discovered to be only partially correct. Faunal remains were found in the interior area, and in much greater density. The bone, however, appears to be heavily eroded.

These excavations revealed at least 14 potential features, 10 (71%) of which were excavated (including Features 1 through 10). These features may be placed into two broad categories -- those which consist of shell pits found under or adjacent to shell midden piles close to the marsh (Features 1, 2, 4, 5, and 10) and those in the interior areas with thin bands of shell (Features 6, 7, and 8).

The features found adjacent to or under the middens range in size from about 2 to 8 feet in diameter and from 0.2 to 1.3 feet in depth (Figure 20). They tend to have fairly significant quantities of shell (averaging 139 pounds), but the remains are almost exclusively oyster. Only two of these pits (Features 1 and 5) produced small quantities of either ribbed mussel or periwinkle. Only two of the five features produced small quantities of faunal material and only two yielded diagnostic remains (small numbers of Deptford sherds).

The features found further inland tend to be about 2 to 4 feet by 3 feet and from 0.2 to 2.0 feet in depth (Figure 21). Each had only a small quantity of shell (averaging 7.7 pounds) and it occurred as either pockets or lenses. In addition, the shell from these features evidenced considerable variety, with periwinkle, stout tagelus, oyster, and ribbed mussel being recovered. All three

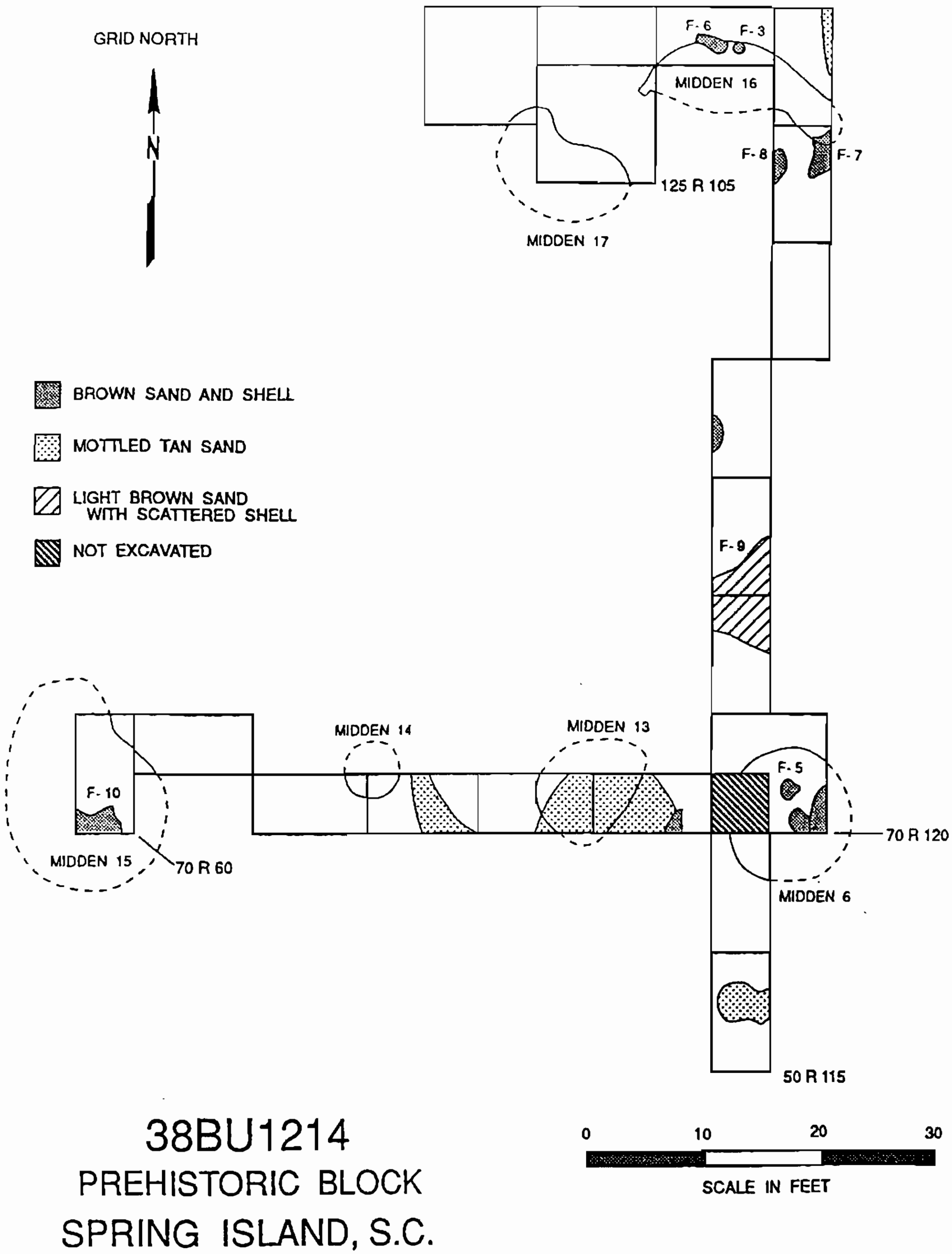


Figure 17. Main excavation block of 38BU1214.

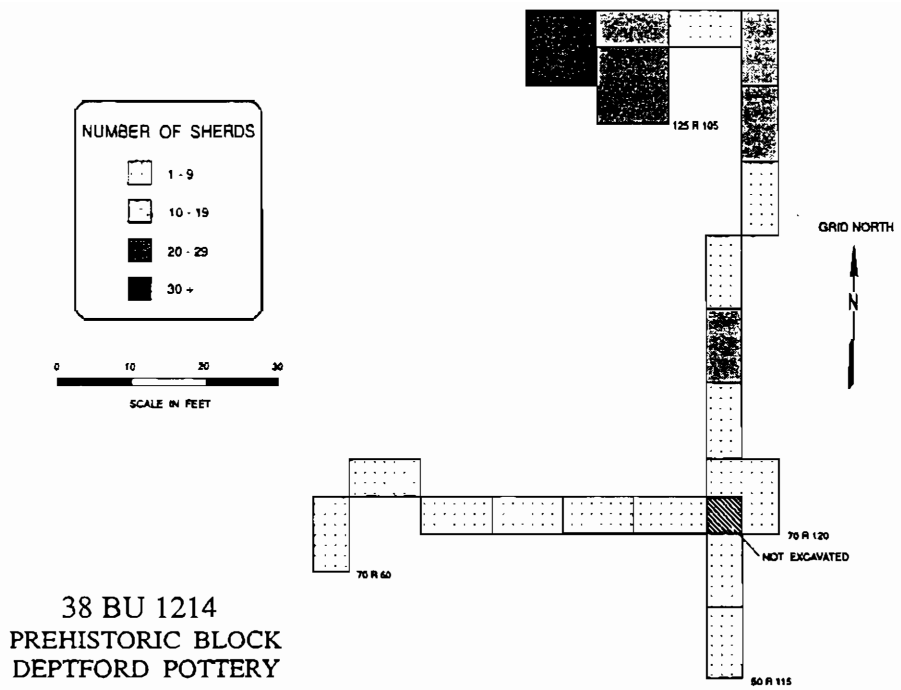


Figure 18. Distribution of Deptford pottery in the main excavation block of 38BU1214.

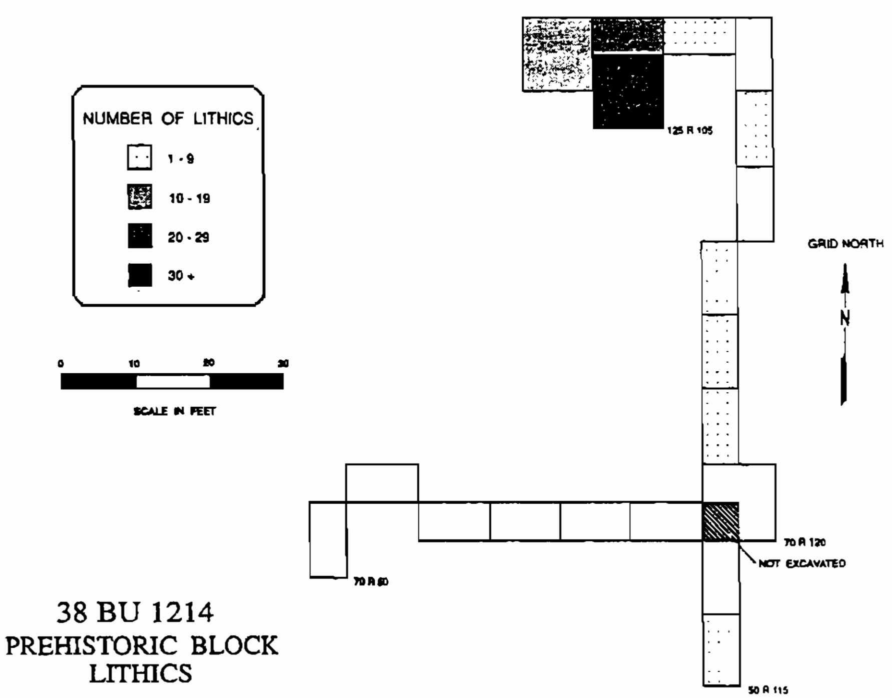


Figure 19. Distribution of lithics in the main excavation block of 38BU1214.

features produced faunal remains, including small quantities of fish bone. Diagnostic materials include Deptford pottery in all three, with a single sherd of St. Catherines pottery in Feature 6.

While the sample of these two potential feature types is too small to allow reliable analysis, it is possible that those associated with the middens represent only shellfish steaming activities, causing them to be larger, contain more discarded shell debris, and to consist almost entirely of one species. The more interior pits, associated with what appears to be a more domestic area of the site, may have served as family cooking pits, causing them to be smaller, contain less shell refuse, and to exhibit greater diversity in material remains.

In addition to these pits, there were two unique features. Feature 3 consisted of an small "dump" of periwinkle and razor clams found within interior Midden 16. This features appears to represent a discrete disposal episode, and is associated with the Deptford occupation.

Feature 9, found midway between the marsh edge and the interior excavations, consisted of a compact light brown sand floor with sparse shell. Associated with the feature were small fragments of crushed faunal material and a higher than expected concentration of Deptford pottery. This feature is interpreted as an occupation floor, although no evidence of distinct architectural features could be identified.

Only a very small quantity of animal bone was recovered from the middens, with fish being a minority constituent. Charcoal was present in the middens, although the site area has been periodically burned off as a land management technique.

Radiocarbon Dating

A single date was obtain from oyster shell gathered from Zone 2b of unit 70R60. This unit was placed in Midden 15 which has produced only Deptford series pottery. The shell yielded an age of 1020 ± 70: A.D. 930 (Beta-40519).

Deptford has usually been given a terminal date of about A.D. 500, after which the Wilmington phase is assumed to be dominant until about A.D. 1000 (DePratter 1979:111). In the absence of a well defined Wilmington phase in the Callawassie and Spring Island area, it is reasonable to expect that Deptford will continue well into the late Middle Woodland or perhaps even into the early Late Woodland. As discussed below, the assemblage from 38BU1214 is clearly late in the Deptford phase, with the Deptford Cord Marked sherds dominating the collection.

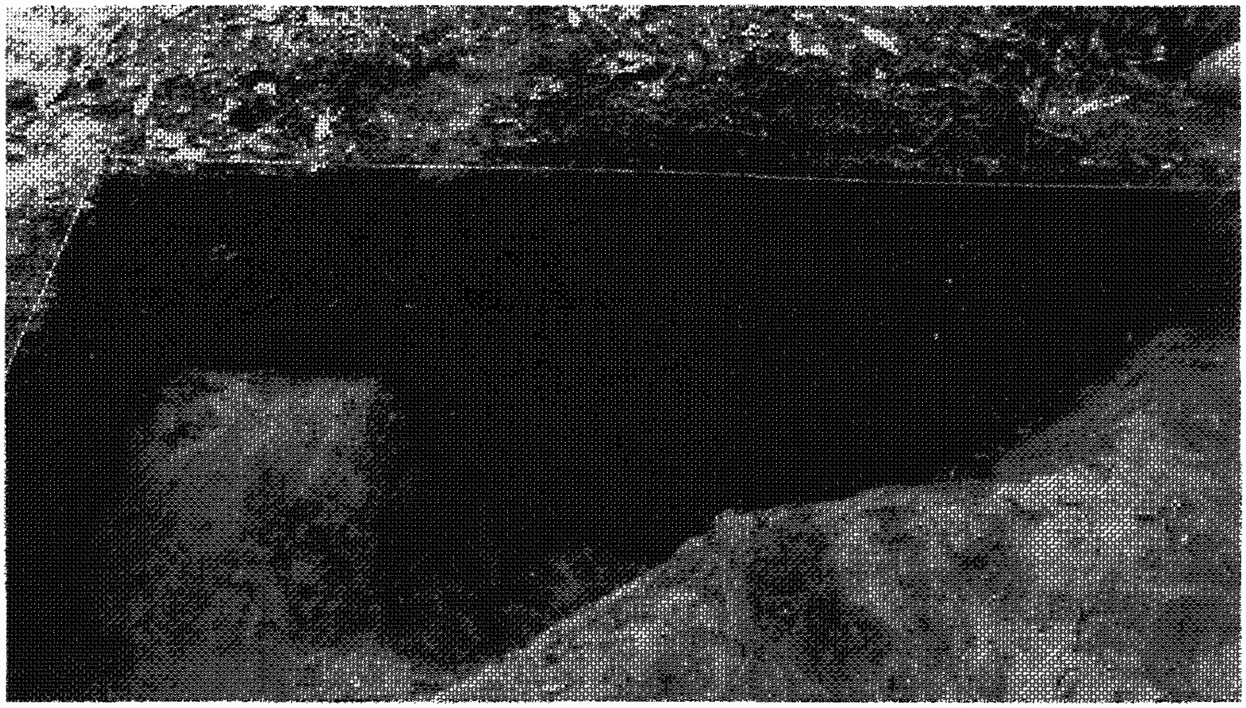


Figure 20. Feature 2 excavated, view to the west.

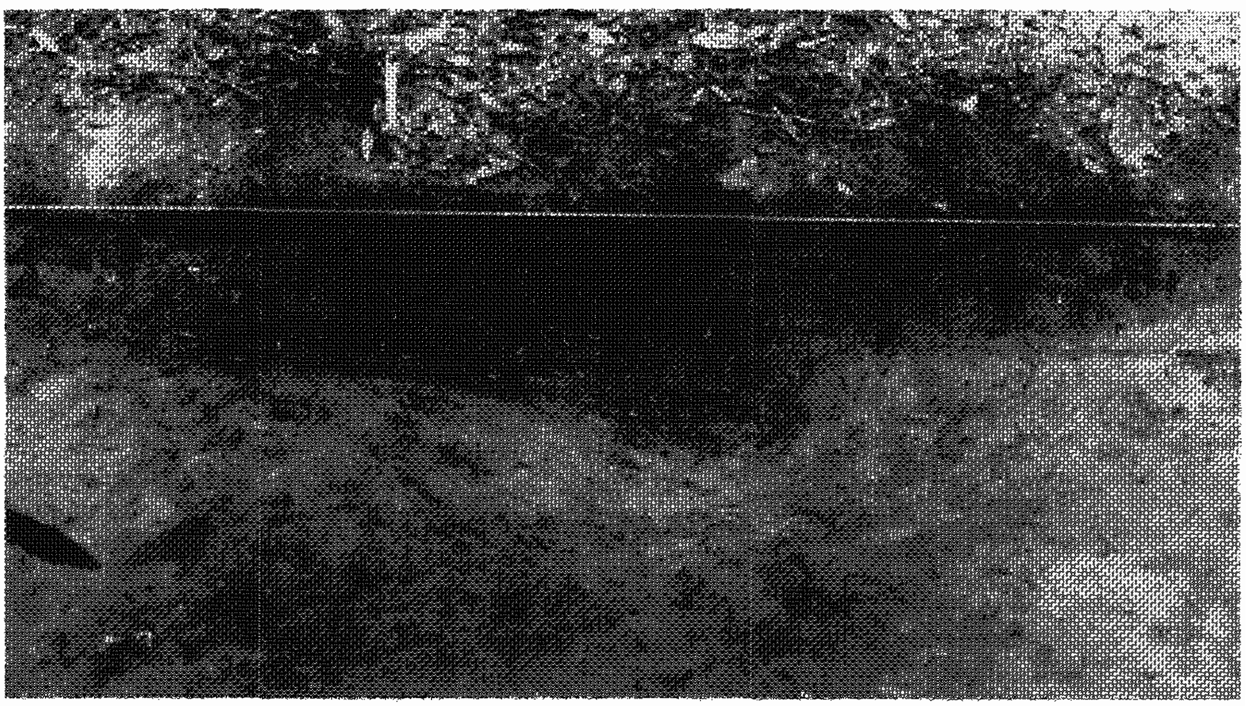


Figure 21. Feature 8 excavated, view to the west.

Artifact Analysis

Excavations at 38BU1214 yielded a total of 1451 sherds, of which 304 (21.0%) were over 1 inch in diameter and suitable for further studies. This collection produced three Stallings sherds (1.0% of the study collection), one Thom's Creek sherd (0.3%), 258 Deptford sherds (84.9%), 24 St. Catherines sherds (representing 7.9% of the total identifiable assemblage),eight Savannah sherds (2.6%), and eight Irene sherds (2.6%). The remaining two sherds are similar to the Catawba or Kimbel Series (see Trinkley et al. 1983:73).

Deptford Cord Marked pottery (n=197) accounts for 76.3% of the Deptford wares, followed by Deptford Plain (n=32, 12.4%). A total of 19 Deptford Check Stamped sherds were recovered, representing 7.4% of the collection. One Deptford Simple sherd was recovered (0.4%). The remaining nine sherds (3.5%) could not be further identified.

The St. Catherines assemblage included 21 St. Catherines Cord Marked (87.5%), two St. Catherines Plain (8.3%), and one St. Catherines Net Impressed (4.2%). Four (50%) of the eight Savannah wares were typed as Savannah Check Stamped, three (37.5%) as Savannah Burnished Plain, while the last specimen was eroded. Of the eight Irene sherds found, seven (87.5%) are Irene Complicated Stamped.

An analysis of the cordage from the 38BU1214 collections provided some interesting contrasts with the studies of sites on Callawassie Island. Of the 197 Deptford Cord Marked sherds, 159 (80.7%) were suitable for the more detailed examination. While the Z or left twist is still the most common, with 109 sherds (68.5%), almost a third of the Spring Island collection exhibited an S or right twist (n=50, 31.5%).

When the tightness of the cord is examined, 61.5% (n=67) of the Z twisted cordage is considered softly or loosely twisted, while 70% (n=35) of the S twisted cordage has a soft twist. The next most frequent is a very tight or hard twist, accounting for 22.9% (n=25) of the Z twisted cordage and 24% (n=12) of the S twisted cords.

The Deptford paste on Spring Island is also considerably grittier, with 50.3% of the Deptford Cord Marked sherds (n=99) exhibiting course or very course inclusions in the paste. Medium paste occurs in only 50 examples, representing 31.4% of the collection. This tendency toward gritty paste is also found in the examined specimens of Deptford Plain pottery, where 20 (62.5%) of the 32 examples had either coarse or very coarse inclusions. This supports previous contentions that the Deptford series will show considerable variability of paste, probably because paste characteristics are more dependent geographic considerations, such as the availability of clays, than on cultural considerations.

Although the collection of St. Catherines material at 38BU1214 is very small (n=24), 18 of the 20 cord marked examples were suitable for analysis. The St. Catherines Cord Marked pottery evidences much less variation in both type and tightness of the twist than the preceding Deptford wares. Of the 18 specimens, 16 (88.9%) have a Z twist, and 10 of these (62.5%) evidence a soft or loose twist. Both of the specimens with an S twist evidence a very tight or hard twist.

Site 38BU1214 yielded 139 lithic specimens, the largest collected from any of the sites investigated. Of these 131 (94.2%) are flakes. Three (2.3%) are secondary flakes exhibiting remnant cortex and evidencing some degree of lithic reduction at the site. Two of these specimens are quartz, while one is a Coastal Plain chert. The bulk of the collection (110 specimens or 84.0%) are non-cortical flakes, including 71 Coastal Plain chert flakes, 24 siltstone flakes, 14 jasper flakes, and one quartzite flake. Eighteen specimens (13.7%), all Coastal Plain chert, are flakes of bifacial retouch. One quartz hammerstone was also recovered.

This collection suggests that while little primary reduction took place at 38BU1214, manufacturing was taking place at the site, with the primary material being locally available Coastal Plain chert. As previously discussed, most of the stone manufacturing and reduction appears to have been conducted inland from the marsh edge.

Four biface fragments, three of Coastal Plain chert and one of siltstone were recovered, as well as two Coastal Plain chert triangular points and a fragment of a Small Savannah River Stemmed point made from Coastal Plain chert. The two triangular points both measure 28 mm in length and have a basal width of 19 mm. One is 3.5 mm in thickness, while the other is 5 mm. These points, like those at 38BU464 on Callawassie Island, best fit the Roanoke Large Triangular type description (Coe 1964:110). Given the A.D. 930 date for the Deptford material at 38BU1214, the association with this type of projectile point is entirely appropriate.

The only other artifacts recovered from 38BU1214 are three oyster shells with intentionally drilled holes (Figure 22). Microscopic examination of the holes has eliminated the possibility that they are accidental or caused by marine organisms. While they appear to be decorative, such a statement is fraught with cultural implications for which we currently have no clear evidence.

<u>38BU1249</u>

The grid, established N29°30'W, parallel to the marsh, was tied into several surveyed golf fairway center line points (100R300 is FW 25 9+00, 300R300 is FW 25 11+00) in order to maintain long-term horizontal control. This base line established along the edge of the marsh is considered grid north-south. Given the limited site area, no permanent grid points were established, although the grid could be reconstructed using the center line points. Vertical control was maintained through the use of an assumed elevation datum (a nail in the base of a pine tree at 304R305, assigned an AE of 10.0 feet). This was later calculated to be 11.0 feet MSL.

During the survey phase several small subsurface midden areas were identified which exhibited a high density of periwinkle shells. Although a relatively low density of pottery was encountered, the remains appeared to date from the Late Woodland St. Catherines phase. These investigations relocated one of the previously identified middens and work concentrated in this single site area. A series of four 10-foot units (290R310-340) were laid out to form a 10 by 40 foot trench bisecting the midden and exploring the area of the midden interior from the marsh (Figures 23 and 24).

Stratigraphy in the site area includes Zone 1 humic brown sand up to 0.5 foot in depth and Zone 2 dense shell midden, both overlying a tan to yellow sand subsoil. The investigated shell midden, identified primarily in 290R320, is estimated to be about 12 feet in diameter and to have a maximum depth of 0.5 foot.

Soil from the midden excavations was dry screened through 1/8-inch mesh using mechanical sifters. In addition, a 2.25 foot square sample of the midden was weighed prior to sifting and the shell, collected for analysis by Lawrence, was weighed after screening. This provided a quantified statement of shell density for the investigated midden (the shell/soil weight ratio is 1:1.3).

The qualitative field assessment suggested that the middens were largely oyster, with only very small quantities of clam, periwinkle, and whelk. This was verified by a detailed species analysis of a portion of the column sample which revealed that oysters represent 85.4% of the column by weight, periwinkle represent 11.4%, clam 1.4%, stout tagelus 0.6%, whelk 0.6%, and ribbed mussel 0.6%. While it is clear that the previous impression that the midden consisted primarily of periwinkle is in error, it is also clear that the midden contains a higher than normal percentage of periwinkle.

Zone 1 soils were screened through 1/4-inch mesh. The increase in mesh size for these zones was based on our belief that small bones, absent the alkaline environment of the shell midden, would not be preserved in the naturally acidic soils. In those areas not associated with middens, and in the plowzone middens, bone was, in fact, very uncommon and the use of the larger screen size appears appropriate.

Very little animal bone was recovered from these excavations,

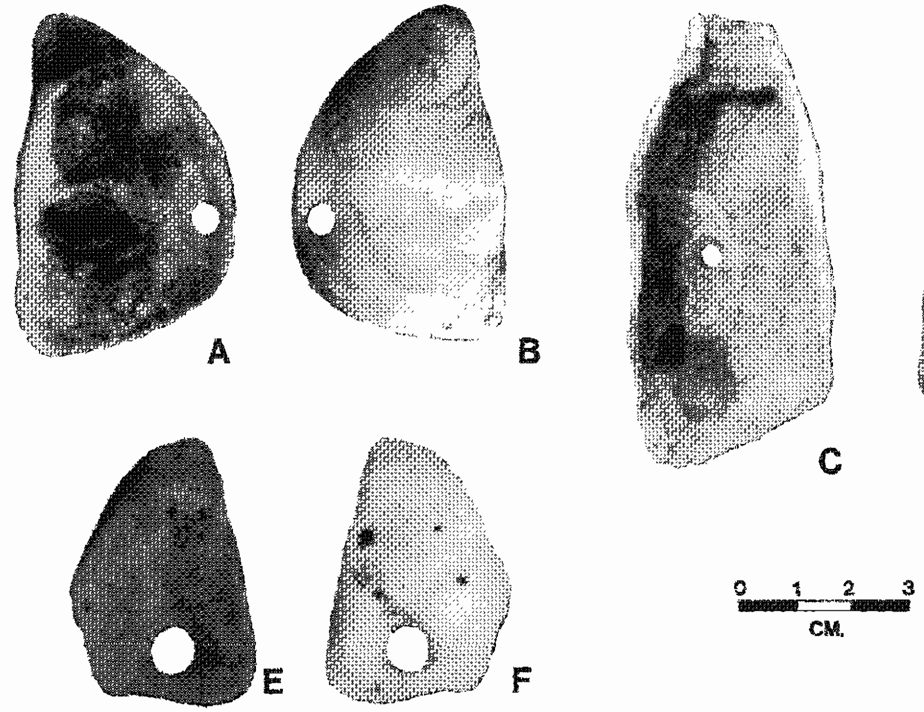


Figure 22. Drilled oyster shells from 38BU1214. Valve interior to the left. Smaller holes on F conceivably enlargements of polydorid bristleworm tube ends.

Figure 23. 38BU1249 excavations, view to the east.

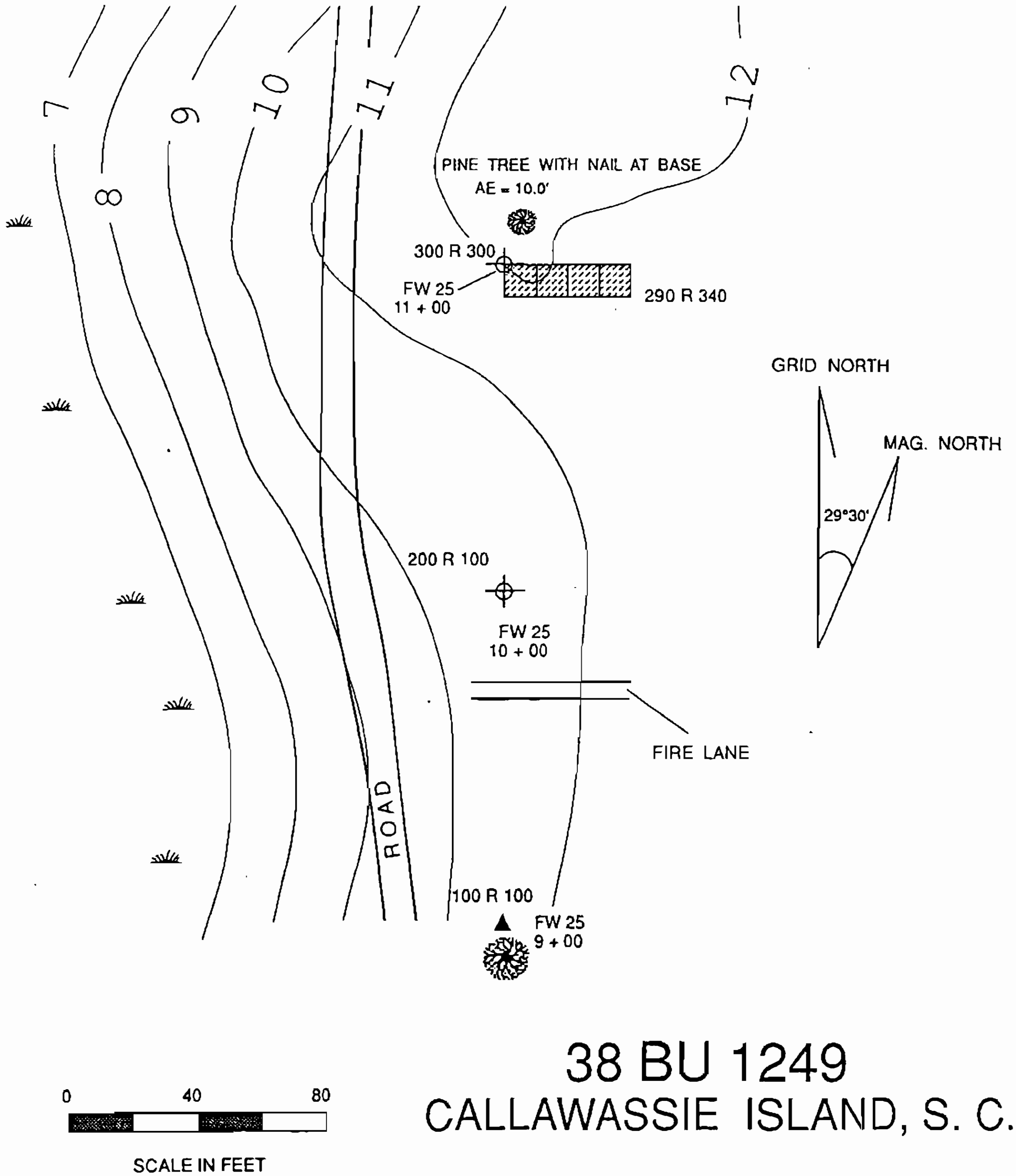


Figure 24. Site 38BU1249.

although the remains found include primarily fish, with very small numbers of mammal remains. Ethnobotanical remains are sparse, although charred hickory nutshell fragments are found in the excavations.

These excavations revealed 4 potential features, 3 (75%) of which were excavated (including Features 1 through 3). All of these represent shell pits with variable degrees of use and complexity. Unfortunately, two (Features 1 and 3) evidence tree and root disturbance and only Feature 2 was completely excavated. All of these features, however, are found at the edges or under the shell midden deposits. All are approximately 3 feet in diameter with depths ranging from 0.7 to 1.0 foot. Feature shape ranged from oval to roughly circular and each was bowl shaped with gently sloping sides. Each feature exhibited the range of shellfish present in the overlying midden. The shell weight for Feature 2, which was completely removed, was 107 pounds. Only Feature 2 produced diagnostic materials, all associated with the St. Catherines phase.

Artifact Analysis

Site 38BU1249 yielded a total of 424 sherds, of which 134 (31.6%) were over 1 inch in diameter and therefore suitable for further analysis. A total of nine Deptford series sherds were recovered (representing 6.7% of the study collection), while St. Catherines ware represented 56.0% of the collection (n=75). A total of 49 Savannah Series sherds were recovered (36.6%) and one Irene sherd was identified (0.7%).

The small Deptford collection yielded five specimens of Deptford Cord Marked (55.6%), one Deptford Check Stamped (11.1%), and three Deptford Plain (33.3%) sherds. Four of the five Deptford Cord Marked sherds were suitable for cordage analysis and it was found that all of these evidenced a Z or left twist, three (75%) using a soft twist and one a hard twist. All of the Deptford sherds exhibited paste with medium sand inclusions.

The St. Catherines collection included 70 specimens of cord marking (93.3%), two plain specimens (2.7%), and one example of net impressing (1.3%). Of the 70 St. Catherines Cord Marked sherds, 62 (88.6%) were suitable for more detailed cordage analysis. All of these exhibited a Z or left twist and 50 (80.6%) had a soft or loose twist. The remainder were evenly divided between a hard and a very hard twist.

Savannah wares included 26 cord marked examples (53.0%), 19 plain burnished examples (38.8%), two check stamped (4.1%), and two with an unidentifiable surface treatment (4.1%). Twelve of the 26 Savannah Cord Marked specimens (46.2%) were suitable for cordage studies and all of these were found to exhibit a Z twist using a softly or loosely twisted fabric.

In spite of the rather sparse collection of ceramics, 38BU1249 produced 26 lithic specimens, all flakes. These included one secondary flake of siltstone, seven non-cortical flakes (three Coastal Plain chert, two jasper, and two quartzite), and 18 flakes of bifacial retouch (representing 69.2% of the collection and including 16 Coastal Plain chert, one jasper, and one quartzite). This collection suggests that the site was heavily oriented toward resharpening of existing stone tools rather than the production of new tools.

<u>38BU1262</u>

Excavations

The grid, established N37°W, perpendicular to the marsh, was tied into several surveyed lot markers in order to maintain long-term horizontal control. This base line established perpendicular to the marsh edge is considered grid north-south. Given the limited site area, only one permanent grid point was established, at the north edge of the site (350R500). Vertical control was maintained through the use of a nearby temporary benchmark with a mean sea level (MSL) elevation. The permanent point established at 350R500 was determined to have an elevation of 14.51 feet MSL. A second control point was established at the southern edge of the site (a nail with an elevation of 10.87 feet in the base of an oak tree).

During the survey phase several small subsurface midden areas were identified which exhibited a high density of shell. Although a relatively low density of pottery was encountered, the remains appeared to date from the late Early Woodland Deptford phase through the late Middle Woodland St. Catherines phase and the Late Woodland Savannah Phase. These investigations relocated two of the previously identified middens and work was initially concentrated in these two site areas (Figure 25).

The first area, situated at the southern edge of the site adjacent to the marsh, was investigated with a 10-foot unit and two five foot units (75R500, 80R500, and 90R500). The second area, at the north edge of the site, was investigated with a series of six 10-foot units (260R500-520, 270-290R500) (Figure 26). As work continued it was decided that a series of six 5 by 10 foot units would be placed between these two block excavations in order to determine if activity loci existed in the intervening site area. Consequently, units 120-130R500, 160-170R500, and 200-210R500 were excavated forming 5 by 20 feet trenches at 20 foot intervals between the two block excavations.

Stratigraphy in the site area includes Zone 1 humic brown sand soil up to 0.9 foot in depth and Zone 2 dense shell midden, both overlying a tan to yellow sand subsoil. The investigated shell middens, identified primarily in 260R520 (in the northern area) and 75-80R500 (in the southern area), are estimated to be about 15 to

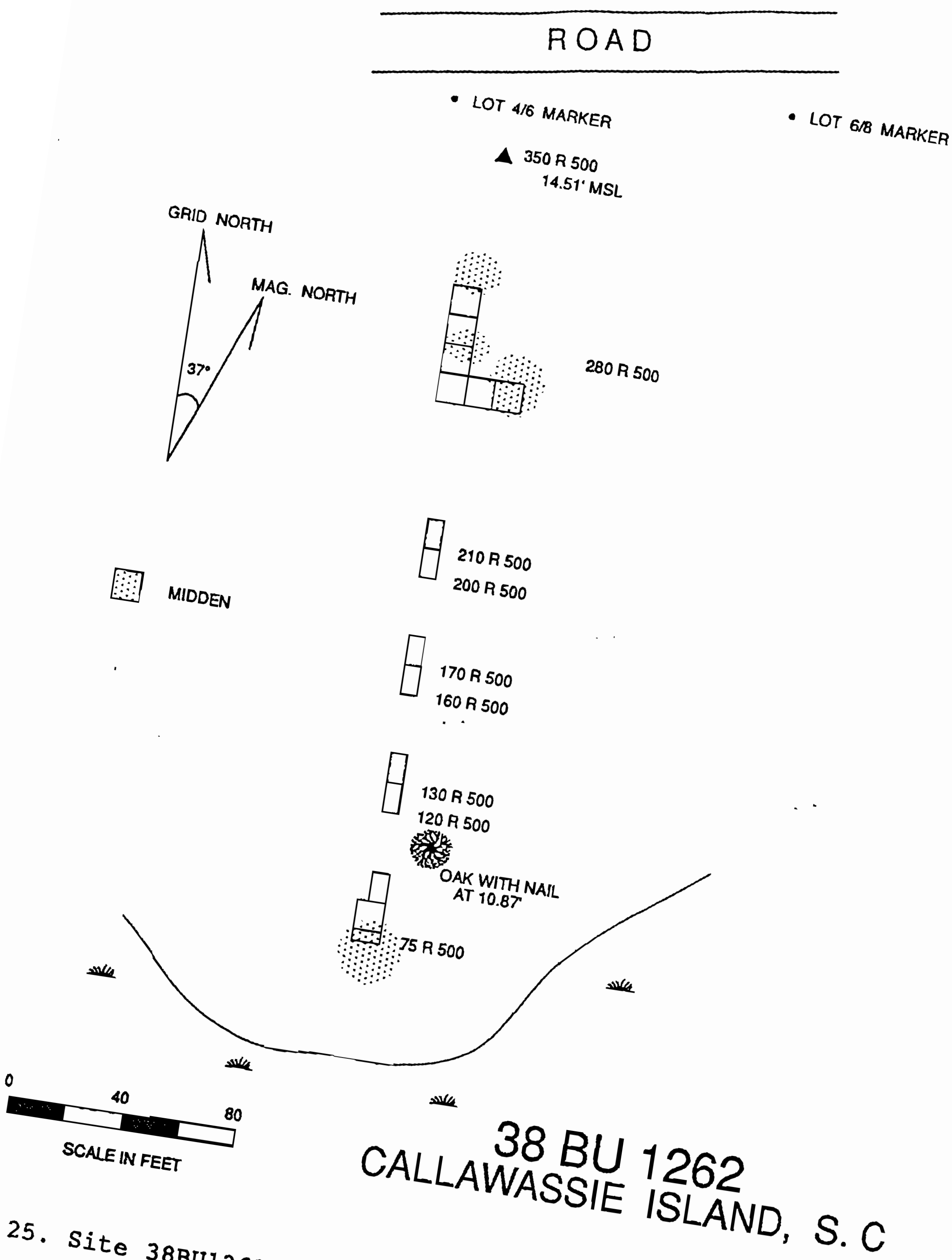


Figure 25. Site 38BU1262.

Figure 26. Troweling 260R510-520, view to the southeast.

20 feet in diameter and to have a maximum depths of 0.8 foot.

Soil from the northern midden excavations was dry screened through 1/8-inch mesh using mechanical sifters. In addition, a 2.25 foot square sample of the midden was weighed prior to sifting and the shell, collected for analysis by Lawrence, was weighed after screening. This provided a quantified statement of shell density for the investigated midden (the shell/soil weight ratio is 1:0.4). Species analysis revealed that the midden is 99.9% oyster by weight, with very small quantities of ribbed mussel, whelk, and periwinkle.

Soil from the southern midden was discovered to be too wet for screening through 1/8-inch mesh and was therefore screened through 1/4-inch mesh. Two factors contributed to this problem. The first was the approximately 9 inches of rain which Callawassie Island received immediately before excavations were begun at this site. The other, and primary cause, is the very low topography of the midden at the southern edge of the site. While the northern midden is at an elevation of about 13 feet MSL, the southern midden is at an elevation of about 8 feet MSL and is bedded on gray marsh muck. The column sample from the southern midden revealed a shell/soil weight ratio of 1:0.4.

Elsewhere on the site Zone 1 soils were screened through 1/4-inch or 1/4 by 1/2 inch mesh (depending on the moisture content of the soils). The increase in mesh size for these zones was based on our belief that small bones, absent the alkaline environment of the shell midden, would not be preserved in the naturally acidic soils. In those areas not associated with middens, and in the plowzone middens, bone was, in fact, very uncommon and the use of the larger screen size appears appropriate.

The excavations revealed that the lower elevations of the site had not been plowed. The northern area, exclusive of the dense middens, had been thoroughly plowed to a depth of about 0.8 foot.

Very little animal bone was recovered from these excavations and ethnobotanical remains are equally sparse.

These excavations revealed two features, both of which were excavated (Features 1 and 2). No post holes were encountered. Both features represent shell pits found at the edges or under the shell midden deposits at the north edge of the site. Feature 1 is estimated to have measured about 9 by 8 feet and had a depth of 0.5 foot. The one-quarter of the feature excavated yielded 267 pounds of shell, including crushed oyster, periwinkle, and ribbed mussel. In profile this pit revealed a dense upper zone of burnt and crushed shell overlying a zone of tan sand and shell. While no diagnostic specimens were recovered from the feature, a small quantity of daub was present. Feature 2 is estimated to have measured about 7 feet in diameter and had a depth of 0.6 foot. Shaped like a shallow basin, the portion excavated produced 72 pounds of shell, including primarily oyster with minor amounts of stout tagelus, ribbed mussel, and periwinkle. The upper zone consisted of brown sand and shell, while the lower zone consisted of yellow sand with imbedded shell. One Deptford Plain sherd was recovered from this feature.

Site 38BU1262 is perhaps most interesting because of what it reveals concerning the site areas used by the Deptford, St. Catherines, and Savannah occupants. The Deptford and Savannah wares, which as discussed below represent the bulk of the materials present at the site, are found concentrated in the north area of the site, on high ground in association with three middens. The St. Catherines wares are found clustered in and around a single midden situation on very low ground immediately adjacent to the marsh at the south end of the site. Between these two areas low quantities of Deptford, St. Catherines, and Savannah pottery are found, but there is no evidence of any intensive occupation.

Why the St. Catherines occupation chose the very low area of the site is not clearly understood, although it is possible that this occupation was limited to a very brief collection and processing episode. No features were identified in this area and the single occurrence of daub, which may suggest somewhat more permanent occupation, is found at the north edge of the site on higher and better drained soils.

Artifact Analysis

A total of 688 sherds were recovered from the excavations at 38BU1262. Of these 178 (25.9%) were over 1 inch in diameter and therefore suitable for more detailed examination. The study collection yielded 67 Deptford sherds (37.6%), 37 St. Catherines sherds (20.8%), and 74 Savannah sherds (41.6%).

Of the Deptford collection, 50 (74.6%) are Deptford Cord Marked, eight (11.9%) are Deptford Simple Stamped, and nine (13.4%) are Deptford Plain. Of the 50 cord marked examples, 29 (58%) are suitable for cordage analysis. These reveal that 96.6% (n=28) evidence a Z or left twist, while only one specimen of an S or right twist is present. Of the 28 examples of Z twisted cord, 85.7% (n=24) indicate that softly or loosely twisted cordage was used. The single example of S twisted cord also indicates the use of a softly twisted fabric. As with the previous collections examined from Spring Island, the paste is dominated by medium sand inclusions, with only 27.6% of the sherds (n=8) evidencing coarse inclusions.

The St. Catherines collection includes a single example of St. Catherines Plain and a single specimen with an indeterminate surface treatment. The remaining 35 sherds are all St. Catherines Cord Marked (representing 94.6% of the collection). Twenty-three of these cord marked sherds (65.7%) allowed examination of the cordage and revealed that 22 (95.6%) were impressed with Z twisted cords. Of these, 18 (81.8%) used softly twisted fabric. The single example of an S twist also indicated that softly or loosely twisted cordage was used.

The Savannah wares included 53 specimens with cord marking (71.6%), 17 specimens with a burnished plain surface (22.9%), two with check stamping (2.7%), one complicated stamped treatment (1.4%), and one with an indeterminate treatment. Of the 53 Savannah Cord Marked specimens, 47 (88.7%) were amenable to cordage analysis. This study revealed that 46 (97.9%) exhibited a Z twist, with 42 of those (91.3%) using a softly twisted cord.

This site produced only six lithic specimens, including one quartzite hammerstone, two Coastal Plain chert biface fragments, and three non-cortical flakes (two Coastal Plain chert and one siltstone). This assemblage, however, may be biased, when compared to the other excavations on Spring and Callawassie islands, by the use of 1/4-inch screens for the bulk of the units.

The only other artifact discovered at this site is a small amount of daub confined to Feature 1.

HISTORIC ARCHAEOLOGICAL INVESTIGATIONS AT 38BU1214

Debi Hacker and Michael Trinkley

Introduction

During the initial shovel testing for prehistoric midden locations at 38BU1214 (discussed in the previous section), an area of dense shell mortar and a light scatter of probable late eighteenth century historic remains was encountered at the east edge of the site (Figure 27). These materials were found in an area about 30 feet in diameter, with the mortar rapidly declining in density 10 to 15 feet away from the core. Both Callawassie Development Corporation and the SC SHPO were notified of this unexpected late discovery. After discussions with the parties involved, the field project was expanded to allow partial exposure of these remains.

Excavations

The previously established grid for the site was expanded to include the area of the historic remains. A series of five 10-foot and one 5-foot units (195R350,180-200R360, and 190-200R370, totaling 525 square feet) were laid out to more fully expose the suspected concentration.

Stratigraphy in this area of the site consisted of a thin lens of black humic loam about 0.1 to 0.2 foot in depth overlying a brown to tan sand with a depth of about 0.5 to 1.0 foot. The subsoil is a yellow friable sand. Excavations combined the black humic loam and the upper portion of the underlying brown sand as Zone 1. Zone 2 consists of the lower half of the brown sand strata, as it began to lighten in color, grading into the yellow subsoil. Analysis of the profiles and the associated artifacts, however, suggests that these divisions are entirely arbitrary and may be combined for interpretation.

The excavations produced a total of 143.5 pounds of shell and 191 pounds of mortar rubble, with these remains concentrated in units 190-200R360-370. The mortar rubble included three distinct types. One represents slabs of soft mortar about 0.1 foot in thickness. One surface typically is smoothed, while the other has sand impressions. These are interpreted to be the remnants of a poured mortar floor which appears to have originally covered the bulk of 190R360 and the western portion of 190R370. The second type of mortar is very friable and includes a dense quantity of crushed shell. It was found concentrated in the north central portion of 190R360 and the southern edge of 200R360. Further excavation

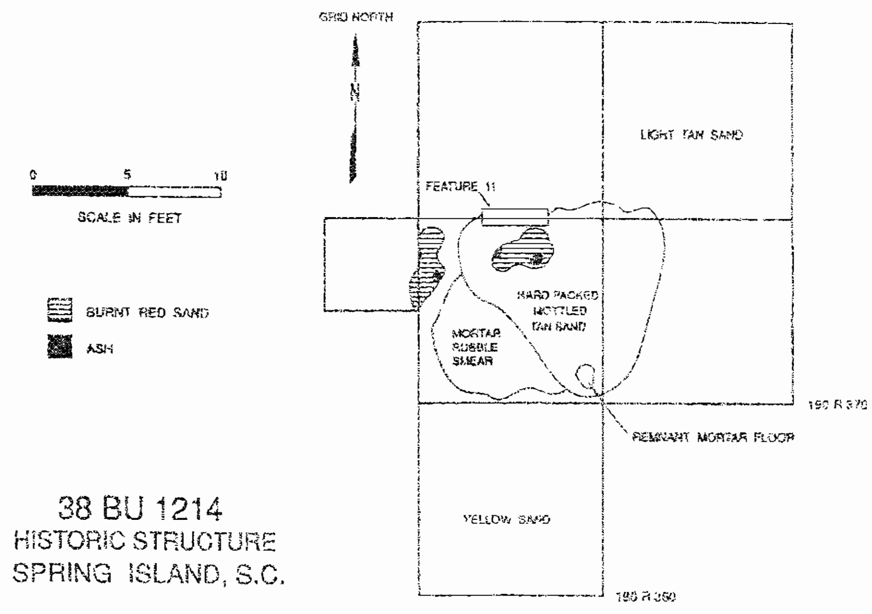


Figure 27. Historic occupation area at 38BU1214.

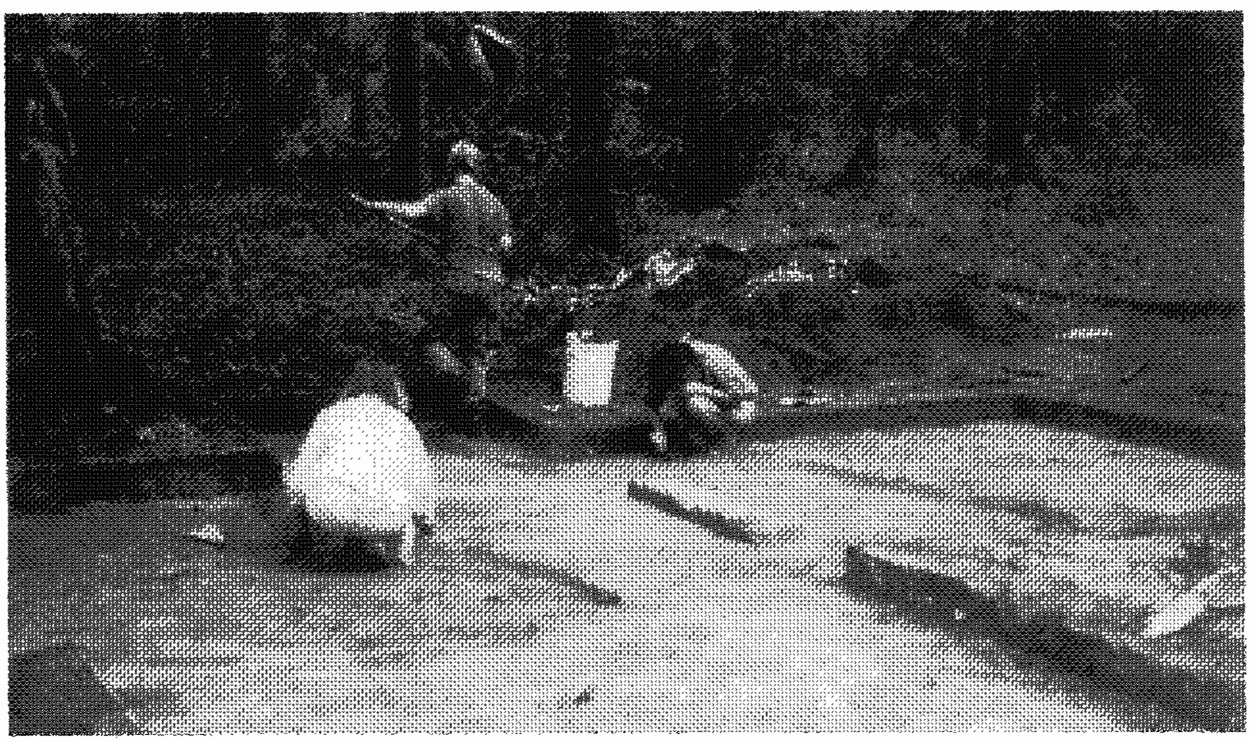


Figure 28. Excavation in the historic block, view to the northwest.

revealed the source of this material to be Feature 11, a cast block of mortar which measured approximately 4.5 feet in length and 1.0 foot in width (Figure 28). Although this material is somewhat similar to tabby, it is actually a very poorly prepared mortar which has used exceedingly large quantities of finely crushed shell. Found with this category of mortar was the third type -- a soft, fine mix which appeared to have served as chinking for logs. The identified fragments are triangular in cross section and the shape suggests the use of logs about 0.5 to 0.8 foot in diameter.

Immediately south of Feature 11 was an area of burnt red sand about 0.2 foot in depth and covering an area about 3.5 by 2.5 feet. Feature 11 is interpreted to represent the remains of a crudely constructed hearth. The in situ remains of the mortar with shell inclusions is a fire back, while the mortar chinking, concentrated in this same area, was probably daubing on an associated log chimney. The burnt area of sand and ash immediately south of the mortar fire back represents the hearth area for this chimney. A second burnt area occurs to the west of the hearth and may represent a second hearth area.

While no other structural materials, such as post holes or a dripline were found, the excavations did identify an area of hard packed mottled tan sand closely associated with the remnant mortar flooring. Surrounding this area the soils gradually became less mottled and lightened in color.

Artifact Analysis

A total of 253 artifacts were recovered from these excavations (Table 7), with the bulk of the collection representing kitchen items, primarily late eighteenth and early nineteenth century ceramics. Also included in the kitchen group are two Colono sherds, 59 fragments of glass, six tableware items, and three kitchenware items. The glass includes 36 "black" bottle glass fragments, 13 clear bottle fragments, five aqua fragments, four green fragments, and one fragment of melted glass. All six of the tableware items are of clear glass, but too fragmented for further identification. The kitchenware items include a fragment of an iron cup handle, and two kettle fragments.

Architectural remains are limited to 17 hand wrought nails and seven unidentifiable nail fragments which are probably also wrought. The identifiable nails include examples which might have been used for shingles, sheathing, and light framing, although none occur in sufficient numbers to suggest the presence of a traditionally constructed frame structure. No window glass or other architectural items are present.

The clothing items include a set of oval cuff links with a brass back and a decorative blue stone setting which evidenced fugitive painting. The link is stamped brass. A single brass button

Table 7.
Artifact Pattern Analysis for 38BU1214

Kitchen Group			
Ceramics	144		
Colono ceramics	2		
Glass	59		
Tableware	6		
Kitchenware	3		
		214	84.6%
Architecture Group			
Hand wrought nails	9		
Hand wrought nail frags	8		
UID nails	7		
		24	9.5%
Arms Group			
Lead shot	1		
Gun flint	1		
		2	0.8%
Tobacco Group			
Tobacco pipe stems	3		
Tobacco pipe bowls	4		
		7	2.7%
Clothing Group			
Buttons	2		
		2	0.8%
Activities Group			
Storage items	1		
Other	3		
		4	1.6%

(South's Type 31) was also recovered.

This assemblage most closely resembles the Carolina Slave Artifact Pattern (Wheaton et al. 1983:285), developed from the excavation of eighteenth century slave structures with very ephemeral architecture. The only significant difference is the even lower than expected percentage of architectural remains at 38BU1214. Clearly the assemblage is impoverished and represents an individual or family at the lowest end of the plantation social scale.

Table 8 illustrates the calculation of the mean ceramic date of 1788 for the collection from 38BU1214. Although it is probable that the single whiteware sherd is intrusive into the collection, its removal does not appreciably change the mean date (1787.6). The dateable ceramics include many low status or utilitarian types such as lead glazed slipware and annular wares. Accompanying these, however, are items of higher economic status, such as the white salt glazed stonewares and molded creamwares.

Table 8.
Mean Ceramic Date Calculations for 38BU1214

Ceramic		Mean Date (xi)	(fi)	fi x xi
White SG Stoneware		1758	2	3516
Lead Glazed Slipware		1733	20	34660
Creamware,	cable	1805	2	3610
	annular	1798	1	1798
	undecorated	1791	40	71640
Pearlware,	poly hp	1805	6	10830
	blue hp	1800	11	19800
	edged	1805	1	1805
	annular	1805	27	48735
	undecorated	1805	14	25270
Whiteware,	undecorated	1860	1	1860
			125	223524

Mean Date = 223524 ÷ 125 = 1788.2

Synthesis

The historic occupation at 38BU1214 is both equally interesting and ambiguous. This isolated eighteenth century structure is similar to several others identified during the survey phase on Spring Island (Trinkley 1990b), although the other sites were much more poorly preserved in the archaeological record.

Based on the distribution of mortar flooring fragments, the structure measured about 10 to 12 feet square, was built at grade, and was rudely constructed. A chimney, constructed of lathe and logs plastered with mortar was present. The fire box, however, was small, measuring about 4 by 2.5 to 3 feet. At this time it is not possible to rule out thatch construction, although log construction is equally likely based on the sparsity of nails and absence of other architectural hardware. A log construction is perhaps more likely given the chimney and floor construction evidence.

Regardless, the structure evident at 38BU1214 is in a sense more crudely constructed than previously documented eighteenth century slave structures (see Adams 1990). John Lawson, in the early eighteenth century, reports that a structure of a Bermudian hired to tend cattle and hogs on Bull Island was equally ephemeral: "one side of the Roof of his House was thatch'd with Palmetto-leaves, the other open to the Heavens" (Lawson 1709:14).

Given the small size and the sparse artifactual assemblage, the structure was probably occupied by a single slave who tended nearby fields or perhaps watched over an animal herd. There is some evidence of such activities in the historical evidence (see Craton 1987:214). Unfortunately, this settlement pattern is very easily overlooked by archaeological survey techniques and no similar structures have been found reported in the archaeological literature. The structures near the sugar mill on adjacent Callawassie Island do, however, offer a somewhat similar analogy in terms of construction and floor area (see Brooker's discussion in a following section of this study). The suggested date of 1780 to 1790 would relate to George Edwards ownership of Spring Island.

CALLAWASSIE ISLAND SUGAR WORKS: A TABBY BUILDING COMPLEX

Colin Brooker

Introduction

In their recent compendium entitled Common Places, Upton and Vlach (1986:xiii) have underscored the importance of an analytic, multidisciplinary and interpretive approach toward vernacular architecture, finding fault with those authors who "squander their talent on mere description." Few writers or readers of architectural history would quarrel with this sentiment, but the fact remains that any building study, whether it be taken from a regional, functional, typological, or social stance relies upon an accurate corpus of descriptive information. There are many ways of presenting such data, and inevitably individual bias will make its presence felt, architectural recording involving selection amongst a multiplicity of observed variables pertaining to such topics as function, construction methods, stylistic affinity, environmental response, and that most elusive factor, building quality. Indeed one might argue the act of transferring information between artifact, paper, photographic emulsion or other medium is itself an interpretive activity though admittedly a low level one. And however tedious or uninspiring the results, it is a necessary task especially when new development, restoration, accident, or neglect may change the object of study, an issue which brings discussion to 38BU409.

Site 38BU409 was first identified by James L. Michie (1982), who found (while conducting a reconnaissance survey under sponsorship of the South Carolina Institute of Archaeology and Anthropology), three ruined tabby built structures (Structures I-III) located near Callawassie Island's northwestern extremity. Michie produced a sketch map showing these architectural features and suggested that they represented two phases of eighteenth and nineteenth century residential building (Michie 1982:46-48, Figure 20). Following Michie's lead, Dr. Larry Lepionka (1982) briefly discussed the same architectural assemblage in his tabulation of Beaufort County tabby sites, identifying one of the structures (Structure I) as a possible mill base and later reiterating Michie's opinion that the group's primary function was domestic.

During July 1983 the author and Jane Bruce Brooker, assisted by Jean Leidersdorf (of Brooker Architectural Design Consultants, Beaufort, South Carolina), undertook measured drawing of the complex, Lepionka concurrently excavating the site under contract from Three Fountainview Development Corporation, Inc. Structures I-III were then re-identified, similarity to building groups known from coastal Georgia and Jamaica indicating to the architectural team that the visible ruins were a previously undocumented sugar processing works. Lepionka reported these findings through several popular articles published in the Callawassie Island Archaeological Society Newsletter (June 1984, December 1984) an ephemeral publication primarily intended for would-be purchasers of island real-estate.

Regrettably, no final report detailing excavation of the Callawassie Island Sugar Works ever appeared. An adjacent settlement excavated by Lepionka during 1984 also escaped publication. Following cessation of archaeological activities Three Fountainview subdivided the still undefined site and constructed new roads accessing the Sugar Works, but impacting other historic structures located nearby. Although Three Fountainview undertook preservation of the major standing ruins in 1984, intervention achieved limited success, the company ignoring recommended preservation procedures and the Secretary of the Interior's Standards for Rehabilitation. Inspection over the later half of 1989 disclosed a sorry picture. Structure II showed evidence of disintegration along its southern flank. Components of the associated settlement had fared worse, all surviving elements displaying the effects of attrition, mechanical damage, and unthinking vandalism.

The accelerated destruction raised an ethical problem. Custom dictates that the excavator of any site be held responsible for its timely publication, the responsibility becoming urgent when mitigation or preservation issues are involved. Here, six or seven years after collection, archaeological data remain unavailable. Yet site 38BU409 deserves notice, attesting manufacturing activities otherwise poorly documented from Beaufort County over the first half of the nineteenth century and building types not previously recorded from coastal South Carolina.

To resolve the unacceptable situation of fast disappearing structures on the one hand and lack of public information on the other, a compromise has been effected, the present study commissioned by Callawassie Island's current owners, Callawassie Island Development Corporation, focusing on the architectural aspects of 38BU409 while leaving largely unexplored questions raised by inaccessible excavated artifacts.

The history and technology of Southeastern sugar production has been described many times. Notable contributions are those of Floyd (1937), Deerr (1949-1950), Crook and O'Grady (1980), Sitterson (1953), and Eubanks (1985). Thanks to these authors primary documents attesting the sugar industry of Georgia have been published or republished, but how South Carolina's coastal planters gained knowledge of what were obviously unfamiliar manufacturing techniques is a problem which has received less attention. Nevertheless, as Floyd mentions, results of local experimentation can be traced through articles written for the Southern Agriculturalist (Charleston, South Carolina 1827-1840), a periodical also used by Sitterson (1953).

At the risk of repetition, these accounts are examined once more. The first section of this study discusses South Carolina's sugar production from about 1828 through 1845, a period of experiment, speculation, and ultimately unrealized promise insofar as cane was concerned. The second section describes sugar cane processing, knowledge of which is necessary if the somewhat fragmentary architectural remains surviving on Callawassie Island are to be understood. Again, little originality can be claimed, the section relying upon the authors previously cited, supplemented (since there is firm evidence showing North American coastal planters gained experience either directly or indirectly from Antillean expatriates) with Caribbean reference materials, Deerr (1949-1950) and France (1983) providing comprehensive reviews.

Archival research has revealed no specific information describing cane culture on Callawassie Island. Therefore the third section of this study almost entirely omits hypothetical discussion of the Island's sugar growing regime, describing the "Works" instead, topics including construction, organization, appearance, and architectural antecedents.

The final section contains tentative accounts describing structures (including slave houses and a possible overseer's dwelling) Lepionka excavated slightly south of Callawassie's Sugar Works. Lack of archaeological data will be acutely felt, the object being to record what little information is now capable of salvage.

Some explanation should be given of technical terms. Sugar making developed its own vocabulary. Southeastern planters borrowed West Indian and Louisianian usage when describing boiling procedures, interchanging words such as "kettle," "copper," and "boiling pan." "Boiling pans" were set into structures variously called "batteries," "trains," "reverbatories," or "copper walls." The following account quotes the planters themselves even though their terminology lacks consistency, the lack of verbal uniformity indicating how experimental a process sugar making was in early nineteenth century South Carolina and Georgia.

Acknowledgements

My interest in the Callawassie Sugar Works arose out of measured surveys sponsored by the Three Fountainview Development Corporation, Inc., Callawassie Island, South Carolina (1983). After the close of the excavations, field plottings were drawn up and research respecting various architectural topics commenced with the hope that Dr. Larry Lepionka would eventually produce his final archaeological report. However, it seems unlikely that these activities would have ever reached conclusion had the Callawassie

Development Corporation not generously agreed to fund this paper through Chicora Foundation, Inc. Besides thanking Callawassie Development Corporation and their agent, Mr. Glen McCaskey, I must acknowledge Dr. Michael Trinkley of Chicora Foundation who was insistent that at least the architectural information from 38BU409 receive publication.

Debts are owed other individuals and organizations. Jane Bruce Brooker made several journeys photographing Jamaican sugar works and sketching relevant displays at the Institute of Jamaica, Spanish Town. Dr. William Guion (Southwestern Research Institute, San Antonio, Texas) visited Structure II during excavation and discussed its technological aspects. Later a National Endowment for the Humanities Post-Doctoral Fellowship (1986-1987) allowed examination of many surviving medieval sugar mills located within the great rift system linking the Red Sea and southern Syria. If far removed geographically, the almost static technology typifying sugar production before the mid-eighteenth century ensured accumulation of useful background data. At my request, Robin Brown (Department of Anthropology, SUNY, Binghamton) exposed a small thirteenth or fourteenth century water powered sugar mill overlooking Wadi l-Bustan, Shobak, Jordan (see Brooker and Knauf 1989), freely giving of her archaeological expertise. Allison McQuitty (British Institute at Amman for Archaeology and History, Amman, Jordan) rendered valuable service near Safi (an important medieval cane production center) smoothing the unfounded suspicions of over zealous Jordanian military authorities and retrieving confiscated field records. With their friendship, Dr. David McCreery (Director, American Center of Oriental Research, Amman, Jordan) and Ambassador Dr. H. Bartles extended practical assistance more diverse than can be enumerated. The staff of the Ecole Biblique Library, Jerusalem and British Library, London also extended their customary courtesy over the course of numerous visits, promptly delivering published books and very patiently assisting my sometimes unprofitable searches into manuscript holdings.

In the United States study has benefitted from the close collaboration of Ramona Grunden (a member of the original Callawassie excavation team) who beyond contributing several paragraphs to this paper undertook voluntary archival research. On Sapelo Island, Georgia, Dr. Lewis Larson (Georgia State Archaeologist) kindly explained easily overlooked features of Spalding's sugar mill and the Chocolate Field (Le Chatelet) building group.

Construction of nineteenth century boiling "trains" is a subject avoided by most modern authors. Fortunately, Dr. Linda Stine (Archaeologist with the South Carolina Department of Archives and History) has tackled the topic in an unpublished thesis (France 1983). I must thank her for making this available through Chicora Foundation and for answering several inquiries. Finally, handsome

gifts from the late Alice Hutchinson Cook (Camden, South Carolina) of rare early nineteenth century topographic books illustrating West Indian sugar estates are remembered with deep gratitude.

Cane Production in South Carolina 1800-1840

Writing during 1828, J.D. Legare noted that tax or duty leveled on "sugars" imported into Charleston, South Carolina (for the years 1823 and 1824) equaled "140 per cent of their first cost" (The Southern Agriculturalist 1828:489). While bitterly complaining of "oppression," Legare realized that these tariffs (imposed following the War of 1812) offered an incentive for local cane production which if successful, would provide an attractive hedge against fluctuating cotton prices (see Crook and O'Grady 1980:9-13). Through The Southern Agriculturalist, Legare and his co-editor, James Gregorie, initiated a lively correspondence, introducing the results of recent North American experiments with cane production or processing. The periodical's promotional intent can be judged from comments prefacing the March 1829 issue where Gregorie declared:

> The Sugar Cane is henceforward to be a staple crop of South Carolina. . . . Is it not clear to everyone that the whole sea coast of South Carolina, for fifty miles back at least, can enter boldly into the cultivation of sugar cane as fast as they can procure seed? (The Southern Agriculturalist 1829:99).

Gregorie listed four main advantages of the crop when "grown in conjunction with some other - as for example cotton":

> The first advantage; and this is a decided one, is giving us a more saleable article - already subject to the influence of the tariff policy in its favor, in aid of our languid and oppressed great staple of the south [i.e., cotton].
>
> The second [advantage] is that this crop is safer than any we could find, within the whole range of those deserving our notice.
>
> The third is that the harvest arrives at a time when the planter's attention can be fully given to his plantation affairs, with safety to himself and family,
>
> The fourth is, that in the field, and until converted into Sugar it cannot be plundered. In this it has the advantage over Rice, Corn, Potatoes, and in fact every other crop.

Gregorie concluded:

> We shall sincerely rejoice at the introduction of sugar, as a crop in South Carolina. . . . On the score of general comfort, a sugar plantation is a place of plenty, compared with one on which cotton alone is raised (The Southern Agriculturalist 1829:99).

If expectations ran high, experience was slight. South Carolina planters at first incompletely understood sugar planting and processing techniques. Early experiments were tentative, Legare observing:

> a few years ago, a few planters attempted its [cane] culture in the neighborhood of Charleston, but we believe that they never gave it that attention which it merited, and they certainly did not attempt the making of sugar even on a small scale. Unfortunately, the high prices of Cotton which at that time rose from a depressed to a most extravagant price, induced them to abandon the Cane, and we believe it has never since been tried (The Southern Agriculturalist 1828:184).

Subsequent correspondence slightly amended this view, an anonymous correspondent noting, "Mr. Maverick informed us the he grew the Sugar Cane in Charleston from 1800-1807 and the he made a small quantity of sugar" (The Southern Agriculturalist 1830: 53). One year earlier, Berners Barnwell Sams of Dataw Island, Beaufort, stated bluntly that he was growing cane for horse food (The Southern Agriculturalist 1829). Writing from Beaufort, South Carolina in September 1828, Edward Barnwell confirmed that despite several small scale plantings (including his own one quarter acre plot), sugar cultivation had scarcely attracted the attention of local planters and described how he visited "several of the Sugar establishments at the southward" with the object of successfully cultivating cane "in this State." Barnwell found the most authoritative information along the Altamaha River and around Darien (McIntosh County), Georgia (The Southern Agriculturalist 1828:485-489).

Pre-eminent among Georgia's sugar cultivators was Thomas Spalding whose pamphlet, "Observations on the Method of Planting and Cultivating the Sugar-Cane in Georgia and South Carolina," was published by the Agricultural Society of South Carolina in 1815. Spalding described the results of almost ten years cane cultivation on Sapelo Island, where methods predicated on the Georgia Sea Island's distinctive environmental conditions had been devised to overwinter seed cane (a crucial step, borrowed from Louisiana according to Spalding), utilize swamp land for cane cultivation, and maximize labor resources at harvesting. Besides his own observation, Spalding presented information about Butlers Island, Georgia on which records of the Darien Agricultural Society show Major Pierce Butler obtained "average yields of 961 lbs. of sugar and 45 gallons of mollasses per acre" (The Southern Agriculturalist

1828:488).

Although impressed, Barnwell, like the majority of South Carolina planters remained cautious regarding the much vaunted new crop, increasing his cane holdings to merely one acre (in 1830), and building "a small mill driven by one horse" near Coosaw River, Beaufort County (The Southern Agriculturalist 1828:487-488; 1830:300-301). The factor weighing most heavily against cane was, as Barnwell readily understood, the amount of capital required (Georgia's more progressive planters convincing him that profits depended upon employment of expensive steam machinery). Also, elevated sugar prices prevailing over the late 1820s were dependent on protected home markets created through tariffs which might well be abolished, a circumstance Legare recognized and warned South Carolina residents against, knowing the hostility of public opinion towards all fiscal impositions (The Southern Agriculturalist 1828:489). Another troublesome problem centered around available work forces, sugar manufacture being highly labor intensive, Spalding reporting that no less than fifty hands were employed per day "in taking in and manufacturing from two to three acres of cane" (The Southern Agriculturalist 1833:142).

Forgetting economic realities, James Gregorie remained optimistic, remarking that:

> between Darien on the Altamaha, Milledgeville on the Oconee and Macon on the Ocmulgee, there are at this time more than one hundred plantations, upon which Sugar Cane is grown, and Sugar manufactured in the more or less quantity. On the Savannah River also, there will be one hundred plantations this year on which Cane will be grown in greater or less degree. All doubts as to the importance and value of the Sugar Cane in Georgia have now passed away, while we in South Carolina are just awakening from our slumbers, and beginning to think upon this important culture (The Southern Agriculturalist 1829:98).

Despite uncertainties, South Carolina's sugar production slowly rose, achieving 30,000 pounds annually in 1840, "made as cheaply, as perhaps we can buy it" (Hammond 1841:1860; see also Governor William Seabrook's account, De Bow's Commercial Review of the South and West, 1849:150, cited in Sitterson 1953:36). The figure reached 77,000 by 1850 with Beaufort County contributing 20,000 pounds, Barnwell County 21,000 pounds, Georgetown County 2,000 pounds, and Horry County 1,000 pounds (De Bow 1854:306).

At no time, however, did South Carolina's cane sugar totals approach those of Georgia (329,000 pounds in 1840 and 846,000 pounds in 1850) or Florida (275,317 pounds in 1840 and 2,750,000 pounds in 1850; see De Bow 1854:173). The truth was (as the 1850 census returns clearly indicate) that cane flourished better south rather than north of the Altamaha. Georgia's counties bordering the St. John's River reported especially high annual yields at that time (i.e., Lowndes, 198,000 pounds and Thomas, 109,000 pounds compared with the more northerly Glynn County's 71,000 pounds, Effingham County's 22,000 pounds, and McIntosh's 3,000 pounds; see De Bow 1854:216-217).

Moreover, high as the 1850 southern Georgia or northern Florida returns may seem, it is worth remembering how insignificant the Southeastern sugar industry was when viewed against Caribbean productivity. Western Santo Domingo, to take an extreme example, near the crest of its prosperity in 1790, made 70,000,000 pounds of muscavado (unrefined sugar from which some of the molasses has been removed) and 13,000,000 pounds of clayed sugar (refined white sugar). Individual estates each manufactured on the average 350,000 pounds of sugar (Stein 1988:67). Cuba, in 1860, produced 515,741 tons of sugar from over 1300 mills (Moreno Fraginals 1976:84).

Visiting Sapelo Island in 1833, the Southern Agriculturalist's editor found Thomas Spalding nostalgic, the planter remarking:

> sugar cane has travelled up the Altamaha river, and its tributary streams from Darien to Milledgeville, and from Darien to Macon, until every log house in this space had its sweets in abundance. However poor the individual may be, however limited his labors, some portion of this labor is set apart for this purpose [sugar making]. . . . You may sometimes see the younger branches of the family at the end of a long lever turning the mill, while the elder are supplying it with cane, carrying away the juices and boiling it into syrup or sugar (The Southern Agriculturalist 1833:143).

Significantly, there was no mention of South Carolina, or the extravagant prospects sugar promised the State only five years previously. Instead, the editor interjected an unqualified warning:

> we beg to be understood . . . that . . . [sugar making] is not grown as a crop, but merely to supply their [i.e., the Georgia growers] own wants, for this purpose it can be cultivated, but would be a loosing business if attempted on a large scale for market (The Southern Agriculturalist 1833:143).

Any doubts concerning the reliability of this opinion had been dispelled the previous year, duties on imported sugars being reduced in 1832 "to about 60% of the American market value" (Crook and O'Grady 1980:13). Later Census returns (such as the 1850 figures previously cited) show South Carolina farmers continued cultivating cane, but facing international competition, the better mechanized Louisianan industry, and falling prices, production remained marginal until the 1860s (see Deerr 1949-1950:247), after which time it became negligible, although still on occasion producing small cash surpluses into the early twentieth century, as at Penn School, Beaufort County (see Dabbs 1970 who illustrates a photograph showing a primitive horse mill and boiling stove about 1907).

Processing

General

Following harvesting of cane, sugar production involved three separate stages -- milling, boiling, and curing -- with Southeastern manufacturing processes before 1830 (when steam mills began appearing), resembling those developed among the West Indian Islands between 1660 and 1800 (see Buisseret 1980:37-38 and Dunn 1982:192-198).

Concerning West Indian practice, George Lewis, owner of Cornwall, located near Savannah del Mar, Jamaica, gave one of the more concise early nineteenth century anecdotal accounts:

> I saw the whole process of sugar-making this morning. The ripe canes are brought in bundles to the mill, where the cleanest of the women are appointed, one to put them into the machine for grinding them, and another to draw them out after the juice has been extracted, when she throws them into an opening in the floor close to her; another band of negroes collect them below, when, under the name of trash, they are carried away to serve as fuel. The juice, which is itself at first of a pale ash-color gushes out in great streams, quite white with foam, and passes through a wooden gutter into the boiling house, where it is received into the siphon or 'cock copper, where the fire is applied to it, and it is slaked with lime, in order to make it granulate. The feculent parts of it rise to the top, while the purer and more fluid through another gutter pass into the second copper . . . from the second copper . . . [the fluid is] transmitted into two others . . . the scum is removed with skimmers pierced with holes, till it becomes sufficiently free from impurities to be skipped off, that is, to be again ladled out of the coppers and spread into the coolers, where it is left to granulate. The sugar is then formed, and it is removed to the curing house, where it is put into hogsheads, and left to settle for a certain time . . . (Lewis 1834:86-87).

Milling

Perhaps the most critical activity, upon which success or failure of the entire operation depended, was milling, since after harvesting cane rapidly deteriorates, losing a proportion of its sugar content within hours (Dunn 1972:191). Edward Barnwell learned that cane required uninterrupted delivery, while the mill itself needed constant power; mechanical breakdown or transportation difficulties causing substantial financial loss. James Gregorie urged the use of tidal or even wind powered mills (common features of the Caribbean landscape; see Dash 1963-1964), but most Southeastern planters relied on animal driven machines.

The simplest example was almost entirely timber built and housed either vertical or, more rarely, horizontal, rollers between which the cane was crushed (such a device was called a trapiche in Latin America; see Figure 29). An illustration of Colonel Hazard's "cheap Sugar mill," erected at St. Simons, Georgia shows three vertically aligned live oak cylinders (each 3 feet long by 1.5 to 2 feet in diameter) mounted on substantial horizontal members supported by two vertical 10 by 12 inch oak "studs . . . framed into oak blocks, and strongly braced on three sides" (The Southern Agriculturalist 1830:364-365) (Figure 30). Here, the central cylinder was driven using a horse harnessed to an "arm" 30 to 40 feet in length, the entire arrangement closely resembling Antillean ox driven mills operating before 1665 and continuing through the eighteenth century (see Dunn 1972:193 and Moreno Fraginals 1976:101).

Although suiting the small operator, this machinery was inefficient and slow, John Couper's open air mill (also on St. Simon's Island, Georgia) producing one hundred gallons of juice per hour using oxen. Jamaican planters obtained better results, cattle or mule-mills "of the old type" expressing 300 to 350 gallons per hour and "Mr. Wollery's" improved mill incorporating "upright iron plated rollers from thirty to forty inches in length" expressing 400 to 500 gallons per hour (see Edwards 1801:262-263 for a plan and elevation of Wollery's equipment). An alternative, the horizontal mill improved productivity still further (Figure 31), Edward Barnwell observing (in Georgia):

> This latter position requiring bevel wheels demands more power, but as its revolution is accelerated, it yields a much greater quantity of juice in a given time. Three to six yoke of oxen are driven at a time, and changed as often as they are fatigued. Perhaps four times in fourteen hours (The Southern Agriculturalist 1828:487).

At Sapelo Island, Georgia, Thomas Spalding got three hundred sixty gallons of juice per hour, using a heavy vertical iron mill, offsetting the increased power required (compared with lighter timber machinery) by an improved two story mill shed design. Horses, mules, or oxen were introduced at the upper stage by an inclined timber ramp, the animals (harnessed to a capstan-like arrangement) turning three vertically mounted iron rollers housed below. Cane was thus fed into the machine and can "trash" (bagasse) removed without interference (Crook and O'Grady 1980:14-15).

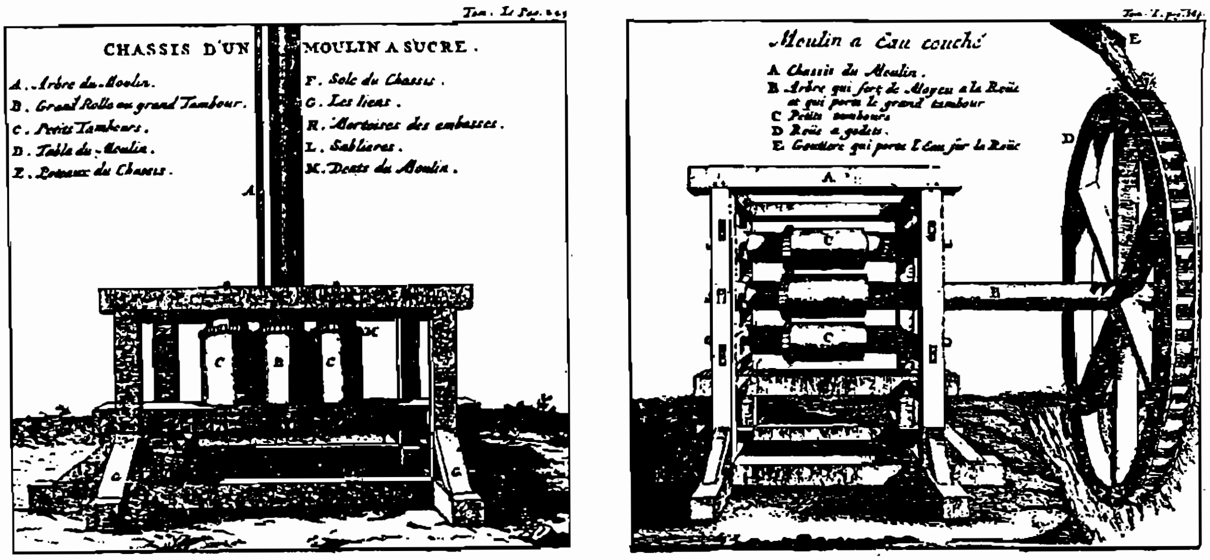


Figure 29. Examples of simple vertical and horizontal sugar mills (Moreno Fraginals 1976:101, 102)

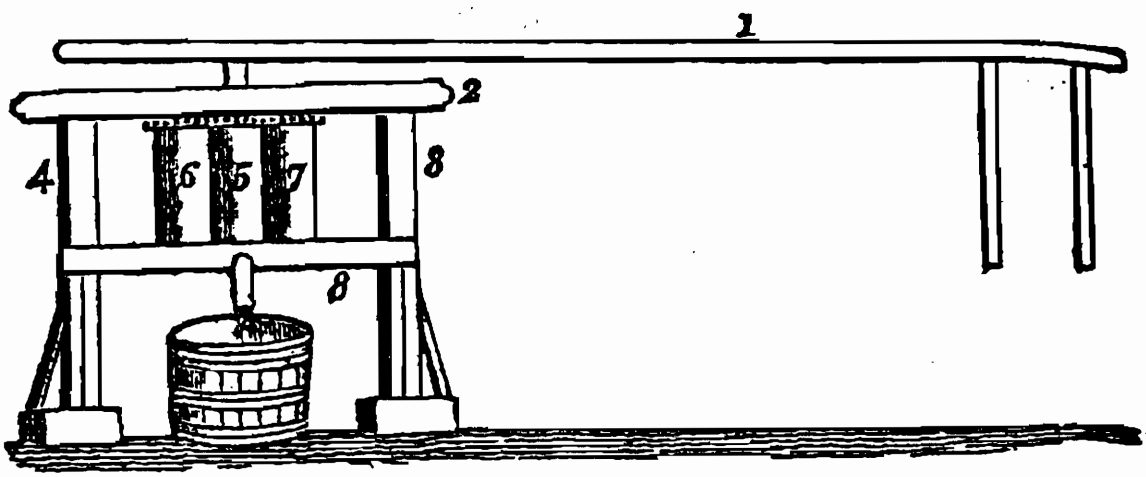


Figure 30. Example of a Georgia vertical sugar mill (The Southern Agriculturalist 1828:364)

The Sapelo Mill was of a West Indian building type (see Buisseret 1980:30-31, Figure 1, Plate 64; Beckford 1790:27), although Spalding states, "drawings I procured from Louisiana served me in [its] erection". The structure was "forty one feet in diameter, of tabby and octagonal in form." Characteristically, Spalding remarks,

> in Louisiana they [mills] are generally of wood, and square and this is the form of Major Butler's. The danger of fire, the superior durability, and the better appearance of buildings should make us prefer either tabby or brick (Spalding, cited in Floyd 1937:236).

However ingenious animal driven mills might be, when "cultivated as a large crop" many thought milling required "the power of steam" (The Southern Agriculturalist 1828:487), an opinion John Hamilton Couper put into practice. Couper installed a steam engine at Hopeton, Georgia (1830) which drove his sugar and rice pounding mills (Floyd 1937:103). Unable or unwilling to meet the expense of similar machinery, Spalding about 1830 designed and apparently operated a tidal mill, heaving discovered that ribbon cane, although promising greater yields, was much harder that the common Otaheite variety. He commented,

> the same mill that used to give me, from the green [Otaheite] cane, three hundred gallons per hour, gives me but hundred and twenty; so extremely hard is the rind of the [ribbon] cane; and leaves probably one half of the juice behind it (see The Southern Agriculturalist 1832:281-285, 1834:142-143).

Ribbon cane, also known as striped or Batavia cane, was initially favored by many Caribbean planters since it flourished on exhausted lands. Planters soon found, however, that it turned tough and low-yielding after the fourth or fifth cutting (Moreno Fraginals 1976:86).

Spalding's experiment was probably an isolated one. In Louisiana steam power made rapid inroads, perhaps three quarters of all growers abandoning animal driven machinery before 1834 (The Southern Agriculturalist 1834:313). South Carolina's marginal production dictated retention of simple production methods, there being no evidence to suggest that steam powered mills ever appeared.

Boiling

After milling came boiling, another critical procedure which demanded experience, "sometimes rather dearly purchased" (The Southern Agriculturalist 1831:180). Spalding observed:

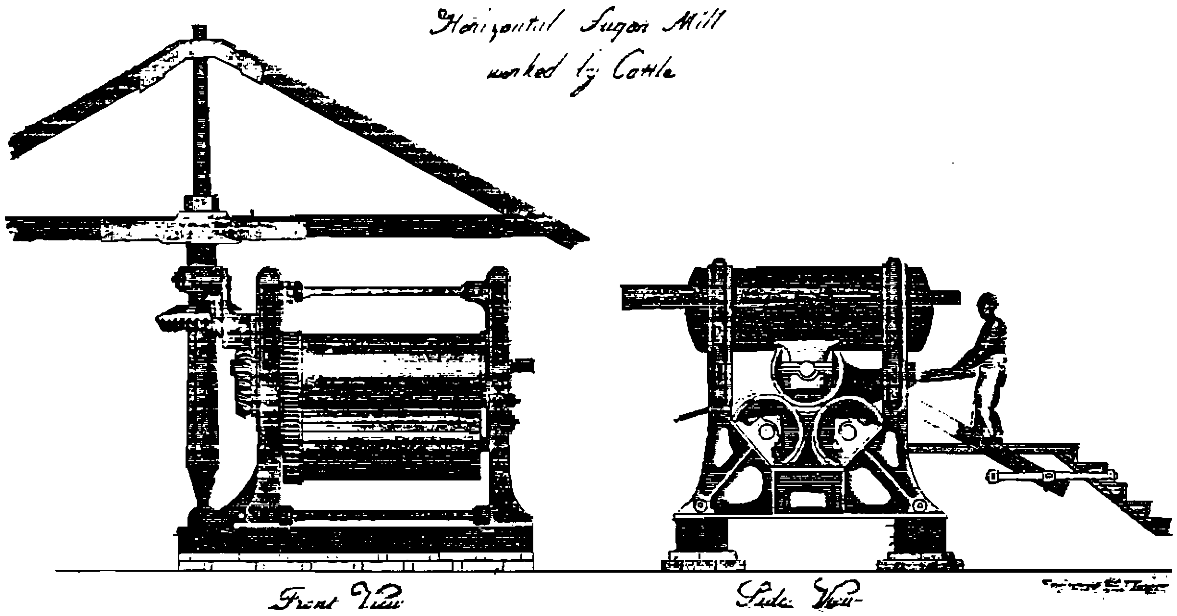


Figure 31. Example of a horizontal sugar mill (Porter 1830:Plate 3).

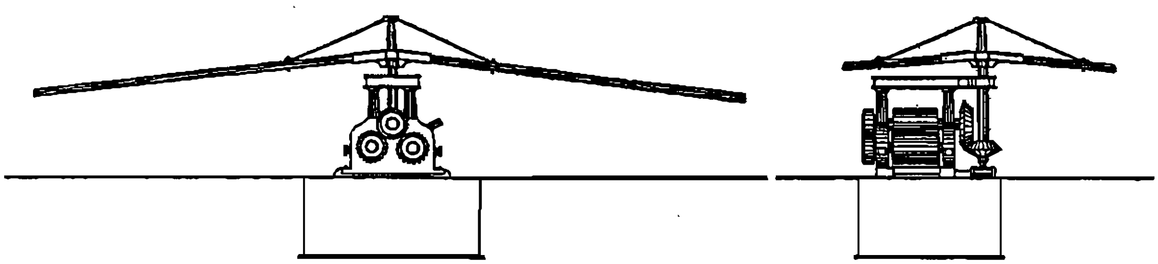


Figure 32. Example of the Fawcett horizontal grinding mill (Moreno Fraginals 1976:104).

> for the operation of boiling or reducing the cane juice into sugar, I feel no precept can be of any use. No rule has yet ever been found to regulate the time of boiling, as it depends upon the quality or ripeness of the cane (Spalding, cited in Floyd 1937:241).

Prerequisites included a boiling house or shed (even of the most primitive form), equipped with four (sometimes three) iron or copper boilers. Planters possessing small acreages perhaps agreed with a "Louisianan of Natchez" who recorded:

> For the encouragement of the timid, I will say as good sugar as I ever saw was made on a piece of good land by one in this State, under a palmetto camp and in three iron pots, - under this shed, an old man, his little boy, and his aged wife, manufactured in one season with these means twelve hundred pounds of most excellent sugar, from about three quarters of an acre of cane (The Southern Agriculturalist 1830:26).

The same author suggested that more substantial, but still economical structures were within reach of all those who could "build a log cabin," log construction he believe being "pretty well understood in Carolina." This was certainly so on the Georgia Sea Islands where John Couper having nine acres under cane at St. Simons erected "a temporary log-house for boiling and curing" which contained three boilers. In 1827 Couper estimated, "such a mill, boilers, house, bricks, and the expense of hanging the boilers, would cost under five or six hundred dollars" (The Southern Agriculturalist 1829:103).

The problem of obtaining permanent boiling house designs was less easily solved. John Couper built his sugar house under the direct supervision of a West Indian planter. His son, John Hamilton Couper, compared detailed drawings from Louisiana, Jamaica, and Demerara, remarking that his Hopeton (Georgia) establishment, built about 1830, was "sanctioned by the practical experience of [those] countries" (The Southern Agriculturalist 1831:248; cited in Deerr 1949-1950:246; see also Johnson 1930:60-63 for plantation management at Hopeton).

That West Indian residents helped introduce directly or indirectly sugar making into coastal Georgia or South Carolina should come as no surprise. Cane's diffusion has a long history inextricably linking islands great and small. Braudel writes:

> Take for example the role played by the islands as stages in the dissemination for crops: sugarcane, which was brought from India to Egypt, passed from Egypt to Cyprus, becoming established there in the tenth century, from Cyprus it soon reached Sicily in the eleventh century; from Sicily it was taken west; Henry the Navigator had

> some brought from Sicily to send to Madeira; which was the first "sugar island" of the Atlantic; from Madeira cane growing quickly moved to the Azores, the Canaries, the Cape Verde Islands and beyond to America (Braudel 1972:I:154; see also Deerr 1949-1950:73-86).

Along the journey's later stages -- through Brazil, Cuba, Barbados, and Jamaica -- sugar-making had undergone accelerated technological innovation (see Deerr 1949-1950:556-538); innovation which various boiling house models circulating about early nineteenth century Georgia and Louisiana reflect.

All designs accommodated three major operations, clarification, boiling, and cooling. Clarification was the first step, raw cane juice being run into cisterns where Georgia planters usually introduced lime. Jacob Wood of Potoir on the Altamaha described the process:

> [from the mill] juice runs into a large tub, and by a coper pump of two inches diameter is raised to a gutter, that carries it forward into the boiling house. I have four clarifiers of wood each containing three hundred gallons; two copper pans holding the like quantity each; in either or the other, the lime is put, generally at the rate of a pint to a hundred gallons: for sugar I lately used marble lime from Mr. Livingston's quarry, in the State of New-York, . . . the <u>quality</u> of the lime is of considerable importance in boiling of sugar. In the British West Indies, they use Bristol lime. From the pans the liquor descends into the boilers, of which there are four of copper, containing one thousand gallons (<u>The Southern Agriculturalist</u> 1830:229).

Here clarification took place inside the boiling house. Wood probably heated the two copper pans mentioned, almost to the boiling point, a method favored by John Hamilton Couper who constructed special furnaces for the purpose at Hopeton, Georgia. Louisiana planters preferred cold clarification, placing their equipment immediately outside the boiling house (see <u>The Southern Agriculturalist</u> 1834:214; France 1983:111-112).

A Jamaica planter, exploiting lands bordering the St. John's River in Florida compromised between the two systems, positioning clarifiers over flues linking his boiling train (discussed below) and chimney, plans showing "the cistern shed" erected against an external building facade (<u>The Southern Agriculturalist</u> 1831:180-183; see also the conjectural Callawassie scheme discussed in a following section).

The clarification process, regardless of the precise steps, was intended to eliminate impurities through decantation. The lime was added to precipitate the colloids and surface scum could be easily removed. Many of the Caribbean planters, however, found the process of clarification so complicated using slave labor that it was abandoned. Their solution was simply the use of additional kettles (Moreno Fraginals 1976:39).

After clarification and filtration, cane juice passed into the first of four kettles ("boilers," "pans," or "coppers") called the "grande." Louisianans added lime at this point:

> the grande is charged by lifting the gate from the vats [containing juice] in the mill room -- a few buckets of its previous charge having been left in the grande to prevent it cracking on the admission of the cold juice. Two or three gallons of its contents are then formed in a milk, as it is called, with from six to twenty four cubic inches of slaked lime; and the milk thoroughly stirred into the contents of the grande. As the heat of the juice increases, minute bubbles of air make their appearance, and a greenish, gray scum forms upon the surface of the liquor. When the temperature reaches 200, the thickness of the scum is very considerable; and it assumes a darker color. Watery vapor now begins to form, and to force itself through the scum, causing it to crack. This stage of the process is called yawing; and its the signal for skimming. This is done with shallow copper skimmers, ten or twelve inches across, attached to long wooden handled (The Southern Agriculturalist 1834:317).

Skimming took about ten minutes. On completion the juice was ladled into the next, somewhat smaller kettle ("flambeau") where boiling and skimming continued. Subsequently juice was transferred into two more kettles of decreasing capacity (the "syrop" and "battery" or "teache"), boiling and skimming being repeated.

Describing the next step ("strike") George Richardson Porter said:

> the syrup remains in the striking teache until, by evaporation, it is so far concentrated as to be capable of granulation in the cooler. When the ebullition in this vessel [teache] is exceedingly violent the syrup is kept from rising too high by beating it and breaking the bubbles with the ladle, or with a wooden spatula. The proper point of concentration having arrived the fire is damped or drawn, and the sugar is laden into the cooler (Porter 1831:93).

Coolers were vats where "syrup" granulated. Spalding owned eight "made of cypress two inch plank, of an oblong form, and ten inches deep, [holding] a tierce [an old measure capacity usually meaning a third of a pipe, or approximately 42 gallons] of sugar each" positioned inside the Sapelo Boiling House opposite its battery (Spalding, cited in Floyd 1937:241). At the St. John's River works, similar coolers measured 7 feet long by 6 feet broad by 8 inches deep (The Southern Agriculturalist 1831:181, 183).

Good crystallization depended upon gradual cooling, the process taking anything between six and fourteen hours (The Southern Agriculturalist 1834:359). It was only now that the planter could judge the quality of his product, which through vagaries of cultivation and, more particularly, climate, might prove inferior. The following passage by Jacob Wood, underscores both how unrealistic Gregorie's notion of cane becoming a South Carolina staple was and the range of boiling expertise the region attracted:

> for many years after I commenced this new culture, I was under an impression, that there was an art in boiling the juice into sugar, and that my frequently not succeeding to the extent of my wishes, was owing entirely to a want of experience, and not the peculiar character of the juice. I therefore began, first with boilers [operatives] from the West Indies, of which I tried four without satisfactory result. I next employed a Beet sugar boiler from Paris, Mons. Vergin . . . he failed not to make sugar, but to make it with that facility required. I then brought from Louisiana one of the best boilers there, Mons. Barron, but he was equally unfortunate. . . . so after spending near $1000 I found on my river swamp, there were seasons, when neither the red [ribbon] nor white [Otaheite] Cane, could be profitably manufactured into sugar. . . . Our climate, though evidently amelioratory, I fear is yet too cold for the Cane plant to arrive at perfect maturity (The Southern Agriculturalist 1830:230-231).

Accepting this risk and contemplating building a permanent boiling house, no problem can have beset the Georgia or South Carolina sugar planter more than furnace construction. Jacob Wood voiced familiar difficulties when he remarked, "for want of information of this nature . . . I was obligated to grope my way in the dark" (The Southern Agriculturalist 1830:229). Recourse might be had to published models, correspondents scattered across the Antilles, Jamaican expatriates, or Louisiana plantation owners, success depending upon not only the skills of a prospective sugar proprietor, but the veracity of his informants.

Simple boiling methods, utilizing fires built under individual kettles, were inefficient, consuming unacceptable quantities of fuel (France 1983:108). On West Indian Island and the South American mainland, such systems (see Deerr 1949-1950:556-557) largely had been replaced before 1800 (except when sugar was grown for home consumption). The vast majority of owners constructed "trains" (also called "Copper Walls" in Jamaica and Barbados, "Batteries" in Louisiana and Georgia, and "Reverbatories" in Georgia and the Spanish Caribbean), incorporating a single furnace from which heat passed beneath several (normally four) boiling pans arranged sequentially. Draught was provided by a tall chimney and often regulated under each pan through small external wall openings, the chimney being located at one end of the train, the furnace proper and "teache" (smallest and final boiling pan) at the other.

The following description typifies early nineteenth century Louisiana practices:

> a set of kettles four in number is arranged in a line against the main building on one side, or on both sides, according to the extent. One set occupies a space of about 30 feet in length by 7 to 8 feet in breadth [cf., the Callawassie train measuring 25 feet by approximately 7 feet]; the tops of the kettles being raised from the floor from 2 1/2 to 3 feet. They are set with utmost precision in a very solid body of masonry, within which are situated the arches (which give support to the kettles,) the furnace, and the flue which communicates heat to them (<u>The Southern Agriculturalist</u> 1834:315).

Spalding (before 1815), John Hamilton Couper (1830), Dr. Robert Grant (Elizafield Sugar Works, Brunswick, Georgia, date uncertain), and John Houston (about 1826) adopted variants upon this pattern, models including unsophisticated flat bedded "trains" (Sapelo) or the more complex Louisiana "boat" type battery built slightly ovoid in section (Hopeton).

Curing

This, the last operational process, was the most straightforward, though accident could still ruin months of labor. From the cooler inside the boiling house, sugar was "spaded up . . . in thin slices by an iron shovel, and carried in small tubs" to a curing shed (<u>The Southern Agriculturalist</u> 1834:361). Here, transferred into hogsheads, "barrels with holes in the bottom" or even (at McBrides' Plantation, Hickory Hill, South Carolina) "osnaburg bags" (<u>The Southern Agriculturalist</u> 1830:352), the sugar drained between twenty and thirty days, releasing on the average forty to forty-five gallons of molasses per hogshead (<u>The Southern Agriculturalist</u> 1834:361).

Draining complete, most Southeastern planters marketed the resultant sugar crystals without further treatment, occasionally distilling their molasses into rum (i.e., at the Thickets near Darien, Georgia). The production of clayed sugar, which involved "washing the crystals white by the percolation of the water, from wet clays or wet sand," a process Spalding understood, rarely occurred. Spalding also mentions "Mr. Howard's method" of refining sugar in vacuo (see Deerr 1949-1950:557), a method producing "perfectly white crystals." However, equipment costs proved greater than anticipated returns and on Sapelo Island vacuum treatment was not pursued (The Southern Agriculturalist 1829:101).

Curing sheds were either free standing structures (such as at Sapelo and Callawassie), or linear extensions to the boiling house (arranged lengthwise or in a "T" shaped configuration). Inside one undifferentiated space was usual (though not invariable) "duly lighted by windows, and well provided with double doors, [positioned] opposite each other, in order to favor ventilation." Louisiana examples had floors consisting "simply of scantling, running crosswise, eighteen inches apart" upon which the hogsheads were arranged. Molasses drained into cisterns positioned below, fabricated using brick lined with Roman cement or "two and half inch cypress plank rendered tight by caulking and pitching" (The Southern Agriculturalist 1834:360; cf. The Southern Agriculturalist 1831:182). Spalding specified the "bottom" of the house should be built as two inclined planes, so that molasses might drain into a central gutter and there discharge into a 2,000 gallon capacity cistern, "made of cypress plank, rammed at the bottom with clay" (France 1983:128). While the system had merit, there is slight evidence suggesting local planters adopted similar arrangements (cf. France 1983:130), both the Callawassie and Elizafield curing houses indicating employment of flat, rather than inclined, sub-floor levels.

Cane harvesting along the Georgia and South Carolina coasts took place during November (The Southern Agriculturalist 1830:227) and curing could easily extend into December. Provision must have been made for heating free-standing curing houses. Stoves sometimes served the purpose in Louisiana, curing houses there being kept at a constant temperature of 80 to 98°F (The Southern Agriculturalist 1834:360).

Form and Construction

Before describing the Callawassie Works, an outline should be given of regional attributes distinguishing local sugar making buildings. Considering layout, organization, and innovation, it appears that despite the financial risks Southeastern growers took over what, for them were frequently untried technologies, their efforts attracted thinly veiled criticism.

Surveying Georgia, east Florida, and Louisiana sugar making, an informed observer found:

> the buildings of the sugar works are either of wood or tabby. In general form, they differ somewhat from the plan adopted in Louisiana. It is more common to find the cane mill in a seperate building. Steam mills are less

common, and the cane carrier is unknown. The kettles are like those above described, although the masonry above their brims is of very inferior workmanship . . . the chimneys are built without the open space for the circulation of air, described in those of Louisiana. Wooden chimneys for carrying off the vapor from the kettles are not in use; and the facilities for transferring the syrup from one kettle to another, are inferior in a majority of the houses. . . . But little uniformity prevails in the method of clarification (The Southern Agriculturalist 1834:411-412).

A certain lack of innovation among smaller Georgian sugar installations probably reflects Spalding's pervasive influence. Spalding's pioneering efforts commanded respect, his Sapelo Island Works (erected about 1805) attracting attention and imitation. Comprising three separate structures, besides the distinctive octagonal mill design (imitated at the Thickets, about 1816, and at Elizafield), the group included a separate boiling house (measuring approximately 38 feet by 28 feet overall) and curing shed (measuring about 48 feet by 22 feet) arranged in a "T" fashion (Figure 33). By 1828 it was obvious the scheme had limitations but, wearied, Spalding redescribed (albeit vaguely) the works recommending only slight modifications over his earlier plan. He proposed "a boiling and curing house connected together of about 80 to one hundred feet in length, and from twenty to thirty feet wide" (The Southern Agriculturalist 1829:60), thus echoing William Beckford, perhaps the richest of Jamaica's eighteenth century sugar magnates, who wrote, "the boiling-house and the curing house are connected together; and those built in the form of a T, are I think the most commodious" (Beckford 1779:28).

Recognizing that Spalding's ideas had become outmoded, the "Louisianan of Natchez" offered an alternative plan illustrating a "T" shaped structure which combined steam milling, boiling, and curing operations under one roof. He also mentioned the improved "boat" battery (i.e., "train') design and suggested using two parallel boiling "sets" (The Southern Agriculturalist 1830:134-135; Figure 34).

This provoked correspondence, "A Jamaica Planter" explaining,

I can assure you, from experience, that, in a calm day, it is very distressing to stand before a single battery, enveloped in a cloud of hot steam. How much that disagreeable feeling would be increased by being placed between two batteries, so close to each other, I cannot say; perhaps some of your navel or military acquaintance may be able to give you some idea (The Southern Agriculturalist 1831:180-185).

John Hamilton Couper held contrary ideas, introducing double

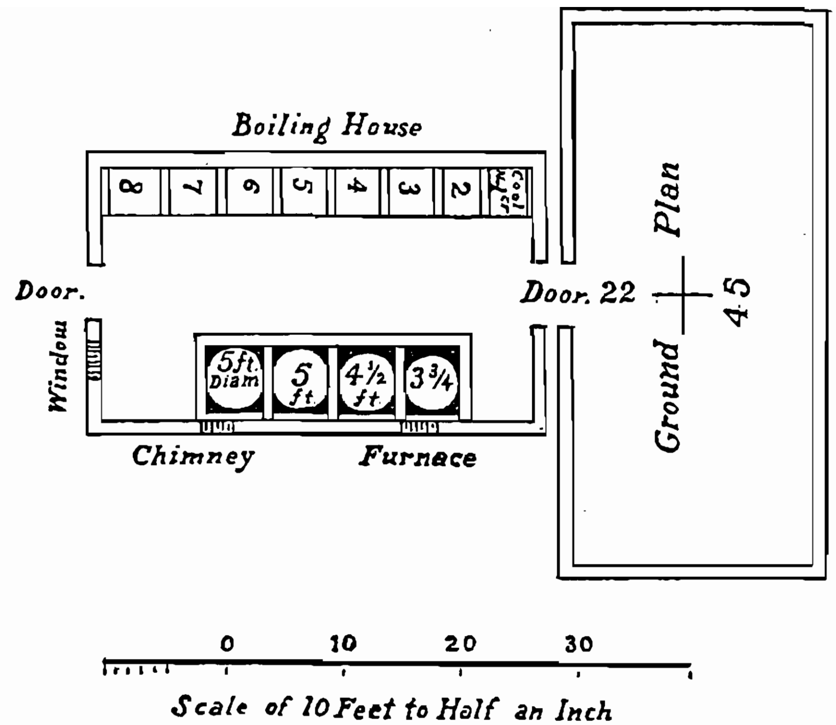


Figure 33. Spalding's sugar works (Floyd 1937).

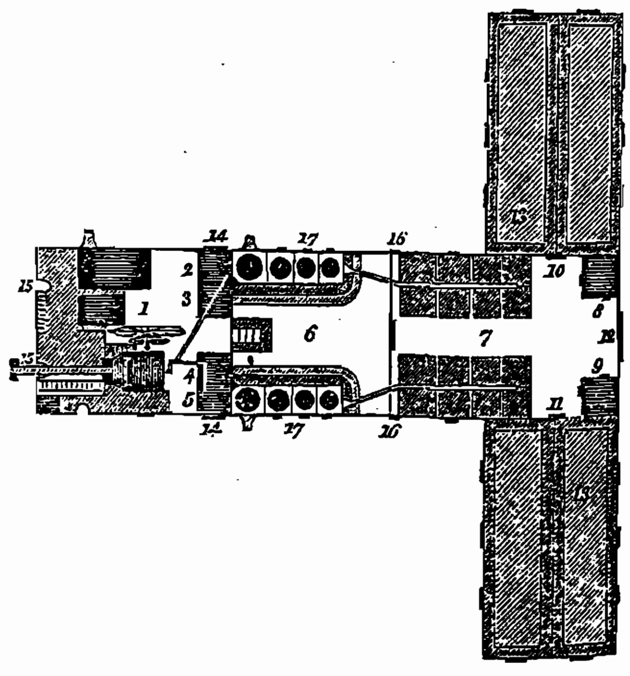


Figure 34. Louisiana sugar works (<u>The Southern Agriculturalist</u> 1830:134)

batteries at Hopeton, accommodated inside one vast tabby building (measuring 240 feet long by 38 feet wide, see The Southern Agriculturalist 1833:520) housing steam milling, boiling, and curing operations. Couper also performed local growers an exceptional service, sending The Southern Agriculturalist fine lithographic plans, describing and illustrating his processing procedures. While serving a much larger enterprise than usual (376 acres of cane in 1831), train designs must have filled long wanted needs since Spalding's writings left readers unsure about important details including furnace size, setting of boiling plans, and chimney dimensions.

There were other, less well publicized schemes. John Houston McIntosh erected (about 1826) a large, single structure near St. Mary's Georgia, allowing expansion should cane cultivation prove profitable. The remarkable feature here was an external wall system incorporating removable tabby blocks which permitted addition of a second boiling train (see Eubanks 1985:108). At Chocolate Field (Le Chatelet), Sapelo Island, what is probably a sugar processing complex includes two parallel tabby buildings separated by long, narrow passageways (Buildings 40 and 41, see O'Grady 1980:5, Figures 1, 3-7) suggesting that boiling and curing house form was more diverse among larger growers than early nineteenth century commentators knew or was indicated in the literature.

For planters possessing small acreages under cane, these models posed dilemmas. The size of the Hopeton and McIntosh works showed that manufacturing had entered a new phase. Only more mechanization, better productivity, and improved product would ensure future profits in highly competitive markets increasingly dominated by Florida and Louisiana. But this required capital, and lacking means, a Southern Agriculturalist subscriber pronounced himself "at a loss as to the proper mill to be used" (The Southern Agriculturalist 1832:82). Spalding, who stubbornly resisted steam power, sent the journal commentary advocating tidal mills (discussed above), impractical advice which the confused subscriber probably ignored. However, Callawassie, with separate boiling and curing houses arranged in a "T" fashion, shows the Sapelo plan, if out of date, still exerted an influence shortly before 1832 when lowering of import duties on foreign sugar caused many Southeastern growers to entirely abandon cane cultivation (Crook and O'Grady 1980:13).

Spalding's promotion of tabby undoubtedly benefitted sugar planters located near Darien, Georgia and possibly along Florida's northeastern coast. Unfortunately, it is not known how many timber built structures have disappeared; therefore, tabby's relative frequency as a sugar house building material cannot be assessed. Nevertheless, Hopeton, McIntosh, and Thickets all demonstrate form-cast materials had the capability of large scale industrial usage (Eubanks 1985; Linley 1982:67, 294).

South Carolina contradicts Spalding's claim (see Spalding 1830) that he revived an almost forgotten building technique, Beaufort County preserving near continuous sequences of tabby building dated between 1734 (Fort Frederick) and 1860 (Haig Point slave housing). The Sapelo Island Works are, however, the first documented instance of tabby sugar mill building, a circumstance which possibly helped finalize material choice on Callawassie Island.

Spalding's statements were unequivocal, boiling and curing houses:

> should certainly be of brick or tabby, . . . to protect . . . against fire [and] . . . facilitate the running of your Molasses from the Sugar (The Southern Agriculturalist 1829:60).

On isolated islands or along sparsely populated coastlines, tabby had the advantage of economy, prehistoric middens providing an ample source of salt-free, weathered shell. Fired brick constituted a more expensive option, entailing high transportation costs and importation of skilled masons. Likewise, stone, much favored throughout the West Indies, was prohibitively costly (except near New Smyrna, Florida where coquina construction is described in the Floyd Papers, Georgia Historical Society, Savannah), neither coastal South Carolina nor Georgia possessing any accessible stone deposits. Several Georgia planters followed Spalding's lead, adopting his casting methods (distinguished by use of 12 inch high form boards and round metal or wooden framework ties, see Coulter 1937:74; Crook and O'Grady 1980:16-17; Kelso 1979:62-64), and limiting fired brick to construction where the direct effect of searing heat could be anticipated (notably in the boiling trains).

Callawassie's Boiling House exhibits traditional tabby construction, retaining a formwork height (2 feet to 2 feet 4 inches) standardized before the mid-eighteenth century (see Kelso 1979:87). Reducing the number of horizontal pour lines necessary for any given vertical dimension, traditional casting introduced fewer possible separation planes than Spalding's method, and was the usual Beaufort practice until about 1840, after which time 1 foot high casting levels appeared intermittently.

Description

Location, Identification, and Layout

Poorly defined, site 38BU409 is located nearly Callawassie Island's northwestern extremity (Figure 7), overlooking a narrow tidal channel linking Chechessee Creek and the Colleton River. Today, the most conspicuous architectural features are three structures designated Structures I - III, forming a closely proximate group situated at an angle to the site's northwesterly shore line. The largest building, Structure II, possess tabby and brick external walls. Slightly north of this stands a massive tabby base of unique form (Structure I); slightly east, excavation has exposed tabby strip foundations defining Structure III, a rectangular building aligned with its long axis oriented almost at right angles to the prime axis of Structure II (Figure 35).

Michie (1982:46-49) thought the group domestic, calling Structure II a dwelling on the dubious evidence of wall height and fenestration pattern. Structure III, he suggested, represented an earlier and abortive attempt "to establish a residence." For Structure I Michie offered no definite views, noting only that it must have "once supported a great deal of weight" and publishing a photograph (Michie 1982:46, 47, Figure 19b) over the caption "unidentified structure."

Subsequent research has shown that Michie's piecemeal approach toward identification of individual buildings was mistaken, Structures I - III revealing their functional attributes most clearly when analyzed in association. Thus, the "T" shaped plan ordering relationships between Structures II and III is highly distinctive, finding close parallels on Sapelo Island where Thomas Spalding's boiling and curing houses originally shared an almost identical layout. Construction confirms that Structure II accommodated industrial, rather than domestic activities, small arched openings piercing lower elevations and a furnace (discussed below), being diagnostic elements of many early nineteenth century boiling houses.

Structure III presents few distinguishing characteristics; however, its position relative to Structure II (which can be nothing other than a boiling house), confirms identification as a curing shed rather than the improbable abandoned domestic building phase Michie postulated, curing sheds (either free standing or otherwise) being indispensable components of all sugar works. Similarly, Structure I must represent a mill base, its mass alone indicating industrial use (i.e., cane crushing given the feature's proximity to Structure II), rather than any usual domestic function.

The significance of this complex's location is unknown, although it is conceivable that cane was brought to the creek side mill by "flats" or "bateau," Spalding and other growers repeatedly mentioning the advantages of water transport (<u>The Southern Agriculturalist</u> 1830:227, where Spalding talks of flats "travelling with a load of three to five hundred canes"). Under this scenario cane would have been off-loaded at a pier positioned along the site's eastern boundary, and perhaps stored temporarily within some form of roofed structure built less substantially than the tabby warehouse adjoining Spalding's Sapelo works. Alternatively, assuming the conjectured overseer's house (Structure V) described below slightly predates Structures I - III, one can speculate that

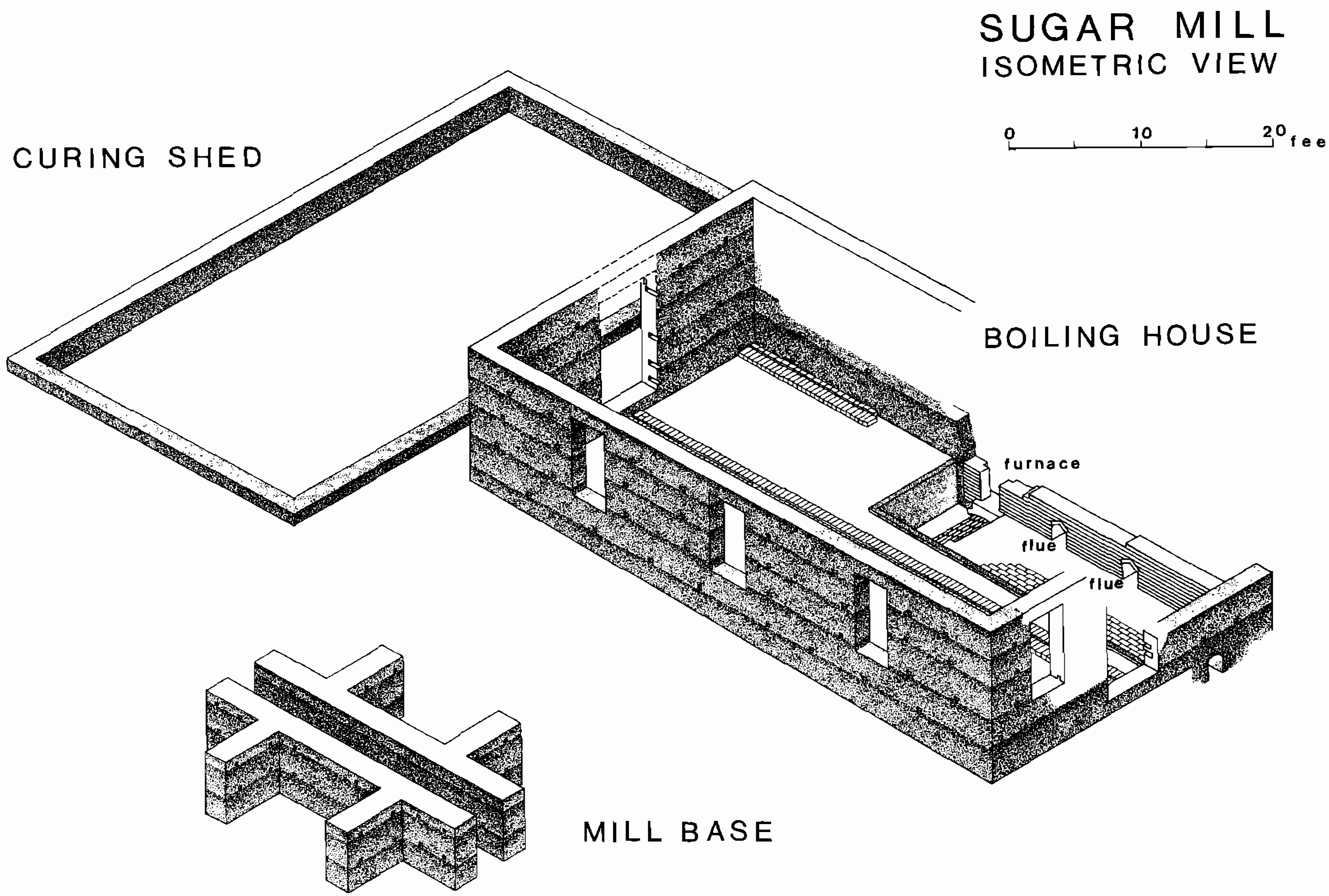


Figure 35. Isometric view of the Callawassie Sugar Works, 38BU409.

industrial development gravitated toward an existing settlement where unobstructed river breezes offered good boiling and curing conditions.

Structure I - Mill Bass

As preserved, this structure consists of two 1 foot 10 inch wide parallel tabby walls, 21 feet 7 inches long distanced 2 feet 6-1/2 inches apart, each wall buttressed at right angles on its outer face by two tabby spurs 1 foot 10 inches wide by 4 feet 9 inches long. The whole feature has a maximum visible height of 4 feet 5-1/2 inches (Figure 35). Horizontal pour lines show individual walls were cast in three separate vertical stages using timber formwork or "molds" defining the overall shape, including external buttresses. Lowest construction levels are partially concealed and therefore their full height cannot be determined;intermediate pours measure 2 feet 2-1/2 inches in height, while the uppermost pour is a much thinner tabby strip (now eroded) about 6 inches thick. Small holes extending through the tabby indicate that inner and outer formwork faces were distanced using rectangular timber members ("pins") measuring 3-1/4 inches by 2 inches in section, these holding the formwork together during casting operations and being removed as the "molds" were struck. Despite heavy surface erosion, the tabby appears densely compacted and exactly dimensioned, showing that an experienced labor force executed the work.

No exact parallel for Structure I is known. Closest analogies are visible at Elizafield Plantation, north of Brunswick, Georgia and the Thickets, near Darien, Georgia, where in both instances massive "H" shaped tabby foundations occur located centrally within a ruined octagonal building. Ford (1937:202) has conclusively identified the two Georgia buildings as animal driven sugar mills, the "H" shaped foundations forming milling machinery bases. The Callawassie feature must also have supported concentrated loads, confirming that it too is a base upon which heavy (probably iron), animal driven, cane crushing equipment was erected. If, as at the Hamilton Mill on St. Simons Island, Georgia, operations were enclosed by a circular timber shed is uncertain, there being no trace of masonry (i.e., brick or tabby) mill house walls. Lepionka's excavation was insufficient to establish further structural information.

Although it is likely that the mill was animal powered, there are only 16 feet of clearance between the mill base and the boiling house, severely restricting the length of sweep arm and thus reducing the efficiency of the grinding.

Structure II - Boiling House

Plan and Organization

Now substantially ruined, surviving wall fragments and excavated foundations show the boiling house comprised a single story, rectangular structure measuring 45 feet by 25 feet overall with the long axis aligned approximately east-west. With the partial exception of the south elevation (fabricated for slightly more than half of its length using brick) external wall construction employs tabby, cast in six successive lifts to a width of 1 foot 2 inches. Pour lines and impressions show forms were 2 feet 2 inches to 2 feet 3 inches high (probably made up using horizontal timber boards), tied at their base using 3 inch by 2-1/2 inch removable wooded pins.

Inside, the boiling house now appears organized on two distinct planes. Entered by way of doors centered about the end elevations (i.e., east and west), the upper level preserves few features beyond a strip of brickwork (1 foot 6-1/2 inches wide) bedded on soil linking the two entrances and two narrow brickwork strips (1 foot 3 inches wide) again resting directly on soil, extending along interior faces of the north and south facades (Figure 36).

The lower level comprises an almost rectangular, sunken space (measuring 25 feet east-west by between 7 feet 7 inches and 7 feet 10 inches north-south) occupying the building's southeastern angle and is defined by badly eroded tabby interior walls (perhaps 1 foot 6 inches wide) extending 2 feet 5 inches above brick paving laid over a clay fill. This area once communicated with the exterior through four small wall openings. Three examples piercing brick portions of the south facade are almost identical. Distanced 6 feet 4 inches to 6 feet 7 inches apart on center and measuring 1 foot 4 inches in width with a maximum height of 1 foot 6 inches, each is surmounted by a somewhat roughly executed brick arch, the voussoirs consisting of regular brick laid in thick mortar giving an almost pointed section. Originally open, all are now closed, new brick having been carefully inserted during a secondary construction phase. The fourth opening (1 foot 2-1/2 inches wide by 1 foot 5-1/2 inches high) is cut at its head into the base of the tabby north facade, which at this point seems less deeply founded than both the south external wall and sunken paved area. Consequently, although defined on the inner face by brick and spanned with a brick arch, the feature is built into subsoil for part of its height.

In the southeast corner of the lower level excavation exposed a brick lined pit, containing black ash. Extending below surrounding paving, the pit communicates with the exterior by an elliptical arched opening, measuring 2 feet 6 inches by 3 feet (maximum) high. Immediately above traces remain of yet another brick built exterior arched opening, measuring 1 foot 6 inches in

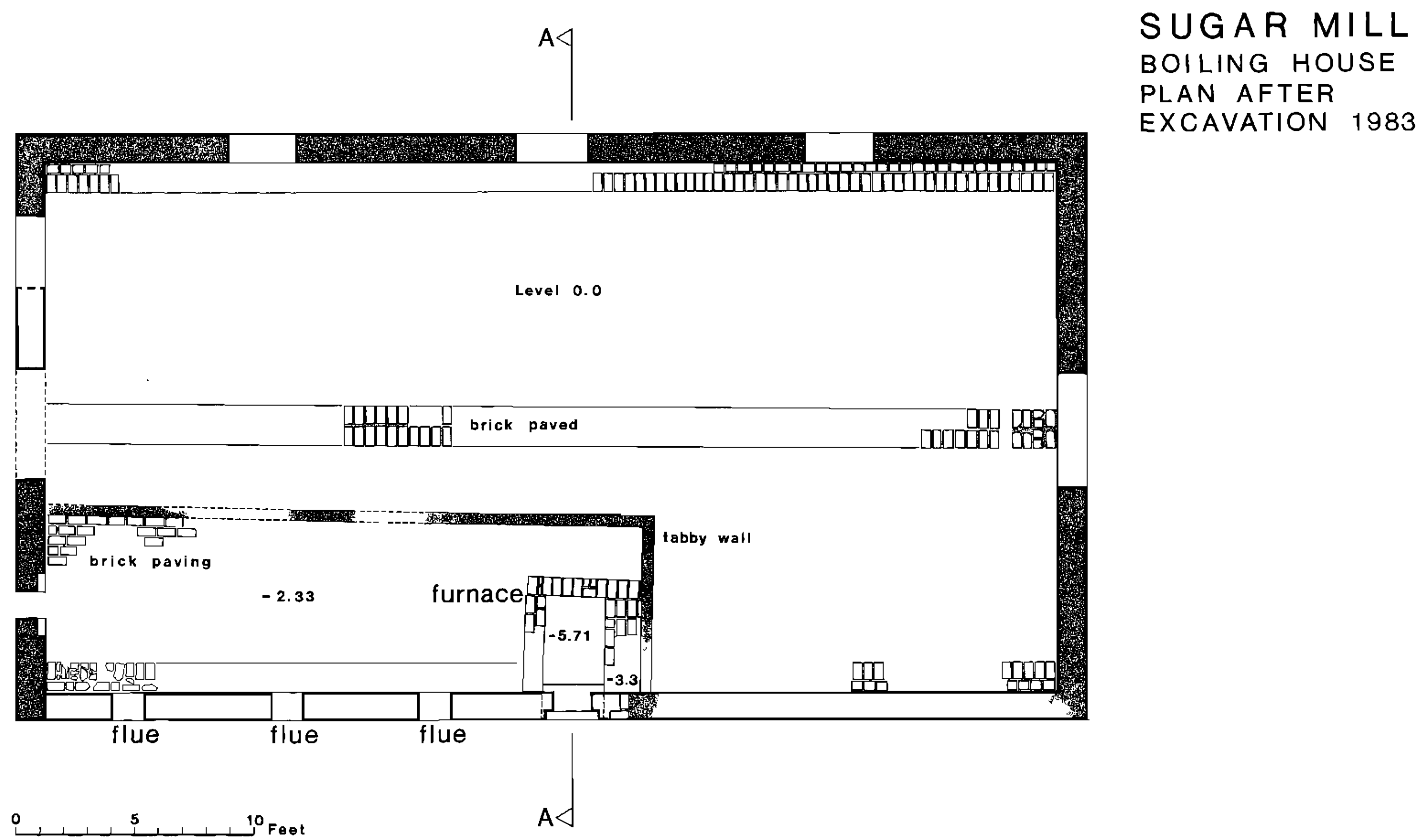


Figure 36. Plan view of the boiling house.

width by 1 foot 9 inches at the springing.

Exterior

The north facade retains evidence indicating three identical window openings; two incompletely preserved in situ, the third preserved among wall falls (see Figure 37). Originally these measured 2 feet 9 inches to 3 feet wide by 6 feet 2 inches high and appear to have been spanned by a double or perhaps single timber lintel (now lost) measuring 2-1/2 inches in depth. Sockets show pre-fabricated timber window frames were cast into place as the work proceeded. While it seems probable window frames were set back 1 to 2 inches from surrounding wall surfaces, no details other than seatings survive.

The west facade is punctured by a central doorway measuring 8 feet 7 inches high by 4 feet 9-1/2 inches wide positioned about the building's main (i.e., east-west) axis. Judging from tabby impressions, the lintel (now lost) was of timber. Opposite, the east facade (now badly ruined) appears furnished with a very similar entrance flanked on its northern side by an opening which, insofar as can be determined, matched windows of the north elevation.

Little is known about the south facade's original appearance. Arched openings at the lower level have already been described. Above, almost all wall elements are lost.

Discussion

After falling into disuse, Structure II was stripped of its equipment, vats (probably timber), gutters, metal grilles, and kettles being removed for scrap or alternative employment elsewhere. The train (described below) was also robbed, its surrounding walls (both tabby and brick) suffering a reduction in height. Plundering accelerated building decay, timber rafters probably soon disappearing. The roof having gone, unrestrained tabby walls disassociated, north and east facades ultimately collapsing outward. Yet although kettles are missing, remaining brick construction incorporated into the south facade indicates the location of the structure's boiling area; brick utilized at this point shielding tabby from heat induced damage cause by adjacent boiling operations. Small arched external openings further confirm that boiling was associated with the lower structural level, analogous features allowing regulation of heat within a "train" by means of wooden (or cast iron) dampers, constituting common exterior features of West Indian boiling houses (see France 1983:228; Buisseret 1980:37).

Ashes remaining in situ show the brick lined pit functioned as an ash collection chamber, indicating that the ruined archway located immediately above and serviced from outside the building,

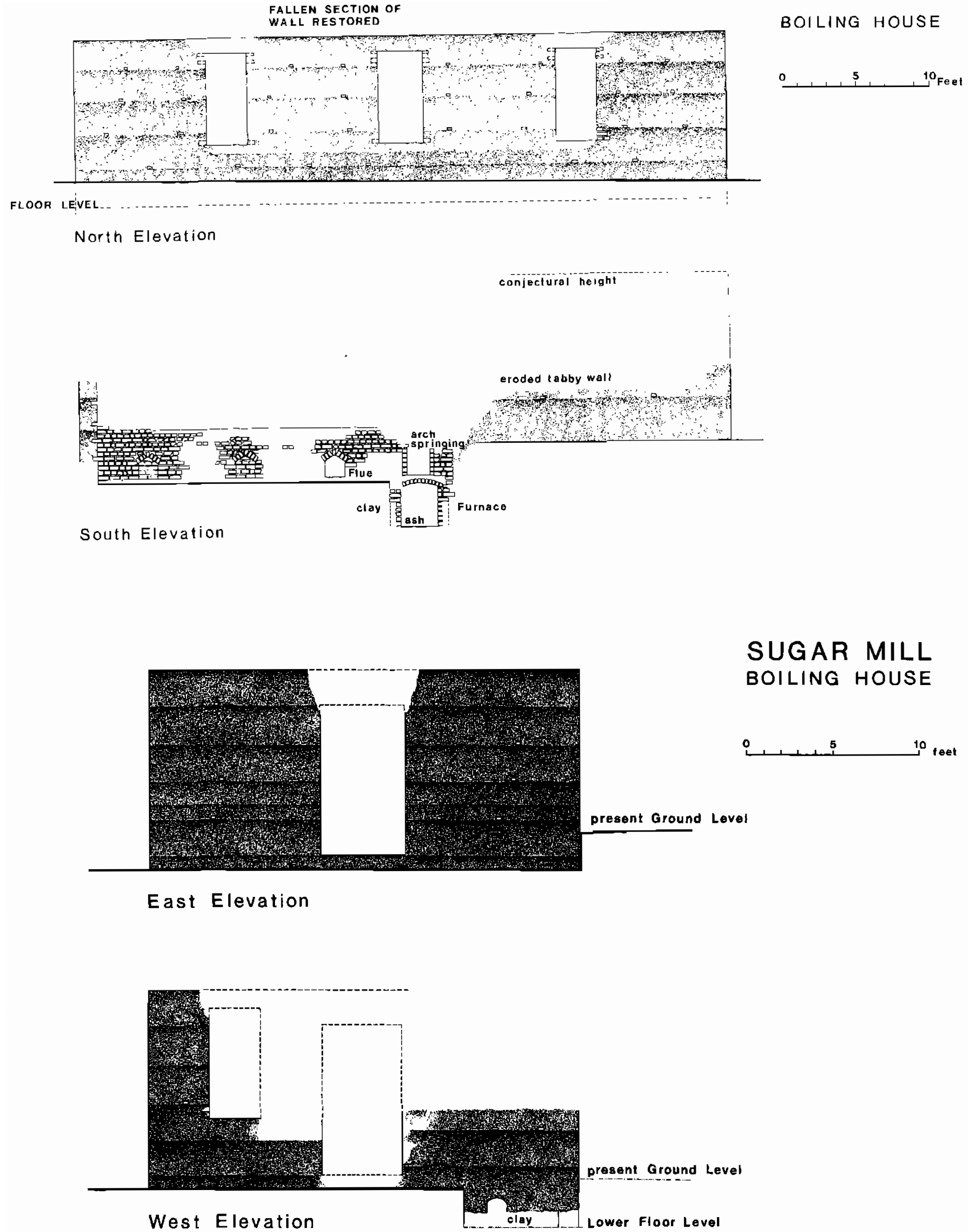


Figure 37. Elevations of the boiling house at 38BU409.

once gave access to a furnace (see Sitterson 1953:141).

The Callawassie boiling house was then of the train ("fire train," "battery") type possessing a single furnace surmounting the brick lined pit described, heat being drawn beneath boiling kettles positioned in a linear style immediately towards the west. The enclosed and undivided sunken area acted as a common closed flue ("fire ditch") over which the boiling pans were set.

Respecting furnace design, John Hamilton Couper (The Southern Agriculturalist 1831:282, 289) furnishes a useful analogy. His Hopeton drawings (Figure 38) showing how the furnace there incorporated an ash pit (S), fireplace (Y), grate, and (located directly above) the reverbatory into which was set the first of four kettles called the "teach" (i.e., teache) (F). Couper observed:

> the ash pit should be sunk 4 feet below the top of the grate, and be of the same size. This depth is necessary that the vicinity of the coals at the bottom may not tend to warp the bars by placing them between two fires. Its door should be about 2 1/2 feet square and have an area greater than that of the air passage between the grate bars. When the dryness of the ground admits of it, it will be advantageous to sink the bottom of the ash pit at least two feet below the foundation of the other parts of the work. . . . A door placed at the mouth of the ash-pit regulates the admission of air.
>
> The dimensions of the fire place must be in proportion to the size and number of the kettles. For the system here represented, an area of 5 feet by 4 feet, with a grate occupying a space of 4 feet square, will be sufficient. The feed-mouth, of cast iron, bevels from the furnace to the outside of the wall, its interior diameter is 14 inches, and the exterior 23 inches. Although not common, it should be furnished with an iron door to regulate the admission of air.
>
> To prevent the ashes on the grate from being swept forward by the draught, and to reflect the flame upward towards the bottom of the teach, the bench v [see Figure 38] . . . is carried up 12 inches high in the center, and curves up on the sides as far as the bottom of the teach. The walls of the furnace are carried up perpendicularly to a height of 24 inches, when they are gradually brought in on the side . . . to meet the teach at a line 4 1/2 inches below the junctions of the lips of the kettle (The Southern Agriculturalist 1831:283).

Structure II's ash pit measures 2 feet 6 inches (east-west) by 4 feet (north-south), its base being located at least 3 feet 6

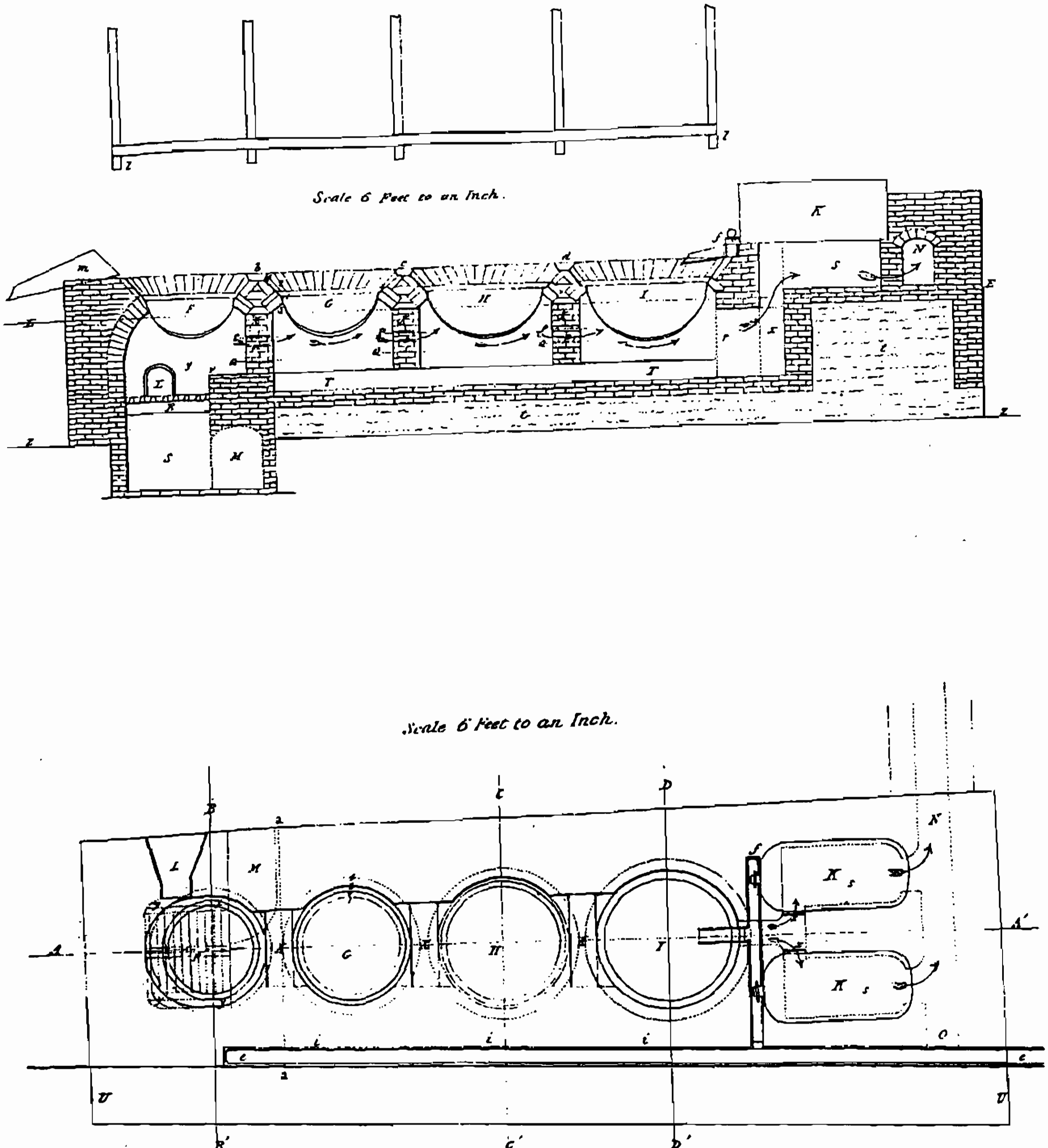


Figure 38. Couper's Hopeton fire train.

inches below the level of the missing fire grate, the position of which can be determined from the furnace's external opening. Brick walls defining the ash pit extend almost 4 feet below surrounding construction (see Figure 37) and are wider on the east side (Figure 36) suggesting that provision was made for a "bench" deflecting heat under the first boiling pan (teache). If so, the furnace perhaps measured 3 feet 6 inches by 4 feet in plan, indicating that, as one would expect, the kettles had lesser capacity than those at Hopeton, where operations were conducted on an almost unprecedented scale. Whether external ash pit and furnace openings were closed by cast iron doors is uncertain, doors and their associated hardware having disappeared. Kettle seatings and support structures are also missing, but assuming flues positioned along the south elevation regulated heat below individual pans, the train accommodated four examples gradually increasing in capacity from east to west.

Describing seating of kettles, Couper writes:

> The arches X, X, X thrown across the bed of the furnace between the kettles, serve in part to support them; and by contracting it, they reverberate the flame in its passage onwards. They are all a brick and a half thick and have a rise of 12 inches, with an arch 9 inches deep. The span of the first, between the <u>teach</u> and the <u>flambeau</u> . . . is 3 feet 4 inches; of the second 3 feet 9 inches; and of the third 4 feet 2 inches. . . . As the arches form the weakest points of masonry, and are most exposed to fire, too much attention cannot be paid to their construction; particularly to that of the first between the <u>teach</u> and <u>flambeau</u>. To prevent the expansion of the brickwork, bracing bars of iron . . . should be placed at the first arch. They are made of iron an inch square, passing at the ends, by screws secured by nuts, through the heads of two other bars an inch and half wide and 3/4 of an inch thick placed on the outside of the masonry, and extending below its foundation (<u>The Southern Agriculturalist</u> 1831:285).

Spalding's battery conducted heat "through the medium of arches" from one boiler to the next. Similar arrangements may have been the case on Callawassie Island, but the configuration is lost, having disappeared along with upper sections of the south elevation. Interpretative problems are also presented by missing evidence for two elements invariably associated with boiling trains -- a chimney and a cane juice receiver. Sitterson states that (usually):

> the flue from the furnace passed under the kettles and at the end of the set turned at right angles and went outside, where it rose in an independent chimney to a height at least equal to the horizontal circuit of the

flue (Sitterson 1953:141).

The pattern was employed by Spalding. At Callawassie variant sequences must be imagined as no structural trace exists suggesting chimney construction against the south facade where it might be expected had Spaldling's plan been blindly followed. Also every possible flue outlet is blocked here, indicating the small unblocked arched opening located on the west facade opened into a chimney, now completely robbed above ground level. There are precedents for the conjectured arrangement, Couper explaining:

> beyond the grand kettle I, and the furthest end of the reverbatory, commences the fleu [sic] r, one foot wide and three feet wide; from it two branches pass to the flues s, s, under the receivers K, K . . . .
>
> The flue N which is 2 feet high by 18 inches wide leads to the chimney. . . . To obviate the risk of fire the chimney is placed 4 feet from the building (The Southern Agriculturalist 1831:286).

The Jamaica Planter previously cited presents similar plans, interposing a cistern shed between chimney and grande boiler, the shed being built against the boiling house outer wall.

Analogy makes it probable then that Structure II once possessed a battery flue passing first through the west facade's small arched opening, secondly outside the building beneath cane juice receivers sheltered under some form of shed roof and finally into a detached chimney stack. No excavation took place west of Structure II and therefore robbed chimney foundations and traces of cane juice receivers may (if the present conjecture is correct) still await discovery.

Within the boiling house direct evidence for coolers has not survived. Comparison with the Sapelo Island and St. John's River works, indicates that these integral components of boiling operations were probably housed against the building's internal north face where large windows ensured good ventilation. Michie reports finding "several pieces of old, light green window glass adjacent to an opening in the east wall of the structure" (Michie 1982:46), suggesting windows were glazed rather than louvered as at the St. John's River Works.

Spalding's boiling house roof incorporated "a latticed cupola to allow the steam to pass freely off," running the entire building length, a West Indian device. Aquatints of Jamaica by Hakewill (1825) illustrate louvered clerestory systems at Williamsfield Estate, St. Thomas in the Vale, Trinity Estate, St. Mary's, and Montpelliar. Whether similar ventilation methods were incorporated into Structure II's roofing system cannot be said, nevertheless, large quantities of nails encountered by Lepionka during excavation (unavailable for study) do perhaps hint that some type of secondary framing once existed in addition to rafters spanning (presumably north-south) across the building.

Attention should also be drawn towards several structural anomalies. The ash pit is puzzling. Construction indicates service from the building exterior by a narrow trench cut through surrounding soil; any wider excavation exposing less deeply founded wall footings either side of the arched opening. No such arrangement was found and it is difficult to see how, without some kind of retaining structure, ash pit access could have been maintained. The small arched flue openings present similar problems. Their position suggests external service by another trench (following along the south facade) which again would have partially exposed wall footings -- an impractical arrangement curiously at odds with structural stability. Why these openings should have been blocked is also unclear, although that alteration (perhaps rectifying an initial design flaw) took place over Structure II's operational lifetime seems obvious.

Structure III - Curing Shed

This structure is represented solely by tabby foundations. Cast in a single continuous operation, foundations comprise 1 foot 3-1/2 inch wide tabby strips defining a rectangular space measuring 45 feet 1 inch by 24 feet 10 inches overall. The long north-south axis of Structure III is aligned nearly at right angles to that of Structure II, a narrow gap (5 feet 1/2 inch to 5 feet 6 inches wide) separating the two buildings. Above foundation level all architectural elements are lost, therefore how exactly the curing shed appeared before its almost total destruction cannot be precisely determined. Foundations suggest framed construction incorporating timber sills raised somewhat above ground level. Sills must have supported corner posts, intermediate vertical framing members and roofing elements together with a floor system perhaps taking the form of "scantling" on which hogsheads containing sugar drained. Lepionka's excavation disclosed no evidence for masonry cisterns, indicating that molasses probably drained directly into timber vats positioned more or less at ground level, rather than by a guttered sub-floor of the type Spalding described (discussed above). Again, elevational treatment is unknown, although a door, centered about the west facade opposite Structure II's west entrance can be safely assumed on the basis of practicality. Likewise, a second, corresponding doorway centered about the east facade seems probable. Without Lepionka's field notes no conclusions are possible respecting fenestration patterns. Lack of nail analyses prevents an assessment of roof construction, although the overall plan shape makes a hipped solution plausible. If heating was provided it must have been by means of an iron stove since nothing suggests brick or tabby brick chimney construction.

Date of the Callawassie Sugar Works

Other than nails and broken mill stone fragments (uncovered inside Structure II's northeastern corner), few artifacts were discovered during excavation of either the boiling house or curing shed. Around the mill base a few fired bricks surfaced, but ceramic material proved rare (cf. Michie 1982:46). Therefore, even if Lepionka's notes are eventually made available, it is doubtful they will illuminate the sugar works' chronological position. Unfortunately, Callawassie Island's ownership between the late 1820s and the 1850s, a period which may have seen the commencement and cessation of sugar making operations, is unknown and archival documents have disclosed little concerning building activities on Callawassie. Indirect evidence is more helpful, showing the building group was probably erected after 1828, since had it then been operationed Edward Barnwell, a prominent Beaufort planter enjoying extensive local kinship ties (including with the Daniel Heyward family, Callawassie Island's owners before that date) would probably have known and reported the works in his <u>Southern Agriculturalist</u> article (<u>The Southern Agriculturalist</u> 1828:485-489).

Construction after 1832, when tariffs on imported sugars were eased also seems unlikely, the scale of building activities pointing towards a market oriented operation rather than production of "syrops" or sweeteners for home consumption. How large this operation may have been is impossible to determine without records, but an idea of potential productivity is given by comparison with the Sapelo Island works.

Spalding stated, "in the year 1814, I had from about eighty acres, one hundred and fifteen tierces, under the disadvantage of having a broken boiler" (Spalding, cited in Floyd 1937:244). This sugar passed through a boiling house measuring 38 feet 6 inches by 28 feet. Structure II on Callawassie measures 45 by 25 feet, suggesting that equal, or slightly greater, yields were anticipated (if not necessarily realized), leading toward the conclusion that construction took place about 1830 when cane's commercial potential still seemed bright.

<u>Associated Settlement</u>

General

The Callawassie sugar mill did not stand isolated. To the south Lepionka exposed remains of an apparent slave settlement, outbuildings, and what may have been a large, high status dwelling. Inexplicably he neither defined the site's boundaries nor put into effect standard mitigation procedures before development began. Subsequently, as already mentioned, Three Fountainview Corporation partially or wholly destroyed the in situ architectural elements despite the lack of final archaeological reports. If ever completed, Lepionka's site survey and field notes are now unavailable, the only accessible records being this author's field notes and site sketches which themselves contain a number of significant lacunae.

The following section is therefore offered with hesitation, its object being to briefly describe domestic components of 38BU409 which, through an unhappy coincidence, Michie entirely missed during his 1981 investigations. Nomenclature of individual structures follows that adopted by Lepionka, who designated Structures V - XII, leaving unattributed a hypothetical Structure IV.

Structure V

Structure V is represented by two tabby chimney bases of unequal size, distanced approximately 17 feet 9 inches apart (measuring from inside faces). At the time of excavation the southern base measured 7 feet 6 inches east-west by 6 feet 1/2 inch north-south and had suffered extensive erosion. The northern base (measuring 7 feet 8 inches east-west by 7 feet 1 inch north-south) proved better preserved, retaining traces of a 9 inch wide beam seating approximately centered about its long axis.

Surveys show that the corresponding internal faces of the two structures are not exactly parallel, indicating faulty setting out, minor design changes during construction, or just possibly two discrete building phases (Figure 39). Attempting to establish the structure's original configuration Lepionka opened several units, but beyond indistinct drip lines and fired brick scatters, little architectural data accrued. Abundant artifacts were recovered, the ceramic assemblage indicating domestic usage of a status above that normally associated with slave occupations.

Scanty architectural evidence renders reconstruction of Structure V speculative. Local vernacular practice indicates the two tabby bases are chimney foundation pertaining to a single double story framed house oriented with its long axis northwest-southeast. The position of the two chimneys within an overall building plan is more questionable. Paired end chimneys erected upon tabby pad supports are conjectured at St. Quenten's Plantation, near Beaufort (late eighteenth or early nineteenth century) and are known from the circa 1780 Phase I Sams House on Dataw Island (Brooker 1989:54-56). But, in both instances tabby bases are distinctly rectangular rather than nearly square and distanced almost twice as far apart as the Callawassie examples (33 feet 2 inches at St. Quenten's). This suggests the tabby features marking Structure V represent internal, instead of end chimneys, a hypothesis explaining slight differences of orientation, dimensional irregularity, and beam seating extending along the northern base.

Structure VI

Before recent attrition, 1 foot 2 inch wide tabby foundation strips outlined Structure VI, these foundations defining a dwelling measuring 10 feet 3 inches by 10 feet overall. Lepionka completely excavated the building, exposing traces of a brick threshold (1 foot 8 inches wide) centered on the eastern facade and inside, a simple brick hearth (measuring 3 feet 10 1/2 inches by 2 feet 6 inches) built opposite the entranceway against the rear (i.e., west) foundation (Figure 40). Large fallen wall fragments showed that Structure VI was enclosed by wattles made up from woven timber lath finished on inner and outer wall faces with at least two coats of oyster shell plaster, giving a total thickness of about 4 inches. No evidence emerged for vertical posts, fenestration patterns or roof construction, but considering the somewhat fragile wall system it seems windows (if they existed) were probably small and the roof thatched or very lightly framed. Bedded directly onto compacted subsoil, the hearth gave no hint of ever having been enclosed, suggesting smoke escaped through a hole piercing the building's roof.

In plantation contexts wattle and daub structures displaying various plan forms are best known from the late eighteenth-early nineteenth century British West Indies where woven lath (often, though not always, plastered) constituted a common slave house building material (Handler and Lange 1978:52-53). Hakewill (1825) illustrates rectangular wattle and daub dwellings on Clarendon Plantation, Jamaica, incorporating a central door opening and end chimney, interior spaces being lighted through small windows positioned either side of the entrance. At Ashford Plantation, Barbados a drawing (circa 1836-1845) shows square slave dwellings again possessing plastered wattle walls and small windows, roofs here appearing hipped rather than gabled (see Handler and Lange 1978:48, Figure 6). Today wattle walling traditions are well exemplified by Haitian rural house (caille) employing thatched or metal roofs supported upon slender upright framing members placed about two feet on center (see Vlach 1986:68-74; cf. Slesin and Cliff 1985:38, 54).

Although wattle and daub chimney construction has recently been recorded for Beaufort County (discussed in this volume by Hacker and Trinkley from excavations at 38BU1214; also from Haig Point Plantation and from Cotton Hope Plantation [Trinkley 1990]), wall fabrication using the material finds few extant local parallels despite strong evidence suggesting widespread frequency over Colonial and successive eras (see Adams 1990:45). One literary source does attest a local early nineteenth century non-domestic example, Abiel Abbott (circa 1832) recording at Okatee, Major J.H. Wigg's mainland plantation overlooking Callawassie Island:

> The store house is a curiosity, being a cube 22 feet square & impenetrable to animals, two legged and four

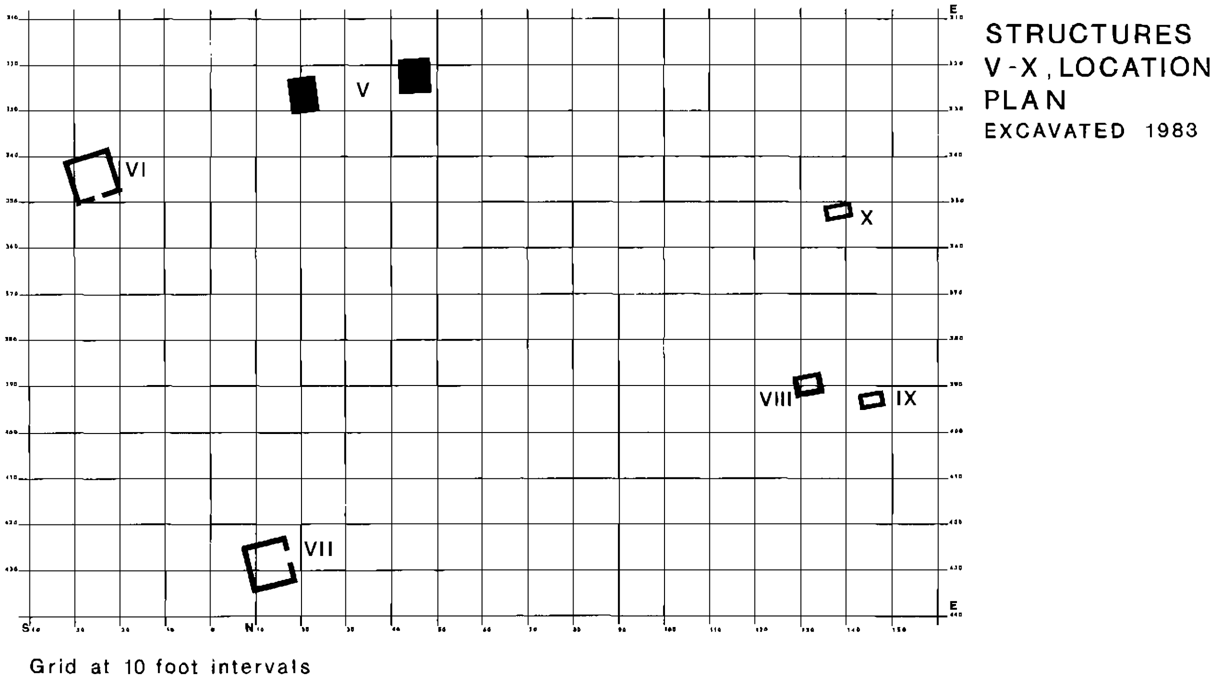


Figure 39. Plan of structures near the sugar mill.

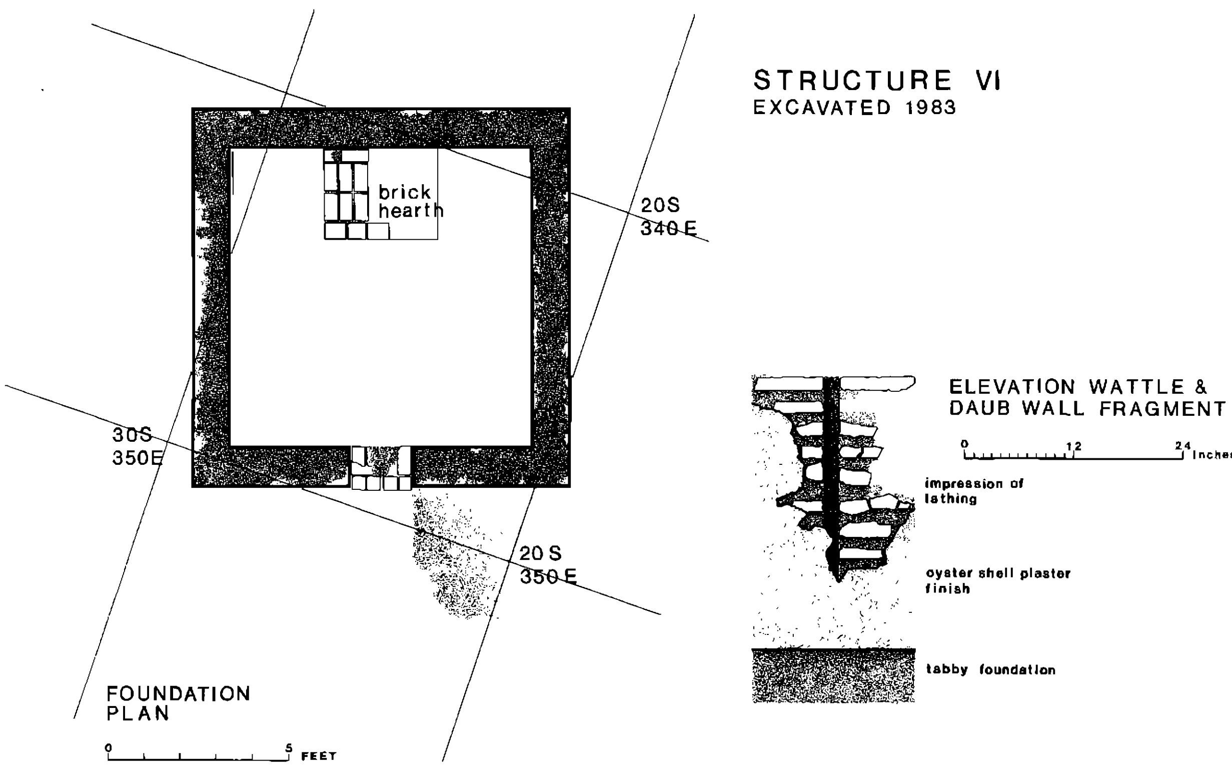


Figure 40. Structure VI.

> legged. It stands on blocks, like a northern cow barn. It is formed of oyster shell lime mortar, laid on both sides of a wattled lathing till it becomes 6 inches thick. It is smoothed and checked [scored] like blocks of Chelmsford granite and will last as long, if the building is not suffered to vary its position (Abiel Abbott, Journey to Savannah, c. 1833, Essex Institute Library, Chelmsford, England).

Leaving aside construction, lack of space is Structure VI's most noteworthy aspect, the dwelling furnishing only about 70 to 85 square feet of living accommodation. Probably too small for family activities, the size suggests temporary or intermittent use by one or, just possibly, two slaves.

Structure VII

Now destroyed, Structure VII was, on excavation, found outlined by 1 foot wide tabby strip foundations defining a building measuring 10 feet 3 inches square. Traces of a brick threshold indicated an entranceway 3 feet 10 inches wide centered about the north elevation. Unlike Structure VI, nothing was found suggestive of heating arrangements, wall or roof construction, rendering the building's original appearance entirely uncertain. Fronting the entrance extended an oyster shell lime plastered surface of undetermined size. That this feature was roofed using some kind of lean-to porch seems unlikely, no evidence being discovered for supporting posts. Lepionka did uncover a pig skull buried immediately inside the threshold, the cultural implications of which obviously require discussion going beyond what is possible here.

Structure VIII

Before its recent destruction, Structure VIII was represented by lower courses of a fired brick chimney and fire box measuring 6 feet 5 inches by 4 feet 10-3/4 inches overall. Originally the feature opened into a hearth on its western face, the rear chimney wall having a width of 1 foot 3-1/2 inches, the two lateral walls of 1 foot 1-3/4 inches with individual bricks measuring 4-1/4 by 9 by 3-3/4 inches. Bonding insofar as visible seemed regular, the one completely preserved course using headers on all three external faces. A single line of headers marked the hearth opening, the floor of which had disappeared.

Construction suggests an end chimney, heating perhaps a single story timber framed slave dwelling built upon ground sills and having its principal axis aligned nearly east-west. Lepionka's excavation failed to establish the structure's original size and yielded no accessible evidence allowing reconstruction of conjectured framing details.

Structures IX and X

Despite mutilation, Structures IX and X are still evidenced by two very similar fired brick chimney and fire box foundations aligned with their respective hearths opening towards the west. The chimney/fire box of Structure IX measures 3 feet 4 inches by 5 feet 7 inches overall; that of Structure X measures 3 feet 5 inches by 5 feet 11-1/2 inches. In both cases lower chimney walls are 9 inches wide on all three external faces. Lepionka's excavation disclosed no information for either structure respecting shape or size, though it is reasonable to suppose that surviving features represent end chimneys of two framed slave dwellings erected on ground sills as part of a single building program.

Structure XII

Visiting Callawassie by chance in 1984, the author observed that Lepionka had excavated south of Structure IX poorly preserved fired brick foundation (1-1/2 inches wide) defining two sides of a feature extending in excess of 20 feet east-west by 21 feet 10 inches north-south. This apparent structure appeared to have been enlarged west a second element (measuring 30 feet 2 inches east-west by an unknown width greater than 21 feet 10 inches north-south), resting upon 9 to 10 inch wide continuous brick foundations.

Unfortunately, road construction soon destroyed these fugitive traces of what may have been a multi-story building of considerable size, and no details regarding exact location, stratigraphy, or artifact associations were ever received from the excavator.

Discussion

Figure 39 will show that the buildings described, excepting perhaps Structures IX and X, display little systematic ordering going beyond the establishment of an almost common orientation. Instead, the distribution pattern is scattered, Structures V - VIII appearing at most loosely clustered. Of course, we may be looking at an imperfect picture, the site's archaeological investigations not being of a kind to discover ephemeral building types or landscape features (i.e., timber sheds, storage shelters, animal pens, fences, gardens). It also seems highly probable the picture is a temporal composite, curious spatial relationships between Structure VIII and Structure IX perhaps indicating two distinct construction phases.

Temporal questions cannot be resolved, the only relevant observations being guesses rather than firm conclusions derived from systematic archaeological analysis. During excavation, an impression was gained (on the basis of artifacts retrieved) that Structures V - VII were roughly contemporary, construction dating perhaps from the first quarter of the nineteenth century.

Structures VIII - X appeared slightly later, the artifact assemblage viewed in the field suggesting construction nearer 1850. Architectural evidence does not necessarily conflict with these observations, but neither does it confirm them, no excavated structure being sufficiently well understood to allow close chronological attribution though analogy or comparative study.

Functional interpretation rests upon slightly firmer ground, all buildings, excepting the large and inadequately recorded Structure XII, indicating domestic usage. Size alone suggests Structure V accommodated individuals occupying a position near or at the summit of the plantation's social hierarchy -- the owners or perhaps an overseer. Of the two possibilities, occupation by the overseer is the most likely, ruins located at 38BU70 offering a better candidate for Callawassie's main antebellum plantation residence (see Michie 1982:38).

Unlike Structure V, the house occupying 38BU70 possesses a tabby built lower story (measuring 40 feet 4 inches square, with 1 foot 6 inch wide external walls), 1 foot wide tabby partitions dividing internal space to create a 7 foot 8 inch wide central through hall. Traces of transverse bean seatings indicate a double pile plan, two rooms probably being located on either side of the principal circulation area, heated perhaps by paired fireplace/chimney stacks positioned inside the building envelope.

Along the south elevation, surviving openings express a five bay compositional arrangement, windows offering excellent ventilation and extensive panoramas over the Colleton River. Upper elements are lost, construction suggesting one or two timber framed stories elevated over the standing tabby built lower floor -- a substantial house viewed against local late eighteenth and early nineteenth century plantation standards.

Assuming that Structure V represents a subsidiary, overseer's dwelling rather than Callawassie Island's main antebellum residence, questions arise respecting the closeness of the sugar works to domestic settlement. Can functional relationships be safely conjectured? Here once more, lack of archeological data complicates discussion and precludes definite answers, but it is worth observing that sugar making required constant supervision, boiling, once started, often continuing night and day. Besides the overseer, skilled slaves (notably "strikers," i.e., those individuals capable of determining the exact moment of crystallization) were on constant call, an operational requirement which might explain the rudimentary living standards Structures VI and VII evidence, these two buildings being temporary shelters instead of permanent family dwelling units. Structures VIII - X testify to a more established, less seasonal occupancy, housing perhaps slaves carrying out duties within the conjectured overseer's dwelling or alternatively accommodating part of a much larger agricultural work force at time when sugar making had ceased (possibly before 1850).

Conclusion

Site 38BU409 demonstrates the fragility of Beaufort County's historical record, being the only tangible reminder for an agricultural enterprise which has otherwise been erased from collective memory, whether that memory be of the legal kind encompassing deeds, wills, land transfers, and depositions or that anecdotal tradition preserved through journalistic, literary, and oral sources. We have no way of ascertaining how sugar making reached Callawassie Island or who was the motivating force behind the importation of technologies demanding management of a sort unfamiliar in South Carolina. Moreover, if the "scent of gain" (as Hafiz-i-Shirazi called it) lingers, all documents recording profit, loss, capital expenditure, or capital accumulation have disappeared along with plantation accounts, day books, and those most tragic records, slave lists.

How great the resultant historical void may be is best judged by examining sugar growing plantations where contemporary information does survive. Continued mention has been made of Sapelo Island, Georgia, whose owner, Thomas Spalding, displayed many character traits distinguishing innovative British landlords who wrought an agricultural revolution over the late eighteenth century. At another level, using among many other sources, the incomparable documentation of Worthy Park, Jamaica, Michael Craton (1978) has chronicled the cost of sugar growing in humanistic terms, describing the brutal toll levied upon cultivators and environment alike (see Moreno Fraginals 1976 for a similar study of the economic impact of sugar in Cuba).

On Callawassie, lack of records surrounding the early nineteenth century development of site 38BU409 forces a narrow focus upon architectural rather than environmental and sociological topics, a focus which allows very limited discussion.

Thus, taking the sugar works first, assuming construction about 1829-1830, one must conclude that there is nothing particularly innovative about either its design or construction insofar as can be ascertained from visible remains. Indeed the reverse seems true, the boiling house (Structure II) showing heavy dependence upon late eighteenth century West Indian models interpreted through the medium of Spalding's publications. The Sapelo (circa 1805) model was not followed completely, minor variations being introduced respecting chimney placement and possibly furnace arrangement. Spalding's adoption of a "T" shaped plan governing the relationship between his boiling house and free standing curing shed was accepted, despite the currency of alternative schemes where boiling and curing operations were housed under one roof (i.e., Elizafield, Georgia).

A conservative approach also marks milling on Callawassie, the unknown owner employing an old-fashioned animal driven mill rather than more efficient and costly steam powered equipment or the frankly experimental tidal device Spalding was tinkering with about 1830.

It could be argued that failure to realize the advantages of steam power vitiated Callawassie's prospect of becoming a commercially viable sugar producing plantation from the start. But this line of reasoning depends upon hind sight. In the late 1820s the equation between risk and profit confronting Southeastern sugar growers was weighted toward risk, the chances of tariff reform being an ever present variable demanding caution respecting heavy capital expenditure. What seems surprising viewing the conservatism of the Callawassie scheme is not how little, but how much capital was ventured on providing permanent processing facilities, even if building costs were offset through predominantly tabby construction.

The price of tabby is not easily quantified. Mid-eighteenth century commentary shows tabby was then thought "much cheaper than brickwork" at Dorchester, South Carolina, although manufacture involved transportation of oyster shells inland from Charleston via the Ashley River (Journal of the South Carolina Commissioners for Fortification, May 1758, South Carolina Department of Archives and History). Spalding believed tabby cost about half that of frame construction "after charging a reasonable hire for . . . negroes" (The Southern Agriculturalist 1830:630). Relative cheapness explains why tabby fabrication survived longest (occasionally down until the early 1870s) along isolated areas of the Georgia/South Carolina coast and why fired brick found extremely limited use at 38BU409 (i.e., fire wall, Structure II; chimney bases, Structures X and XIII; possibly chimney stacks, Structure V). On Callawassie, as on neighboring islands, tabby constituted a material of necessity, minimizing financial exposure while maximizing non-urban building skills and abundant natural resources.

There were less labor intensive building solutions, Structure VI vividly illustrating the point with its minute floor area, slight tabby foundations, plastered wattle walls, and possible thatched roof. The rudimentary nature of construction here recalls South Carolina's earliest European settlements, but this is perhaps a false analogy; Structure VI demonstrates that building modes never followed straight line evolutionary paths in the isolated Sea Island plantation world. Rather, differing architectural traditions co-existed, some primitive, others more sophisticated, the total spectrum of building reflecting overlapping areas of cultural experience. Choice was a matter of expedience, following cycles of expansion and retrenchment, of prosperity and hard times induced by ever fluctuating market forces. While correlating certain building modes with certain ethnic groups or geographical areas is tempting (wattle and daub construction being a noteworthy case), to do so without qualification over simplifies complex architectural patterns. Wattle and daub might well have come out of native North America, West Africa, or even the West Indies (cf. Adams 1990:45). It might equally have sprung from deep seated European memories of colonial settlement. Whatever the material's derivation, wattle and daub's significance at 38BU409 is that of an hierarchic indicator. Comparing Structure VI with Structure V, or better, Callawassie's conjectured main plantation house (38BU70), we start measuring the gulf separating comfort levels of planter and slave. An architectural undercurrent can also be glimpsed, a category of transitory shelters built near the conjectured work place falling between conventional single family slave dwellings (cf. Structures VIII - X) and non-habitable service buildings perhaps represented by the enigmatic Structure XI. Whether or not comprehensive excavation would have more fully illuminated this poorly understood building type constitutes one of the tantalizing and unanswerable questions site 38BU409 raises.

Structures VIII - X prompt other queries. Beyond the fact that each possessed a brick end chimney, nothing is definitely known about their form, construction date, or length of occupation. Neither is it known if Structures IX and X represent part of a larger row, or if these evident slave dwellings were accompanied by transitory features such as fenced enclosures, animal pens, and simple storage buildings. The catalog of uncertainties is long and enumeration becomes pointless when its obvious that some (perhaps most) could have been narrowed had excavated materials undergone proper analysis or, an attempt had been made to establish early field divisions before golf course and road construction obliterated Callawassie Island's historical land forms (cf. McHenry 1986). Which brings us to a final conclusion.

History exacts demands upon all those individuals entrusted with exploration of the past. It also imposes a cost upon its custodians. On Sea Island plantations where, before emancipation almost every act modifying the natural landscape involved slave labor, there can be no justification for destroying without full reportage the works of subjugated and all too often silenced peoples whose testament the antebellum man-made landscape has become. Neither can there be any justification for sweeping aside, without thorough investigation, those creations (whether they be buildings, gardens, slave settlements, or temporary structures) reflecting aspirations and value systems of a planter elite, however foreign the aspirations and value systems seem to modern sensibilities.

ANALYSIS OF SHELLFISH REMAINS FROM SPRING AND CALLAWASSIE ISLANDS

David R. Lawrence

Shellfish from 38BU1214, Spring Island

Introduction

This report continues an analysis of archaeological shellfish, primarily the American Oyster *Crassostrea virginica* (Gmelin), from small, Woodland period (Deptford) middens on Spring Island in Beaufort County, South Carolina. Previous work (Lawrence 1990b) involved the analysis of oysters from a more northerly site on the western bounds of Spring Island - 38BU747. At that site, oysters were gathered from both intertidal and subtidal settings of the nearby, low salinity waters of the Port Royal Sound area; collecting seasons included the late spring to early summer interval of time. The oysters were cooked or heated and used as food. Oyster valves from 38BU747 include some which were used as scrapers, with the concentration of scrapers greatest away from the immediate midden areas. This present work reinforces these previous observations and interpretations of the Woodland period Spring Island midden oysters.

Background and Methods

The locality 38BU1214 was visited on July 26, 1990. At that time excavation of Middens 4, 5, 6, and 13 had been completed and work was proceeding on the trenches extending northward and westward from the Midden 6 area (Figure 17). Middens exposed had been carefully covered and left open for inspection. In addition to the samples collected for these analyses, all sifter screen discard piles were examined for oyster valves used as scrapers, and those found were gathered to become part of a reference collection of such objects.

Oyster analysis did focus upon the column samples of each midden. From each column, materials were chosen at random and sorted by taxa, oyster shell size, and oyster valves. This sorting proceeded until either (1) the sample was exhausted, or (2) the number of larger oyster left valves (height greater than three inches, which is the minimum marketable size for present-day South Carolina oysters) equaled or exceeded forty (now thought to be the minimum number necessary to yield meaningful interpretations of season of gathering). Valve ratios were calculated from these samples or subsamples, all of the sorted materials were carefully inspected, and the larger left valves were scrubbed clean for ligament seasonality analysis. Interpretations of the oysters are again based upon the criteria of Lawrence (1988) as modified to reflect the complementary work of Kent (1988) in the Chesapeake Bay area. These amended criteria may be found in Lawrence (1990a).

Only subtle differences were found in the source areas and initial uses of the oysters from the various middens at 38BU1214. Therefore the oysters from this site are here described collectively, with midden-to-midden differences noted where appropriate.

Oysters From the Midden Column Samples

Each column sample contains a mixture of intertidal and subtidal oysters. Of the larger (>3 inches in height) left valves (numbers examined in Table 1), typically less than six per sample display truly subtidal characters; the intertidal remainder came from mud flat, possibly creek bank, settings. Subtidal larger right valves are more common than their left valve counterparts. This latter observation has been made in other Woodland period (Deptford) oysters (for example, at Minim Island, 38GE46; see Lawrence 1989) and remains unexplained. Smaller intact valves (both left and right) are dominated by subtidal individuals.

Both larger and smaller subtidal oysters (and some intertidals) contain the perforations and galleries of clionid sponges but the incidence of these boring sponges in the total collection is not high. Evidence of polydorid bristleworms is present but is rare. Occasionally, and most commonly in smaller valves and fragments, sponge galleries penetrate the valve interior, indicating that the oysters were collected after their death. Among the smaller and fragmented materials are numerous juvenile oysters likely representing both intertidal and subtidal source areas. Hence the oysters from all sources were gathered as bulk samples, with sorting taking place before use at the site. Left-right valve ratios for larger valves (Table 9) depart far from 1:1 in the columns from Middens 4, 15, and 17. These midden samples have a high percentage of intertidal oysters among the larger left valves; the greater fragility, and ease of cracking during use by humans, of intertidal oysters' right valves doubtless contribute to the observed excesses of left valves in the three midden column samples. There is no evidence to support the notion of conscious separation of left and right valves by the site occupants.

As at site 38BU747 (Lawrence 1990b) the oysters have characteristics of those found within open estuaries such as the nearby Broad River Estuary and its Colleton River and Chechessee River parts. In such settings both lowered salinities and environmental fluctuations result in fewer space competitors of the oysters in the subtidal environment, bringing about the relatively few preserved oyster associates seen in the column materials from

Table 9.

Oyster Data from Samples at 38BU1214

Provenience	A	B	C	D
Midden 4- 120R260	52	26	2.0	17
Midden 5- 60R175	29	26	1.1	10
Midden 6- 70R120	42	31	1.4	10
Midden 13- 70R110	40	29	1.4	15
Midden 14- 70R80	13	10	1.3	--
Midden 15- 65R60	40	19	2.1	--
Midden 16- 135R115	40	29	1.4	10
Midden 17- 125R105	27	14	1.9	--

A= number of left valves with height greater than three inches
B= number of right valves with height greater than three inches
C= A/B or left-right valve ratio
D= number of left valves inspected suggesting Spring/early Summer season of gathering

38BU1214. Maximum valve height ranges between 120 and 140 mm in intertidal oysters from the column samples and evidence to support the notion of depletion of this oyster resource, through the time represented at this site, is lacking. Subtidal oysters show a wide range in maximum size with those, for example, from Midden 16 being significantly larger than those from Midden 6, with subtidals from Middens 4 and 13 intermediate in maximum size. This suggests the possibilities that depletion of subtidal oysters did occur and that Midden 16 is older than Midden 6. However, because of conceivable changes in source environment use, and the fact that distinction of subtidal versus intertidal oysters is subjective in part, the differences cannot be quantified and relative ages cannot be reconstructed with certainty.

The oysters were used as food. Heating (steaming or baking) during food preparation is suggested primarily by valve discolorations; subtle shades of beige and gray are quite prominent in the valves and probably record alterations to the shells' organic matrix brought about by the heating process(es). Each column sample also contains valves with iridescent to sucrose internal surfaces; these textures also suggest heating of the organisms. Sucrose textures in ligament areas are especially prominent in samples from Middens 14, 15, and 17. Shucking cracks occur on intertidal right valves but the most common evidences of forceful separation of the valves are small stabbing notches, with accompanying ventral area exfoliation. Both single and multiple notches can be found on left and right valves. The prominence and size of the notches suggests that the valves were separated rather easily and this interpretation is compatible with the notion that the oysters were first steamed or baked, with the valves likely being slightly separated or agape when shucked.

The difficulties in reading seasonality from the ligaments of Spring Island Woodland period oysters have been discussed in the report on 38BU747 (Lawrence 1990b). Yet again a strong inference for general season of gathering can be made (Table 9), using the ligament growth model outlined in Lawrence (1988). In five of the column samples (Table 9) sufficient left valves display 1-5 growth units, since production of the most recent ligament topographic high, to make a strong inference of a Spring to early Summer time of gathering. Preservational problems in the other three samples (Middens 14, 15, and 17) have been noted above. But all three of these samples do contain some spring to early summer ligaments, and also contain oysters with external growth "rings" indicating the same season of collection. These findings do not preclude the gathering of oysters during other seasons of the year, but merely indicate that the only strong inferences are for the times as noted here.

Oysters displaying dorsal valve abrasion, resulting in subdued or missing cardinal area structures, are present in the collections from 38BU1214. Both left and right valves display this abrasion, and the overwhelming majority of these valves are relatively small, subtidal individuals. Again some of these oysters were used as scraping implements or tools. The scrapers were found in column samples from Middens 14, 16, and 17; they did not occur in the column from the northwest corner of Midden 13 but were abundant in the sifter screen discards from more southeasterly parts of this midden. Apparently the activities associated with this scraping were localized in the area between Middens 13-14 and 16-17. Evidence at hand suggests that this focal point did not change through time, since scrapers were not found in all of the materials examined from Middens 4, 5, and 6.

Other Taxa from the Column Samples

Preserved oyster associates are not at all common in the column samples. Worthy of note is one intact valve of the quahog, *Mercenaria mercenaria* (L.), found in Midden 17. It displays a ventral notch suggesting that it was gathered live, had its valves forcibly separated, and was used as food. Thus site users were visiting nearby sand flats and sand bars where this venerid clam can most commonly be found. In addition there are numerous specimens of the marsh periwinkle *Littorina irrorata* Say in Midden 16 materials. In the southeastern United States this snail lives primarily upon the stems of the cordgrass *Spartina*, and it can be found today on the cordgrasses of the high marsh immediately adjacent to 38BU1214. The periwinkles were obviously utilized by the site occupants. Their local concentration and small size suggest use as food, in soups or stews. This cooking could have separated meats from the univalve shell; the thin and small opercula may have been softened and rendered unobjectionable by this food processing, or themselves may have been separated from the meats by cooking and easily skimmed off the top of any vessel or pot. In this interpretation, the stratigraphic concentrations of *Littorina* become evidence of the "dumping" of residual shells after the pot contents had been eaten (Lawrence 1990a:78).

Fauna from the Feature Samples

Materials were submitted by Chicora Foundation, Inc. from Features 1-10 and a variety of individual block excavations at 38BU1214. Because of time and financial constraints less attention was paid to these samples but they do, even upon more cursory examination, lead to interpretations which may be important to our total understanding of the site. The feature samples are here briefly discussed.

Feature 1

Clionid-infested subtidal oysters occur but the sample is dominated by mudflat intertidal individuals which are relatively large for the site (heights commonly in the 140 mm range). Spring to early summer ligament growth fabrics are especially prominent. Here, as in other feature samples, food use of the oysters is suggested.

Feature 2

The sample contains small subtidal oysters but also includes the largest (height of 152 mm) mudflat intertidal oyster observed from site materials. One channeled whelk (*Busycon canaliculatum* L.) displays a chipped margin suggesting forceful extraction of meats for food use.

Feature 3

The sample contains marsh periwinkles and fragments of the stout razor clam *Tagelus plebeius* Solander. This latter species lives within sediments and obtains its food and oxygen from the overlying water column by using an elongate posterior siphon. In nearby parts of South Carolina these razor clams appear to be restricted to intertidal flats and bars where finer-grained sediments (silts and clays) compose more than three percent of the materials (see Lawrence 1990a). Thus site inhabitants were actively seeking both quahogs and razor clams during their visits to the "sand" flats and bars of the surrounding area.

Feature 4

The collection includes both intertidal and subtidal oysters, with at least one of the subtidal oysters collected after its death. Also present are both valves of a single quahog which was most likely opened, by site inhabitants, by impact of some instrument against the left valve exterior.

Feature 5

Clionid sponge-infested subtidal oysters and marsh periwinkles are most prominent in the sample.

Feature 6

Oysters with multiple stabbing notches, fragments of razor clams and quahogs, and marsh periwinkles are present in the material.

Feature 7

Subtidal oysters, a large quahog, and marsh periwinkles appear in the lot.

Feature 8

Specimens include both subtidal and intertidal oysters and a quahog fragment.

Feature 9

This sample includes very chalky specimens. Oysters are small subtidal individuals and include at least one collected after death. One dark gray (burnt or "trashed"?) oyster may represent a scraper. An extremely friable quahog fragment is present.

Feature 10

Subtidal oysters are most conspicuous in the collection.

Comments

Examination of the feature samples has added razor clams and whelks to the list of shellfish taxa actively sought and utilized by the Woodland period inhabitants of 38BU1214. The presence of local concentrations of non-oyster shellfish (Feature 3) suggests that individual events did focus upon the collecting of organisms such as periwinkles and razor clams. The overall taxonomic diversity in feature samples appears higher than that in the column samples. This appearance may be due to (1) the greater volume of sediment from which the feature samples of shellfish came, or (2) the inadvertent overlooking of non-oyster taxa during sorting of the column samples.

Summary and Discussion

While individual events did target the gathering of a variety of molluscs, oysters were overwhelmingly emphasized as a shellfish food source by the Woodland period occupants of site 38BU1214. The oysters could all have come from the nearby, open, low salinity waters of the Broad River Estuary. Times of collection included the spring and early summer months of the year. Both subtidal and intertidal sources of oysters were utilized, with the intertidal sources including mudflats. Arguments can be made, using maximum sizes of oysters and the notions of resource depletion, that some middens (e.g., Midden 16) may be older than others, but such inferences are not strong. Relative ages of site components, based upon their shellfish remains, cannot be determined with certainty.

The oysters were heated (baked or steamed), opened with relative ease, and used as foodstuffs. Some valves, especially relatively small subtidal individuals, were subsequently used as scrapers. The activities involved appear to have been centered in the area between Middens 13-14 and 16-17. The middens' sizes, seasonal focus and presence of scrapers at the site point toward use of 38BU1214 (and 38BU747) as fish camps (see Lawrence 1990b) but full development of this hypothesis is beyond the scope of the present work.

Shellfish from 38BU19, 38BU464, 38BU1249, 38BU1262, Callawassie Island

Introduction

The cultural significance of shellfish samples from four archaeological sites on Callawassie Island, Beaufort County, South Carolina (38BU19, 38BU464, 38BU1249, and 38BU1262) has been analyzed and interpreted and is here summarized. The samples consist overwhelmingly of valves of the American Oyster [*Crassostrea virginica* (Gmelin)]; from such settings and contexts oysters can yield information concerning the environments being exploited, the use or uses to which the oysters were put, and other behavioral aspects of the original site inhabitants. The reconstructions proffered here are based upon the methods and criteria of Lawrence (1988) as modified to include the complementary work of Kent (1988) to the north in the Chesapeake Bay area. A summary of these modified criteria may be found in Lawrence (1990a).

At my request oysters submitted from test pits, excavations of individual features, and presorted column samples did consist solely of the left valves of the oysters (Table 10). Left valves are commonly the better preserved ones, they more typically contain oyster associates critical to source area evaluations, they are sensitive indicators of numbers of shells collected dead, and they contain the more useful ligaments for analyses of seasons of gathering. Hence they are emphasized when time or resources do not allow the handling of numerous and bulk lots of oysters. It must be noted that the lack of bulk samples does preclude the study of left versus right valve sorting, and under these circumstances right valves cannot be used to complement or support interpretations of oyster handling and use from these proveniences. However this presorting or preselection of samples does lead to time-efficient work. All of these previously sorted left valves were scrubbed clean and carefully inspected for evidences of their source areas, cultural use or uses, and season of gathering.

Valve sorting and the nature of right valves were addressed in the four bulk and column samples examined (Table 11). These materials were submitted to the writer in boxes and, for each provenience, two boxes were chosen at random. A first box was opened and sorted in its entirety into large (height equal to or greater than three (3) inches, the minimum marketable size for present-day oysters in the State of South Carolina) versus small, relatively intact, individuals of both left and right valves of oysters, with other taxa and associated debris set aside for separate examination. The second box was sorted only for larger left and right oyster valves. The numbers reported in Table 2 represent the sums of larger valves, drawn from both of the boxes examined. At least 50 of the larger left valves were then scrubbed clean and likewise inspected for evidences of their source areas, cultural use or uses, and season of collection. In sum, over eleven hundred counted oyster valves were examined in detail during the course of this work.

The sites were visited on September 21, 1990 and October 15, 1990. At the time of the September visit work at 38BU464 was nearly completed and, by courtesy of Chicora Foundation personnel, all of the excavations had been left open for inspection. By mid-October the work at 38BU19 and 38BU1249 had also been completed and field work at 38BU1262 was just beginning. Again, all previously excavated sites had been left open for my examination. Thus oysters from the majority of proveniences reported upon herein have been seen in their original and archaeological contexts. Observations from the field have been added to the summaries provided, where appropriate.

General Nature of the Samples

Oysters from the sites on Callawassie Island show modest differences as to their source areas, and those from 38BU19 include individuals which have been used as scrapers. These dissimilarities are treated below in the discussion of individual samples. However oysters and the other shellfish from the samples share certain

Table 10.

Numbers of left oyster valves [*Crassostrea virginica* (Gmelin)] inspected from test pits, feature excavations, and presorted column samples from archaeological sites on Callawassie Island.

Locality	**Sample Site**	**A**	**B**	**C**
38BU19	TP #1	2915	43	13
	TP #2	2915-A	13	13
	TP #5	2919	40	5
	TP #10	2924	38	23
	Mound, Trench A	2929-D	42	24
38BU464	335R550	2961	27	78
	250R740,L1	2979	43	24
	250R740,L2	2981	35	20
	250R740,L3	2982	33	35
	Feature 3	3004	56	4
38BU1262	Feature 2	3072	43	3

Total number of left valves inspected = 655

A= sample archival number
B= number of left valves with height equal to or greater than three (3) inches
C= number of left valves with height less than three (3) inches

Table 11.

Numbers of larger (height equal to or greater than three (3) inches) oyster [*Crassostrea virginica* (Gmelin)] valves from column samples, submitted in bulk, from localities on Callawassie Island.

Locality	**Sample Site**	**A**	**B**	**C**	**D**
38BU464	280R300	2943	77	32	2.4
38BU1249	290R320	3030	96	59	1.6
38BU1262	75-80R500	3044	53	20	2.7
	260R520	3063	117	33	3.5

Total number of larger valves inspected = 487
A= sample archival number
B= number of larger left valves
C= number of larger right valves
D= left/right valve ratio

characteristics which, to eliminate redundancy, can be described for the samples collectively.

Although the American Oyster is most prominent in the bulk column samples, other shellfish occur as well. Fragments of the Atlantic Ribbed Mussel [*Geukensia demissa* (Dillwyn)], fragments and entire valves of the Northern Quahog [*Mercenaria mercenaria* (L.)], fragments of the Stout Razor Clam [*Tagelus plebeius* Solander], largely entire specimens of the Marsh Periwinkle [*Littorina irrorata* Say], and both fragmentary and entire whelks [*Busycon* spp.] are complementary elements of the fauna. Thus these prehistoric inhabitants of the Callawassie Island area were gathering shellfish from nearby cordgrass or *Spartina* marshes (periwinkles and mussels) and sand flats or bars (quahogs and razor clams), as well as collecting whelks (most likely during their visits to oyster beds; see Lawrence 1990a for a detailed discussion of the environmental significance of these taxa). Ventral marginal notches on the quahogs and bladed stabbings of the body whorl of whelks suggest that meats were forcibly extracted from these two taxa, indicating a food use. Poor preservation does prevent direct observations concerning the purposes for which the mussels and razor clams were gathered, but a food use is the most common interpretation of the presence of these taxa at archaeological sites. The locally high concentrations of periwinkles also point toward dietary usage, perhaps in soups or stews (Lawrence 1990a).

The oysters were gathered from environments very similar to those which can be observed, in the present day at low tide, from the bridge leading onto Callawassie Island. Elongate and rather thin-valved individuals came from clusters exposed on the mudflats of the major channel regions; more ovate individuals were scattered nearby, typically in topographically lower sections of the low intertidal/highest subtidal areas; the most robust and ovate specimens, typically with a high percentage of epibionts such as clionid sponges, quite likely came from truly subtidal sources. All could have been gathered, by wading and walking, at low water. It is the impression of clustered versus scattered oysters, and the inferred tidal position of the scattered individuals, which change from provenience to provenience.

Oysters from each and every sample examined were used as foodstuffs. Evidence comes from valve marginal features, discolorations, and textures. Although ventral cracks appear on some relatively thin right valves, the most common evidence of forceful separation of the valves, by humans, are stabbing notches. Multiple, relatively small notches are most widespread and can be observed on both large and small, and left and right, valves. Dorsal valve exfoliation frequently occurs around the notched, marginal regions. On some ribbed cluster oysters, notches appear *between* the ribs of left valves and *at* the ribs of right valves. This suggests that, during shucking, the oysters were held with left valve in the palm of the hand and "attacked" (using some instrument) at the visible and accessible point(s) of the right valve ribs. The relatively low incidence of cracks suggests rather easy shucking of the shells, and is compatible with the notion that the oysters were baked or steamed during food preparation. This use of cooked oyster meats is supported by valve discolorations and textures.

Beige to brown valve discolorations occur in each of the samples examined, and grayed valve portions are present in a few of the oyster valves. Past experience with archaeological oysters suggests that such discolorations are most common in shells that have been heated. It can be proposed that these discolorations result, at least in part, from alterations to the organic matrix of the shells, with these changes brought about by heating. The larger samples typically contain at least one valve with a dark brown to gray area similar to those described by Kent (1988) and interpreted by that author as resulting from impact with hot coals of a fire. Although most common on valve exteriors, the valve coloration changes also appear on valve interiors. The surfaces of the valve interiors commonly have pearly to iridescent lusters and tend toward sucrose textures; these observations are also compatible with mineralogic changes brought about by valve heating. Some samples (most especially from 38BU464) display secondary and beige mineral "crusts" with adherent detrital grains on many valve interiors. Samples of these "crusts" effervesce in dilute hydrochloric acid, are undoubtedly calcium carbonate, and are most certainly calcitic. At least some of these deposits are associated with markings which may be attributed to rootlets (or fungi?). Differences in soil chemistry and microenvironment, brought about by the presence of these living organisms, may account for this secondary and post-burial precipitation of calcium carbonate, but available studies to support this proposal are not to be found. In a complementary fashion, it can be noted that grayed individuals are most commonly those infested with clionid sponges. Perhaps chemical microenvironmental differences, due to the decaying sponge tissues, result in a still-different type of post-burial shell alteration.

Seasons of gathering have been difficult to determine for many of the proveniences. Some of the presorted samples lack sufficient numbers of larger left valves to make strong inferences of seasonality. Other lots do not have well-preserved ligament areas. Truly subtidal individuals are difficult to interpret because the backlog of comparative data, from living oysters of the southeastern United States coast, does not exist. In many cases the inability to recognize the annual ligament growth unit of the year before gathering (this recognition is critical) did hamper interpretations of seasons of gathering. Where inferences were possible, they are noted below under the discussion of individual samples.

38BU19

Introduction

The site 38BU19 includes a significant Middle to Late Woodland period burial mound yielding St. Catherines and Savannah ceramic wares but the most recent work was confined to an area to the south of the mound proper. Numerous small shell middens occur in this area and the recovered ceramics indicate an age similar to that of the mound. Of the 14 five-foot units excavated, six yielded moderate to significant quantities of oyster shell and samples were submitted from four of these test pits. All samples had been presorted.

Test Pit 1, Archive #2915

The sample (Table 10) does contain a few thin, elongate, intertidal cluster oysters but more striking are numerous ovate left valves. These latter include quite massive individuals ranging up to 13.9 cm in height and at least three of the larger left valves were collected dead. The relatively low incidence of shell epibionts suggests that these were oysters scattered in the lower intertidal-uppermost subtidal zones. The possibility exists that these oysters were gathered throughout the year but no strong inference of time of collection can be made. Quahogs and periwinkles also occur in the excavation debris.

Test Pit 2, Archive #2915-A

The sample (Table 10) is easily divisible into two parts. Ten display subdued sculpture in the beak and cardinal areas and smoothed lateral margins indicating their use as scrapers. Although modified by humans, at least six of the valves are yet robust, suggesting that they were non-clustered oysters in the lower intertidal-uppermost subtidal zones. These valves are chalky in part, display pearly and/or sucrose valve interiors suggesting prior heating, but do not display preserved valve discolorations. The remainder of the sample consists of typical elongate, thin-valved cluster oysters. No reconstruction of season of gathering is possible. Quahogs are also present in the excavation debris.

Test Pit #5, Archive #2919

The sample (Table 10) contains only one or two undoubted low intertidal-uppermost subtidal oysters. The pre-eminent intertidal cluster oysters are relatively large and include the largest individual (height of 18.1 cm) seen in the collections from Callawassie Island. This individual displays the dark brown patch or area interpreted to result from impact with coals during cooking of the oysters. The possibility exists that these oysters were gathered throughout the year but no strong inference of season(s) of gathering can be made. Significant numbers of periwinkles occur in the spoils from this excavation.

Test Pit #8

Oyster valves used as scrapers appear in the spoil piles from this excavation; they are similar to those described from Test Pit #2.

Test Pit #10, Archive #2924

The sample (Table 10) contains thin shelled and elongate, intertidal cluster oysters but most striking is the coequal number of ovate and robust valves which range up to 10.8 cm in height. A rather high incidence of clionid sponges and polydorid bristleworms suggests that these latter oysters came from the subtidal zone. At least five individuals (including three submitted right valves) are chalky but lustrous, display subdued sculpture on cardinal areas and/or lateral margins, and have been used as scrapers. These five all exhibit subtidal characters. No inference of season(s) of gathering is possible. The spoils from this excavation include knobbed whelks, periwinkles, and quahogs.

Mound-Trench A, Archive #2929-D

This sample (Table 10) was specially collected by Chicora Foundation personnel to provide some comparison between oysters of the mound proper and those of the smaller middens to the south. Although ovate and moderately thick valves are present, the majority appear to be more elongate and thinner individuals typical of intertidal mudflat clusters. Clionid sponges are relatively common as epibionts and the presence of moderate to severe valve infestations by polydorid bristleworms suggests that the robust individuals include truly subtidal forms. Four valves (including three submitted right valves) display the brownish-black patches interpreted as the remnants of coal impact during cooking of the oysters. A strong inference of spring to early summer gathering can be made for oysters from the mound proper.

38BU464

Introduction

Site 38BU464 consists of a series of discrete shell middens located in the interior of Callawassie Island. Six middens were selected by Chicora Foundation for intensive examination during the most recent field studies, and oysters from three of these areas were submitted for analysis. Ceramic artifacts associated with the submitted oysters were predominantly St. Catherines/Savannah phase materials. Although the area around 335R550 was found to represent a largely plowed midden, shell from the area was requested for comparison with that of the basal and intact Feature 3 of this provenience. Except for the bulk column from 280R300, materials had been presorted.

250R740 Levels 1,2,3; Archive numbers 2979,2981,2982

This column section was extracted in three (vertical) parts (Table 10). No microstratigraphy was evident in the exposed walls of the excavation. In the basal Level 3 individuals, relatively few intertidal cluster oysters are evident. In next uppermost Level 2 materials, cluster oysters become a significant minority of those submitted for examination, and these largely have heights in excess of three inches. Thus the more ovate, lower intertidal-uppermost subtidal oysters are relatively smaller in Level 2 (versus Level 3). These observations suggest that site occupants may have had a preference for the scattered, ovate oysters but turned their increased attention to the intertidal clusters when scattered individuals, of appropriate size, became more difficult to gather. The uppermost Level 1 oysters again include relatively few intertidal cluster oysters and they display the highest percentage of larger individuals (Table 10). Level 1 oysters contain the most prominent shell epibionts seen in these column samples. Explanations for these observations include the possibilities that: (1) a hiatus in site usage is present, during which time larger, scattered oysters were replenished in the local environments, and (2) during continuous occupation, the uppermost oysters came from different, but still local, sources. Collectively, a strong inference of spring-early summer season of gathering may be made for the oysters from the 250R740 area. A statement of seasonality, however, does not preclude gathering during other months of the year, but rather means that the only strong inference of months of gathering is that given.

Whelks, mussels, stout razor clams, quahogs, and significant numbers of periwinkles were observed in the spoil piles from excavations in this area. Site inhabitants were not relying solely upon oysters in their use of shellfish for nutrition.

335R550, Archive #2961
Feature 3, Archive #3004

Oysters from the midden excavation (Table are overwhelmingly small (Table 10), robust, ovate individuals, with a rather high incidence of clionid sponges, which came from the lowermost intertidal-uppermost subtidal zones; only three or four individuals have the appearance of intertidal cluster oysters. No inference of season of gathering is possible. By contrast, oysters from the underlying Feature 3 are predominantly rather large (Table 10) intertidal cluster ones which range up to 12.5 cm in height; at most three of the left valves came from lower parts of the tidal profile containing more scattered individuals. Left valve cracks are rather common in the Feature 3 materials, indicating the relative thinness and fragility of these valves. These Feature 3 oysters were gathered during the spring to perhaps early summer seasons. The difference in oyster sources suggests that Feature 3 and the overlying midden may not represent a continuous occupation of the site.

During the September site visit a small pit was observed on the floor of this excavation, near to the east wall. This pit contains numerous, small, ovate, robust oysters typical of those from scatters in the lower intertidal-uppermost subtidal zones of the local area. The relationship between these materials and those submitted from Feature 3 is not clear. Most likely the pits or pit lobes represent single events during which oysters from differing environments may have been utilized.

A quahog and a knobbed whelk were submitted with the Feature 3 materials, and periwinkles and mussels are also present in the spoil materials from the general area of this excavation.

280R300; Archive number 2943

In the larger individuals from this bulk and column sample (Table 11), ovate individuals are present but rather thin and elongate left valves, typical of the intertidal mudflat settings, are most common. Only three of the larger left valves display prominent clionid sponges as epibionts, and one of these was collected dead. Ovate and robust left and right valves are more common among the smaller oysters, but shell epibionts are not at all common in even these latter individuals. Inhabitants of this site were thus exploiting both intertidal clusters of oysters and more scattered, smaller, lower intertidal specimens of this species. If the materials from 250R740 had not been separated by level, they may have yielded a bulk sample quite similar to the one from 280R300. A strong inference of spring through early summer gathering can be made for these oysters.

Fragments and entire valves of quahogs, fragments of both mussels and stout razor clams, and significant numbers of periwinkles are present in the column sample. At least two species of whelks also occur and one specimen of a knobbed whelk displays a slit-like perforation of the body whorl, made most likely for extraction of the meats.

38BU1249

Introduction

Site 38BU1249 lies in a maritime forest to the southeast of 38BU464. The site was originally recognized to include a midden, rich in periwinkles, of likely late Early Woodland (Deptford) age. More thorough excavations at the site have downgraded the importance of periwinkles and have suggested a Late Woodland (St.

Catherines/Savannah) age for its occupation.

290R320, Archive number 3030

In this bulk and column sample (Table 11) and for both larger and smaller, left and right, valves, robust and ovate individuals are most common. The sample includes the largest left valves seen in column samples from Callawassie Island; heights range up to 14.0 cm. Twenty of the 96 larger left valves display prominent clionid sponge galleries and external shell perforations, and many of these valves show the gray discolorations mentioned in a previous section of this report. This proportion of epibionts appears to be mirrored in all parts of the sample. Clearly a significant part of this sample came from the lowest intertidal/uppermost subtidal portions of the nearby estuarine environments. The oysters may have been gathered throughout the year but no strong inference of any season of gathering is possible in the materials examined. Given the previous suggestion that Callawassie Island inhabitants may have preferred to collect scattered oysters from the lower intertidal/upper subtidal zones (38BU464, 250R740, above) and the large size of such individuals from this column sample, it is tempting to speculate (using resource depletion arguments) that this site may be older than others of near-similar age in the island setting.

Fragmented quahogs, mussels, and stout razor clams appear in the column sample. Although not predominant, there are still quite significant numbers of periwinkles in the sample examined; the concentration is higher than in the other bulk and column lots.

38BU1262

Introduction

Site 38BU1262 was first recorded in 1990 and is based upon the presence of several buried shell middens, plus Woodland period ceramics, in this southern and marsh-facing area of Callawassie Island. Most recent excavations did focus in part upon two midden areas at the site, one of which yielded predominantly St. Catherines/Savannah (Late Woodland) phase ceramics, while the other was predominately Deptford (Early Woodland). Bulk and column samples from both of these excavation areas were submitted for analysis. A third sample came from Feature 2 at 38BU1262; this provenience is a shell pit lying at the edge of or under the midden deposits at the north (western) edge of the site, and has yielded late Early Woodland (Deptford) age artifacts.

75-80R500, Archive number 3044
260R520, Archive number 3063

But minor differences were found between the oysters from these two proveniences, and the sites are here described collectively. Among both larger (Table 11) and smaller left valves, elongate intertidal cluster oysters and more ovate individuals, the latter with relatively few shell epibionts and most likely from scatters in the lower intertidal zone, occur in subequal numbers. By contrast, ovate and robust oysters from the lower intertidal scatters are pre-eminent in both larger and smaller right valves. Most likely, the preserved source differences reflect the greater fragility of the right valves of the rather thin, intertidal cluster oysters. A strong inference of spring to summer gathering can be made for these oysters from 38BU1262. Those from 75-80R500 may have been gathered one to several months earlier, in these seasons, than those from 260R520 but because of the analytic difficulties cited above, and the possibility of climatic changes through time, this detailed time relationship remains obscure.

Fragments of mussels and stout razor clams are present in both of the bulk, column samples. Periwinkles also occur in both, but are present in fewer numbers than at the other sites on Callawassie Island. Fragmentary and entire valves of the quahog appear in the 75-80R500 column but are absent in the materials examined from 260R520.

Feature 2, Archive number 3072

Intertidal cluster oysters appear to be in a slight majority in this sample (Table 10). A strong inference of winter through spring seasons of gathering can be made for the oysters from this shell pit setting. One quahog, with a notched margin indicating forceful separation of the valves, was present in the submitted materials.

Summary

The oysters from these sites largely conform to the generalities for Callawassie Island archaeological oysters stated in a previous section of this report. The relative percentages of intertidal cluster versus scattered oysters (typically from lower in the tidal profile) do range from midden to midden and also change within different parts of the same midden; no areal patterns for oyster sources do emerge from the material at hand. Temporal patterns (at least at 38BU464) suggest that occupants of these sites may have preferentially collected the scattered, ovate, robust oysters from the lower intertidal/uppermost subtidal zones; inhabitants turned their attention to the intertidal cluster oysters when these desired oysters were of rather small size and/or were in short supply. If this reconstruction is correct, then resource depletion arguments can be used to suggest that the midden at 38BU1249 (290R320), with its numerous large, ovate, "scatter" oysters, is the oldest of those analyzed from the Late Woodland period of Callawassie Island. This recreation of course does imply some degree of temporal continuity in the use of shellfish resources of the local area, during the time period of concern.

Of more striking interest has been the discovery of oysters used as scrapers. Scrapers have also been found on nearby Spring Island where they occur in similar, small middens of Deptford age (Lawrence 1990b). This unearthing of scrapers from St. Catherines/Savannah contexts on Callawassie does extend their occurrence in time in the Woodland period of Beaufort County, South Carolina. The uses to which these implements were put remain conjectural. Inferred times of gathering center around the spring to early summer months, and this same seasonal pattern is also present in the Woodland period materials from Spring Island (Lawrence 1990b).

POLLEN ANALYSIS OF SAMPLES FROM SPRING AND CALLAWASSIE ISLANDS

Arthur D. Cohen

Although palynology has a long tradition in archaeological research (see, for example, Butzer 1971; Dimbleby 1967; Evans 1978), it is rather uncommonly integrated into archaeological research in South Carolina. These investigations were requested by Chicora Foundation, Inc. at the suggestion of Dr. Patricia Cridlebaugh, to determine if pollen samples could be recovered from Middle Woodland shell middens along the coast of South Carolina.

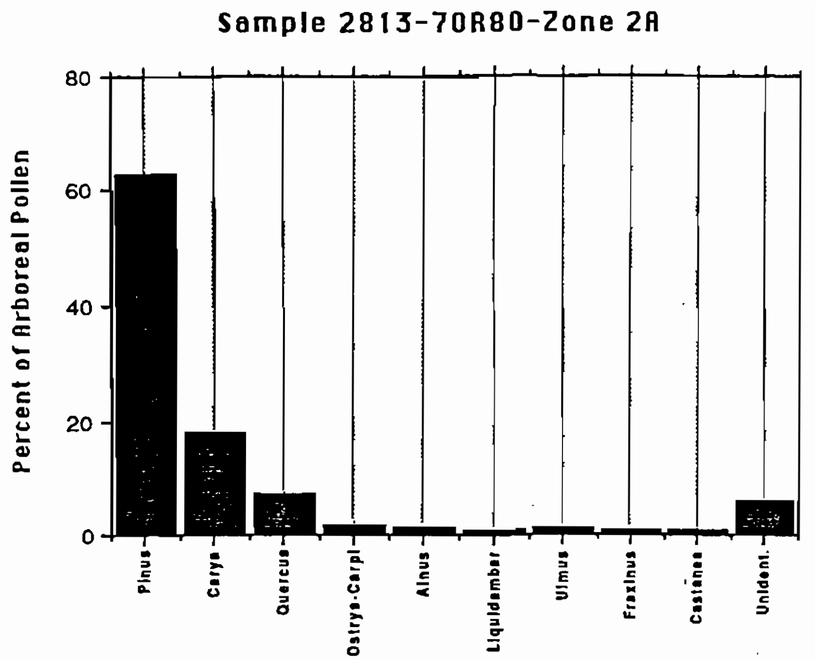
Analysis of Samples from 38BU1214, Spring Island

Two shell midden samples were obtained from Chicora Foundation for pollen analysis. There were: ARCH 2813 (70R80, Zone 2a) and ARCH 2871 (130R120, Zone 2a). These were processed by standard palynological procedures as described by Faegri and Iversen (1966) using maceration in potassium hydroxide, hydrochloric acid and hydrofluoric acid, and were stained with Safranin O.

Both samples were found to be very low in pollen and spore content and all palynomorphs that were found were moderately corroded. Seven slides were prepared for each of the samples and it was necessary to count all pollen and spores found on these slides in order to obtain a large enough count to produce significant graphs. Of the two samples, ARCH 2813 contained the most pollen (198 total grains). Sample ARCH 2871 was nearly barren, containing only 68 palynomorphs on the seven slides. It was decided to discontinue making additional slides after seven because analysis of this many slides was already very time consuming (requiring 3 to 6 hours per sample).

Figure 41 shows pollen diagrams of arboreal and nonarboreal pollen for sample ARCH 2813. This sample was dominated by arboreal pollen (89% AP, 11% NAP). Pine (*Pinus*), hickory (*Carya*), and oak (*Quercus*) were most abundant. All other forms occurred in trace amounts. All forms represented typical well-drained forest types as might occur in sandy uplands today. The nonarboreal pollen were dominated by types indicative of cleared or open sites (compositae, cheno-ams, gramineae) with some acidic wetter spots supporting ferns and *Sphagnum* moss.

Figure 42 is a pollen diagram for arboreal pollen in Sample ARCH 2871. It exhibits a similar spectrum to that of sample ARCH 2813, with slightly less oak and some slight differences in trace forest components. Since this sample had such a low content of nonarboreal pollen (8% NAP versus 92 AP), a diagram for nonarboreal



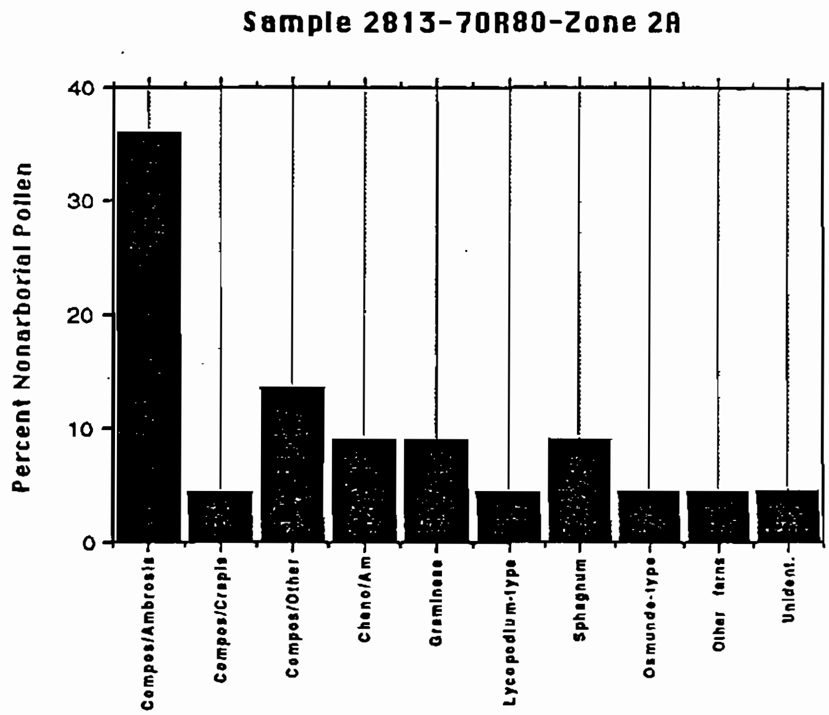


Figure 41. Arboreal and nonarboreal pollen diagrams for 70R80, Zone 2a.

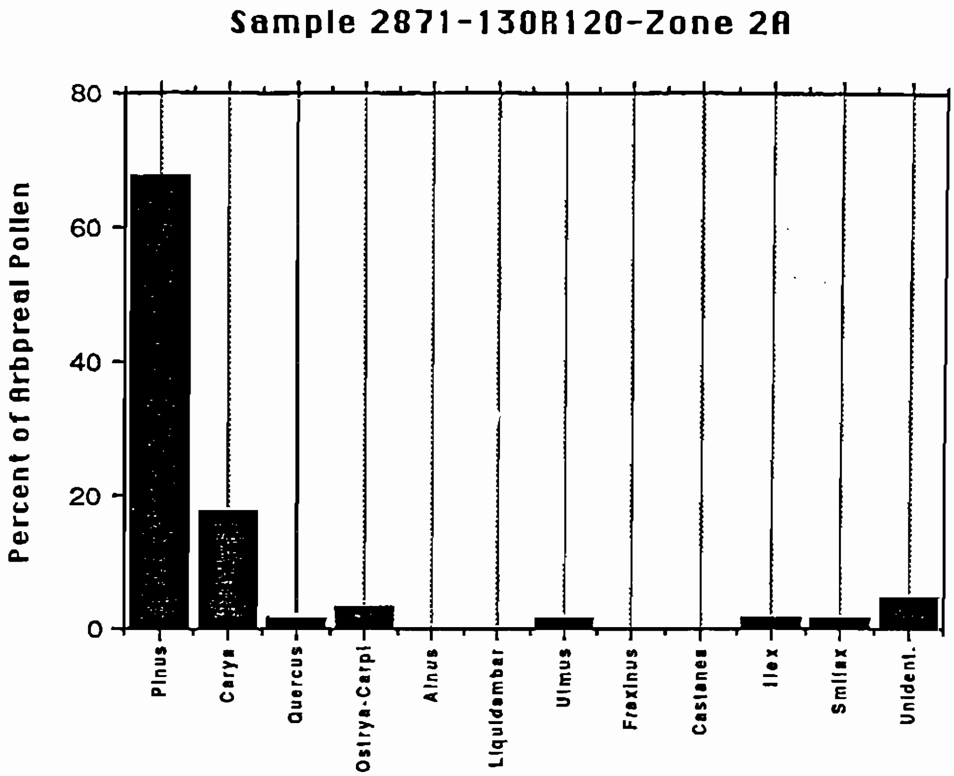


Figure 42. Arboreal pollen diagram for 130R120, Zone 2a.

types could not be prepared. However, trace amounts of compositae (Ambrosia and other types), gramineae, ferns, and Sphagnum were observed, suggesting a relatively dry, open, sandy setting with occasional moist acidic spots where shaded.

Since interpretation of pollen diagrams tends to be done on a relative basis, it would be useful to have a chronological sequence of samples for this region with which to compare these analyses (not only for dating purposes, but also for interpreting relative changes in ecological conditions). Unfortunately, such a sequence does not presently exist. It would be useful to obtain a core from the wetland area north of 38BU1214 for pollen analysis, since it probably contains a much better preserved and more complete record of ecological conditions in the region through time than exists at these midden sites.

Analysis of Samples from Callawassie Island

A series of four samples were submitted from archaeological excavations on Callawassie Island. Two were collected from 38BU19 (ARCH 2929-A and 2929-B) and two were collected from 38BU464 (ARCH 3003 and 3018).

These were processed by standard palynological procedures as described by Faegri and Iversen (1966) using maceration in potassium hydroxide, hydrochloric acid and hydrofluoric acid, and were stained with Safranin O.

Organic matter was present (i.e., cell fragments, occasional fungal spores, cell fillings, etc.), but few pollen grains. For all intents and purposes, all four samples were barren. Sample ARCH 2929-B had a few more pollen than the others; but, after having microscopically examined every part of 12 slides, only 15 pollen grains were identified (and these were highly corroded). This is not enough to do a pollen count.

THE FAUNAL REMAINS FROM THE FIVE ARCHAEOLOGICAL SITES ON SPRING AND CALLAWASSIE ISLANDS.

Jack H. Wilson, Jr.

Introduction

The vertebrate faunal collections from six components at five archaeological sites on Spring and Callawassie islands, Beaufort County, South Carolina were analyzed for this study. The faunal material from 38BU1214 on Spring Island, Beaufort County, South Carolina, is from two components at the site--prehistoric Deptford shell middens and a posited isolated eighteenth century slave settlement. The faunal collection from the historic component at 38BU1214 consists of more than 283 bone elements and fragments that weigh 450.7 grams. The prehistoric faunal remains total 380 bone elements and fragments that weigh 267.4 grams. This prehistoric Deptford component at 38BU1214 produced faunal remains from shell middens and the features associated with these shell middens. The historic component associated with the eighteenth century slave structure at 38BU1214 produced faunal material in the plowzone, Zone 2 (house midden remnant), and one feature (number 11). The prehistoric site at 38BU19 consists of shell middens, non-midden areas, and features that possess primarily St. Catherines ceramics. The faunal collection from this site consists of 65 bone elements and fragments that weigh 67.8 grams. The site at 38BU464 also consists of shell middens and features that have St. Catherines ceramics. The faunal collection from 38BU464 contains 2188 bone fragments and bone elements that weigh 697.8 grams. Another series of St. Catherines/Savannah shell middens and associated features were investigated on Callawassie Island at 38BU1249. This site's faunal assemblage consists of 50 bone elements and fragments that weighs 90.0 grams. The final collection of faunal material is from a mixed set of Deptford, St. Catherines, and Savannah shell middens investigated on Callawassie Island at 38BU1262. Only 42 bone fragments and bone elements weighing 39.5 grams were recovered from this site.

The faunal collection obtained from the Deptford, St. Catherines, and Savannah middens and the historic component was obtained by screening soil in Zone 1, a loamy sand through 1/4-inch mesh screen. The shell midden soil, Zone 2, was screened through 1/8-inch mesh screen. All feature fill was screened through 1/8-inch mesh screen. The only divergence from the screening practices outlined here occurred at 38BU1262, where Zone 1 was screened through 1/2-inch mesh screen, and Zone 2, the shell midden fill, was sifted through 1/4-inch mesh screen. This divergence introduces a bias in the faunal collection from 38BU1262, especially in its comparative utility with the other sites in this study.

The report sections that follow provide a description of the animal species represented in these faunal samples, the results of the zooarchaeological analysis of the remains, and a comparison of the data obtained from the six components with that for other sites of the appropriate time period from the coast of the Carolina Province.

Environmental Background

The Carolina Province marks the transitional zone between the tropical fauna of the southern Atlantic and the temperate fauna of the northern Atlantic, and is located between Cape Hatteras, North Carolina and Cape Canaveral, Florida (Briggs 1974; Ekman 1953). Spring Island and Callawassie Island are part of the Sea Island section of the coast that lies south of the Santee River into northern Florida, with the area north to Cape Fear, North Carolina forming the northern embayed section (Emery and Uchupi 1972). Along the edge of the Continental Shelf, the warm Florida Current flows northward, bringing tropical species north as far as Cape Hatteras. Closer inshore, the cold Labrador Current flows southward, and temperate marine species may be found in these cool waters as far south as Cape Canaveral.

The Sea Islands possess a relatively uniform temperature, rainfall, topography, and vegetation cover (Johnson et al. 1974; Mathews et al. 1980). Today, Spring Island and Callawassie Island exhibit three major ecosystems, the maritime ecosystem which consists of the upland forest area of the island, the estuarine ecosystem of deep water tidal habitats, and the palustrine ecosystem which consists of essentially fresh water-non-tidal wetlands (Sandifer et al. 1980:7-9). The maritime ecosystem is comprised of four subsystems, including sand spits and sand bars, sand dunes, transition shrub, and maritime forest (Sandifer et al. 1980:108-109). Of these four, the maritime forest and transition shrub subsystem are likely to have been important exploitation zones for the prehistoric and historic inhabitants of the two islands.

The estuarine ecosystem in the vicinity of the two islands consists of areas of deep-water tidal habitats and adjacent tidal wetlands. Spring Island is surrounded by the saltwater marshes associated with Callawassie Creek, Chechessee Creek, Chechessee River, and the Colleton River. Callawassie Island is bordered by the saltwater marshes of a tributary of Chechessee Creek, Callawassie Creek and the Colleton River. The estuarine systems are an important resource for use by the prehistoric and historic inhabitants of the two islands given the high biomass the ecosystem contains.

The freshwater palustrine ecosystem comprises all wetland systems, such as swamps, bays, savannas, pocosins, and creeks, where the water salinity measures less than 0.5 ppt. Remnant spring fed sloughs and freshwater ponds comprise the palustrine ecosystem on Spring Island and on Callawassie Island.

Combined the maritime forests, transition shrub, freshwater sloughs and ponds, saltwater marsh, and tidal creeks and rivers that mark the environment of Spring Island and Callawassie Island define a number of diverse habitats that could be exploited for food resources by the prehistoric and historic inhabitants of the area.

Analytical Techniques

The faunal collection from the six components at the five sites were studied by the author using standard zooarchaeological procedures and the Chicora Foundation comparative faunal collection. The bone material was sorted to class, suborder or species, and individual bone elements were identified. The bones of all taxa and other analytical categories were also weighed and counted. The Minimum Number of Individuals (MNI) for each animal category was computed using paired bone elements and age (mature/immature) as criteria. A minimum distinction method (Grayson 1973:438) was used to determine the MNI for each of the six archaeological components. This method provides a conservative MNI estimate based on the total faunal assemblage from each cultural component (one Deptford, four mixed Deptford/St. Catherines/Savannah, and one late eighteenth century historic in this case) in the study.

As a measure of zooarchaeological quantification, MNI has a number of problems (Grayson 1973:438; 1984:28-92; Klein and Cruz-Uribe 1984:26-32). How one aggregates the MNI will affect the number of individuals calculated. If MNI is calculated based on the entire site, the number will be smaller than if it is calculated for each excavation unit and totaled for the site. Use of MNI emphasizes small species over large ones. For example, a collection may have only a few large mammals, such as deer, and scores of fish. Yet, the amount of meat contributed by one deer may be many times greater than that contributed by a score or two of fish.

Given the problems associated with MNI as a zooarchaeological measure, an estimate of biomass contributed by each taxon to the total available for use by the inhabitants of the site is also calculated. The method used here to determine biomass is based on allometry, or the biological relationship between soft tissue and bone mass. Biomass is determined using the least squares analysis of logarithmic data in which bone weight is used to predict the amount of soft tissue that might have been supported by the bone (Casteel 1978; Reitz 1982, 1985; Reitz and Cordier 1983; Reitz and

Scarry 1985; Reitz et al. 1987; Wing and Brown 1979). The relationship between body weight and skeletal weight is expressed by the allometric equation $Y = aX^b$, which can also be written as $\log Y = \log a + b(\log X)$ (Simpson et al. 1960:397). In this equation, Y is the biomass in kilograms, X is the bone weight in kilograms, a is the Y-intercept for a log-log plot using the method of least squares regression and the best fit line, and b is the constant of allometry, or the slope of the line defined by the least squares regression and the best fit line. Table 12 details the constants for a and b used to solve the allometric formula for a given bone weight X for each taxon identified in the archaeological record.

The results of the analysis of the faunal collections from the six components at five archaeological sites on Spring and Callawassie islands will be split into two sections. The first section will consider the faunal remains from the five archaeological sites with prehistoric components. The results of the analysis of the faunal material from the historic component at 38BU1214 follows as the second section.

Identified Fauna from the Prehistoric Sites

Before considering the results of the zooarchaeological study of the faunal remains recovered from the five prehistoric components, the general use and habitat preference for each identified species will be considered. Tables 13-17 lists the various animal species identified in the archaeological collections recovered from the excavations within the identified shell middens and features at these five components.

Wild Mammals

The most numerous of the wild mammals is the white-tailed deer (Odocoileus virginianus). A variety of uses exist for the different parts of this animal, so that almost all of a deer was utilized in some manner prehistorically by the Native Americans (Runquist 1979:169; Swanton 1946:249). Deer metatarsals were used as beamers and split to make needles; ulnae were used as awls; and antlers were made into flakers, projectile points and fish hooks (Swanton 1946:249; see also Trinkley 1980a). Rattles, flutes, bracelets, and beads were also made from deer bone (Swanton 1946:249). Sinew and entrails were manufactured into bow strings, rawhide, throngs, and "thread" (Swanton 1946:249). Deer brains were combined with green corn to tan leather (Lawson 1967:217). The skins, hooves, and antlers were rendered into glue. Heads, skins, and antlers were used as decoys in hunting and as status/clan indicators. Hides were sewn into clothing, and used as coverings for houses/doors (Swanton 1946:249). In general, the deer's preferred habitat is the edge of deciduous forests and open forests, although they will move to mudflats around marshes to feed on the grasses found there.

Table 12.

List of Allometric Values Utilized in this Study to Determine Biomass in Kilograms (kg) Based on Bone Weight Expressed in Kilograms.

Faunal Category	log a	b	r^2
Mammal	1.12	0.90	0.94
Bird	1.04	0.91	0.97
Turtle	0.51	0.67	0.55
Snake	1.17	1.01	0.97
Chondrichthyes (shark)	1.68	0.86	0.85
Osteichthyes (boney fish)	0.90	0.81	0.80
Non-Perciformes	0.85	0.79	0.88
Siluriformes (catfish, sea catfish)	1.15	0.95	0.87
Perciformes (sea bass, bluefish)	0.93	0.83	0.76
Sparidae (porgy)	0.96	0.92	0.98
Sciaenidae (drum)	0.81	0.74	0.73
Pleuronectiformes (flounder)	1.09	0.89	0.95

Derived from Table 4 in Reitz (1985:44) and Table 2.3 in Quitmyer (1985c:440).

These variables are used to solve the formula $Y = aX^b$, or $\log Y + \log a + b(\log X)$; where Y is the biomass in kilograms, X is the weight of the bone in kilograms, a is the Y-intercept, b is the slope, and r^2 is the proportion of total variance explained by the regression model (see Reitz 1985:44; Reitz and Scarry 1985:67).

Two rabbit species are common to the study area, the eastern cottontail (Sylvilagus floridanus) and the marsh rabbit (Sylvilagus palustris). Besides being used by the Indians for food, the skins of rabbits were made into robes (Swanton 1946:250). Rabbit innominates and scapulae were used as beads by Native Americans (Wilson 1984:519). Rabbits occupy a number of different habitats, but are usually found in thickets, in overgrown fields, and along the edge of forest clearings and forest edges. Important to rabbits in their choice of habitats is access to escape cover offered by thickets, weed patches, and dense high grass. The marsh rabbit generally prefers damper ground than does the eastern cottontail, and is somewhat more likely to be found in locations near marshes.

Raccoon (Procyon lotor) bones are present in small numbers in the prehistoric collections. Raccoons served as a food resource for Native Americans, the furry skin was used for clothing, and claws were utilized as ornaments (Swanton 1946:250). This mammal is able to adapt to a variety of habitats, although they prefer wooded areas near water.

Remains of the opossum (Didelphis virginiana) are present. The opossum was used as a food resource and its hair was woven into textiles (Swanton 1946:250). The preferred habitat of the opossum, a nocturnal, is wooded areas near water, but they are often found in and around human settlements.

Aquatic Reptiles: Turtles

The diamondback terrapin (Malaclemys terrapin) is a turtle found in an estuarine setting that feeds on marine molluscs (Obst 1986:113). The subspecies Carolina diamondback terrapin (Malaclemys terrapin centrata), which inhabits the Atlantic Coast from North Carolina to Florida (Obst 1986:214), is probably the turtle represented in the prehistoric faunal collections. The taste of diamondback terrapin flesh is considered to lie between that of chicken and fish (Obst 1986:113). In addition to serving as a food resource, the shells of the terrapin could be used to make rattles (Swanton 1946:252). This resident of the coastal marshes, tidal flats, coves, estuaries and the lagoons behind barrier beaches can be joined in this brackish water environs on occasion by other turtles including mud turtles and cooters (Ernst and Barbour 1972:105).

Another turtle present in small quantities in the faunal collections is the mud turtle (Kinosternon spp.). This turtle also dwells in the water, and it is usually found near freshwater sources (Obst 1986:109) and on occasion in brackish water. Mud turtles could possibly have been used as a food resource.

The third turtle species present is the Eastern box turtle (Terrapene carolina carolina). This turtle is widespread throughout the southeast and is adaptable to both aquatic and terrestrial habitats. Box turtles can be found near permanent bodies of water, or in open, mixed forests where the climate is hot and dry in the summer and the winters are mild (Obst 1986:106). Box turtles were used as a food resource, and their shells were made into rattles by Native Americans (Swanton 1946:252).

A fourth turtle species identified in the prehistoric faunal assemblages is the cooter (probably Chrysemys floridana). This turtle can be found primarily in and around bodies of freshwater such as ponds, lakes, rivers, and canals (Obst 1986:109-111), and on occasion in brackish waters. These turtles use the land to lay their eggs at some distance from water, to sun themselves, and occasionally to feed. As with the other turtles, the cooter could have served as a food resource, and their shell could have been made into rattles by Native Americans.

Pisces

Remains of fish are an important part of the prehistoric faunal assemblages analyzed for this study. The fish present are found in both freshwater and tidal creek habitats, or are those found in a marine setting (that is they spawn in the estuary or use the area as a nursery. The one predominately freshwater fish identified is the bullhead catfish (Ictalurus spp.). The bullhead catfish is found in pools and backwaters of sluggish streams, usually in areas of heavy vegetation (Lee et al. 1980:442). The most common freshwater catfish found in the sluggish waters and low salinity areas of South Carolina estuaries is the white catfish (Ictalurus catus) (Wenner et al. 1981).

The remaining fishes identified in the collections are species that either spawn in the estuary or use the area as a nursery. The most abundant family in the collection are the drums (Sciaenidae). Members of the drum family include black drum (Pongias cromis), silver perch (Bairdiella chrysoura), seatrout (Cynoscion spp.), spots (Leiostomus xanthurus), red drum (Sciaenops ocellatus), star drum (Stellifer lanceolatus), and Atlantic croaker (Micropogonias undulatus). All of these drums are commonly found in bays and estuaries. The star drum and the Atlantic croaker are good seasonal indicators, being present in the estuarine system from early spring with a maximum availability in the late fall.

The remaining marine fish specimen present is the sea catfish (Arius felis). Sea catfish are common in waters with salinities up to 45 ppt., but occasionally are found in water with salinities up to 60 ppt. and in fresh water (Lee et al. 1980:476). This fish inhabits turbid, shallow coastal waters with sand or mud substrate. The sea catfish is an opportunistic bottom feeder that preys primarily on worms and small crustaceans. This marine fish is often found in schools.

Commensals

Commensal species are those animals commonly found near human occupations such as pests, vermin, animals that prey on pests and vermin, and pets. Mice, rats, moles, and snakes comprise the commensal species that can be identified in the prehistoric faunal assemblages. The rice rat (Oryzymous palustris) is a major crop pest that prefers wet or marshy areas, but is found wherever food resources are abundant. The deer mouse (Peromyscus spp.) is usually found in forested areas, but is also present at forest edges, in open clearings, and in overgrown clearings. The snakes present include the terrestrial species of corn snake (Elaphe spp.), black racer (Coluber spp.), and king snake (Lampropeltis getulus). The water snake (Natrix spp.) is also present.

Analysis of the Prehistoric Faunal Remains

The prehistoric vertebrate faunal remains analyzed for this study are comprised of the following assemblages. A total of 380 bone elements and fragments that weigh 267.4 grams were recovered from the Deptford component of 38BU1214 from Spring Island (Table 13). The primarily St. Catherines faunal assemblage from 38BU19 on Callawassie Island comprised 65 bone elements and fragments that weigh 67.8 grams (Table 14). The faunal collection from 38BU464, another St. Catherines site on Callawassie Island, totaled 2188

Table 13.
Minimum Number of Individuals (MNI), Number of Bones, Weight, and Estimated Meat Yield by Species for the Deptford Component at 38BU1214.

SPECIES	MNI #	MNI %	NUMBER OF BONES	WEIGHT gm	BIOMASS kg	BIOMASS %
White-tailed Deer, <u>Odocoileus virginianus</u>	2	16.67	19	66.7	1.152	29.93
Raccoon, <u>Procyon lotor</u>	2	16.67	47	25.5	0.485	12.60
Opossum, <u>Didelphis virginiana</u>	1	8.33	3	2.9	0.069	1.79
Rabbit, <u>Sylvilagus</u> spp.	1	8.33	2	1.9	0.047	1.22
Unidentified Mammal	-	-	54	60.9	1.062	27.59
Unidentified Bird	-	-	26	9.8	0.163	4.23
Carolina Diamondback Terrapin, <u>Malaclemys terrapin centrata</u>	1	8.33	19	13.3	0.179	4.65
Box Turtle, <u>Terrapene carolina</u>	1	8.33	4	1.1	0.034	0.88
Mud Turtle, <u>Kinosternon</u> spp.	1	8.33	2	0.2	0.011	0.29
Unidentified Turtle	-	-	9	1.8	0.047	1.22
Drum, Sciaenidae	1	8.33	17	25.9	0.433	11.25
Sea Catfish, <u>Arius felis</u>	1	8.33	1	1.9	0.037	0.96
Catfish, <u>Ictalurus</u> spp.	1	8.33	1	0.1	0.002	0.05
Unidentified Fish	-	-	50	6.1	0.128	3.33
Unidentified	-	-	126	49.3	-	-
TOTAL	12	100	380	267.4	3.849	100

bone elements and fragments that weigh 697.8 grams (Table 15). Fifty bone elements and fragments that weigh 90.0 grams comprised the faunal assemblage from the St. Catherines/Savannah site of 38BU1249 on Callawassie Island (Table 16). A total of 42 bone elements that weigh 39.5 grams were recovered from 38BU1262, a mixed Deptford, St. Catherines, Savannah site on Callawassie Island (Table 17). Tables 13-17 also list the Minimum Number of Individuals (MNI), number of bones, weight of bone, and biomass calculations by faunal category for prehistoric component from each site. Tables 18-22 summarize the MNI and biomass calculations by faunal category for each prehistoric component. The ten species/taxa that contribute the most to the total biomass calculated for the prehistoric component could only be compiled for the faunal assemblages from 38BU1214 and 38BU464 (Table 23).

Examination of Tables 13-23 show that there is a great variety in the quantity of bone, weight of bone, and MNI and biomass calculations among the study faunal samples. The discussion that follows will focus primarily on the faunal assemblages from 38BU1214 (a Deptford component) and 38BU464 (primarily a St. Catherines component), with the St. Catherines component faunal collections from 38BU19 and 38BU1249, and the mixed Deptford/St. Catherines/Savannah site, 38BU1262, being considered when appropriate. The faunal assemblage from 38BU1262 besides being mixed also suffers because it was not obtained by excavation

Table 14.
Minimum Number of Individuals (MNI), Number of Bones, Weight, and Estimated Meat Yield by Species for the St. Catherines Component at 38BU19.

SPECIES	MNI #	MNI %	NUMBER OF BONES	WEIGHT gm	BIOMASS kg	BIOMASS %
White-tailed Deer, <u>Odocoileus virginianus</u>	1	16.67	9	25.5	0.485	40.45
Raccoon, <u>Procyon lotor</u>	1	16.67	5	3.1	0.073	6.09
Unidentified Mammal	-	-	12	12.2	0.250	20.85
Turkey, <u>Meleagris gallapavo</u>	1	16.67	2	0.9	0.100	8.34
Unidentified Bird	-	-	2	5.7	0.019	1.58
Box Turtle, <u>Terrapene carolina</u>	1	16.67	6	4.6	0.088	7.34
Mud Turtle, <u>Kinosternon</u> spp.	1	16.67	2	1.1	0.034	2.84
Drum, Sciaenidae	1	16.67	3	5.9	0.145	12.09
Unidentified Fish	-	-	1	0.1	0.005	0.42
Unidentified	-	-	23	8.7	-	-
TOTAL	6	100	65	67.8	1.199	100

procedures that were used at the other sites in this study.

The Deptford Component Faunal Categories from 38BU1214

In the faunal collection from the Deptford component at 38BU1214, the wild mammals comprise the largest faunal category based on both MNI (n=6) and biomass (1.753 kg) calculations (Table 18). Included in this group are deer, raccoon, opossum, and rabbit (either the cottontail <u>Sylvilagus floridanus</u> or the marsh rabbit <u>S. palustris</u>). All four, including the cottontail rabbit, are species that could be found near the marsh, although only the marsh rabbit prefers the wetlands. Deer would normally be found in the vicinity of the maritime forests, especially along its edge. Raccoons and opossum would usually be found near fresh water sources. Deer, raccoon and opossum occasionally visit the marsh area to feed.

The next most abundant faunal category by both MNI (n=3) and biomass (0.6 kg) in the Deptford component at 38BU1214 is the fish (Table 18). The identified fish present include one individual each of drum, sea catfish, and catfish. Drum are relatively large predatory fish that are most common near the mouths of intertidal creeks where they feed (Cain 1973). The sea catfish is an opportunistic bottom feeder that would be found in the turbid shallow waters of the estuarine system and the intertidal creeks in areas with salinities as high as 60 ppt. (Lee et al. 1980:476). The third identified fish species present is the catfish, with the white catfish (<u>Ictalurus catus</u>) being the most common freshwater catfish found in the sluggish waters and low salinity areas of the

Table 15.
Minimum Number of Individuals (MNI), Number of Bones, Weight, and Estimated Meat Yield by Species for the St. Catherines Component at 38BU464.

SPECIES	MNI #	MNI %	NUMBER OF BONES	WEIGHT gm	BIOMASS kg	BIOMASS %
White-tailed Deer, Odocoileus virginianus	4	5.56	68	215.9	3.310	38.26
Raccoon, Procyon lotor	6	8.33	32	18.9	0.370	4.28
Opossum, Didelphis virginiana	2	2.78	3	1.8	0.045	0.52
Rabbit, Sylvilagus spp.	1	1.39	2	0.6	0.017	0.20
Eastern Gray Squirrel Scirus carolinensis	1	1.39	3	0.6	0.017	0.20
Deer Mouse, Peromyscus spp.	1	1.39	1	0.1	0.003	0.03
Rice Rat, Oryzymous palustris	1	1.39	1	0.1	0.003	0.03
Unidentified Mammal	-	-	52	63.4	1.101	12.73
Duck, Anas spp.	2	2.78	2	3.4	0.062	0.72
Turkey, Meleagris gallapavo	1	1.39	1	1.1	0.022	0.25
Unidentified Bird	-	-	33	8.5	0.143	1.65
Carolina Diamondback Terrapin, Malaclemys terrapin centrata	1	1.39	26	10.5	0.153	1.77
Cooter, Chrysemys floridana	1	1.39	16	8.8	0.136	1.57
Box Turtle, Terrapene carolina	1	1.39	10	3.3	0.070	0.81
Mud Turtle, Kinosternon spp.	1	1.39	18	2.7	0.062	0.72
Unidentified Turtle	-	-	9	5.1	0.094	1.09
Drum, Sciaenidae	32	44.44	302	158.5	1.653	19.11
Sea Catfish, Arius felis	10	13.89	167	31.7	0.532	6.15
Catfish, Ictalurus spp.	2	2.78	6	2.8	0.053	0.61
Unidentified Fish	-	-	642	43.7	0.629	7.27
Corn Snake, Elaphe spp.	2	2.78	73	9.3	0.131	1.51
Black Racer, Coluber spp.	1	1.39	2	0.4	0.005	0.06
King Snake, Lampropeltis getulus	1	1.39	2	0.2	0.003	0.03
Water Snake, Natrix spp.	1	1.39	42	2.6	0.036	0.42
Unidentified Snake	-	-	1	0.1	0.001	0.01
Unidentified	-	-	672	104.6	-	-
TOTAL	72	100	2188	697.8	8.651	100

Table 16.
Minimum Number of Individuals (MNI), Number of Bones, Weight, and Estimated Meat Yield by Species for the St. Catherines/Savannah Component at 38BU1249.

SPECIES	MNI #	MNI %	NUMBER OF BONES	WEIGHT gm	BIOMASS kg	BIOMASS %
White-tailed Deer, <u>Odocoileus virginianus</u>	1	20.00	16	72.2	1.235	79.37
Raccoon, <u>Procyon lotor</u>	1	20.00	1	1.6	0.040	2.57
Unidentified Mammal	-	-	2	3.8	0.087	5.59
Unidentified Bird	-	-	2	1.2	0.024	1.54
Box Turtle, <u>Terrapene carolina</u>	1	20.00	1	0.6	0.022	1.41
Drum, Sciaenidae	1	20.00	6	4.6	0.120	7.71
Sea Catfish, <u>Arius felis</u>	1	20.00	3	1.0	0.020	1.29
Unidentified Fish	-	-	2	0.2	0.008	0.51
Unidentified	-	-	17	4.8	-	-
TOTAL	5	100	50	90.0	1.556	100

Table 17.
Minimum Number of Individuals (MNI), Number of Bones, Weight, and Estimated Meat Yield by Species for the Deptford/St. Catherines/Savannah Component at 38BU1262.

SPECIES	MNI #	MNI %	NUMBER OF BONES	WEIGHT gm	BIOMASS kg	BIOMASS %
White-tailed Deer, <u>Odocoileus virginianus</u>	1	25.00	3	9.2	0.194	25.39
Raccoon, <u>Procyon lotor</u>	1	25.00	7	19.1	0.376	49.21
Unidentified Mammal	-	-	3	3.2	0.075	9.82
Unidentified Bird	-	-	10	4.6	0.082	10.73
Drum, Sciaenidae	1	25.00	1	0.3	0.016	2.09
Unidentified Fish	-	-	1	0.3	0.011	1.44
Corn Snake, <u>Elaphe</u> spp.	1	25.00	5	0.7	0.010	1.31
Unidentified	-	-	12	2.1	-	-
TOTAL	4	100	42	39.5	0.764	100

South Carolina estuaries (Wenner et al. 1981). The low numbers of each identified fish species present would indicate that their capture was by hook-and-line or gigging. Mass recovery of fish by nets or seines by the Deptford inhabitants of 38BU1214 is not indicated by the variety or number of fish remains.

The other faunal category in the Deptford component from

38BU1214, represented by both MNI (n=3) and biomass (0.271 kg), is the aquatic reptiles (Table 18). The turtles that comprise this category consist of one individual each of Carolina diamondback terrapin, mud turtle, and box turtle. The Carolina diamondback terrapin is present in some quantity within the marsh on a year-round basis, although maximum yields would be available during their breeding season of May and early June (Quitmyer 1985b:20). The Carolina Diamondback terrapin inhabits the estuarine area, being found near shell bottoms and oyster beds where it feeds (Sandifer et al. 1985:202). The mud turtle is generally found in freshwater, although it occasionally will venture into estuarine settings (Ernst and Barbour 1972:105). The box turtle is a freshwater aquatic turtle that is equally at home on the land, often being found in open woods and near standing water. These turtles could be caught using handlines, traps, or by hand.

Although no individuals species could be identified in the Deptford faunal collection from 38BU1214, wild bird remains are present and contribute 0.163 kg to the total biomass (Table 18). Bird species that inhabit the marsh/wetlands surrounding Spring Island include a variety of ducks (Anas spp.) and Canadian geese (Branta canadensis). The turkey (Meleagris gallapavo) and bobwhite quail (Colinus virginianus) are two bird species that could have inhabited the cleared areas, forest edges, and maritime forests of the island.

Somewhat surprising is the fact that no commensal species are included in the prehistoric Deptford faunal collection from 38BU1214 (Table 18). As will be seen, a variety of mice, rats, and snakes are commonly found in prehistoric and historic sites of the

Table 18.
Summary of the Deptford Component Faunal Categories Expressed as Counts and Percentages for MNI and Biomass, 38BU1214.

	MNI		BIOMASS	
FAUNAL CATEGORY	#	%	kg	%
Wild Mammals (Deer, Raccoon, Opossum, Rabbit)	6	50.00	1.753	62.90
Wild Birds	-	-	0.163	5.84
Aquatic Reptiles (Turtles, Terrapins)	3	25.00	0.271	9.72
Fish (Drum, Sea Catfish, Catfish)	3	25.00	0.600	21.53
Commensal Species	-	-	-	-
TOTAL	12	100	2.787	100

Table 19.
Summary of the St. Catherines/Savannah Component Faunal Categories Expressed as Counts and Percentages for MNI and Biomass, 38BU19.

	MNI		BIOMASS	
FAUNAL CATEGORY	#	%	kg	%
Wild Mammals (Deer, Raccoon, Opossum, Rabbit)	2	33.33	0.558	58.80
Wild Birds	1	16.67	0.119	12.54
Aquatic Reptiles (Turtles, Terrapins)	2	33.33	0.122	12.86
Fish (Drum, Sea Catfish, Catfish)	1	16.67	0.150	15.81
Commensal Species	-	-	-	-
TOTAL	6	100	0.949	100

Table 20.
Summary of the St. Catherines/Savannah Component Faunal Categories Expressed as Counts and Percentages for MNI and Biomass, 38BU464.

	MNI		BIOMASS	
FAUNAL CATEGORY	#	%	kg	%
Wild Mammals (Deer, Raccoon, Opossum, Rabbit)	14	19.44	3.759	49.73
Wild Birds (Duck, Turkey)	3	4.17	0.227	3.00
Aquatic Reptiles (Turtles, Terrapins)	4	5.56	0.515	6.81
Fish (Drum, Sea Catfish, Catfish)	44	61.11	2.867	37.93
Commensal Species	7	9.72	0.191	2.53
TOTAL	72	100	7.559	100

region. It is possible that this absence, and the relative abundance of the other faunal categories, including the wild bird category, is related to the small size of the faunal sample.

The St. Catherines/Savannah Component Faunal Categories from 38BU464, 38BU19, 38BU1249 and the Mixed Collection from 38BU1262

The composition of the largest St. Catherines faunal assemblage from 38BU464 (Table 20) on Callawassie Island differs from that of the 38BU1214 Deptford component. The largest faunal category according to biomass for 38BU464 continues to be the wild mammals (3.759 kg), with deer, raccoon, opossum, and rabbit being present. The fish faunal category, however, has the most MNI, 44 (61.11%) as compared to the 14 (19.44%) noted for the wild mammals. The same identified fish species are present at 38BU464 as are found at 38BU1214--drum, sea catfish, and catfish. However, given the numbers and variety of sizes indicated for the drum by the different size otoliths recovered, it is possible that the fish were collected by the inhabitants of 38BU464 through the use of nets or seines. Although individuals of the three identified fish species can be found in the estuaries year-round, these species generally migrate out of the estuaries during the winter months. Catfish and drum are generally most abundant during the spring, summer, and fall, and rare in the winter.

The turtles (Carolina diamondback terrapin, mud turtle and box turtle) in the St. Catherines/Savannah faunal collection from 38BU464 are a distant third when both MNI (n=4) and biomass (0.515 kg) are considered. Although it is possible that these three turtles may have been available year round, it is more likely that they were available as a food resource only from the spring through the fall, being absent during the winter. The wild bird category occupies the fourth position according to both MNI (n=3) and biomass (0.227 kg), with duck and turkey being identified species present. The duck, as a migratory waterfowl, would generally have been present on the coast of South Carolina only during the fall, winter and early spring of the year. However, the small number of duck identified in the collection (MNI=2) does not rule out the possibility that these remains represent specimens that summered on the coast.

Commensal species are also found in the faunal assemblage from 38BU464, with the deer mouse, rice rat, and a variety of snakes including corn snake, black snake, king snake, and water snake being identified. The presence of these commensal species indicates that the site may have been occupied for a relatively long period of time during the year, at least from spring through early winter when these animals would have been present. Combined with the information on the primary season(s) of availability for the fish, bird, and wild mammal fauna (this latter category being available year round), it would appear that there is no clear division by season for when 38BU464 was most likely occupied. Essentially, habitation at any season of the year is indicated, with a winter occupation being supported the least by the data derived from the analysis of the vertebrate remains.

The various faunal categories established for the St. Catherines/Savannah assemblages from 38BU464 and 38BU1249, and the mixed Deptford/St.Catherines/ Savannah collection from 38BU1262 all reflect the small sample size upon which they are based (Tables 21-23). All three emphasize the importance of the wild mammals faunal category over the other categories, especially the fish. Although the sample sizes are small for these three sites, their faunal categories do appear to indicate that the importance of the wild mammals and fish resources noted for both the Deptford component at 38BU1214 and the St. Catherines/Savannah component at 38BU464 is not misplaced.

Rank of Ten Most Prominent Fauna Species by MNI and Biomass at 38BU1214 and 38BU464

The ten most important identified faunal species by MNI and biomass in the Deptford Component at 38BU1214 and in the St.

Catherines component at 38BU464 are listed in Table 23. The MNI and biomass rankings at 38BU1214 are similar for the first three positions, with deer, raccoon, and drum appearing in that order of importance. These three species underscore the importance of both the land and aquatic fauna as food resources. The remaining seven fauna species at 38BU1214 are from both the land (opossum, rabbit, and box turtle) and the estuarine environment (diamondback terrapin, sea catfish, mud turtle, and catfish).

The pattern exhibited among the ten most prominent faunal species in the St. Catherines assemblage from 38BU464 is similar to the 38BU1214 pattern with both aquatic resources (drum and sea catfish) and land fauna (raccoon and deer) comprising the top four species. The emphasis would appear to be shifted slightly toward the estuarine/marine habitat being of somewhat more importance than noted for the Deptford component at 38BU1214. By biomass, deer and raccoon still rank first and fourth, but the box turtle is the only other land based animal that ranks among the top ten species according to biomass. On the other hand, the estuarine/marine habitat species include drum (second), sea catfish (third), diamondback terrapin (fifth), cooter (sixth), duck (ninth), and mud turtle (tenth). A commensal species, the corn snake, ranks seventh according to biomass and is tied for fifth according to MNI.

One impression that may be drawn from the general composition of these two faunal assemblages is that the 38BU464 St. Catherines remains reflect a longer, more intense occupation than does the 38BU1214 Deptford material. The number of commensal species at the former site would tend to support this, although questions relating to seasonality and sample size certainly may be clouding the issue.

Table 21.
Summary of the St. Catherines/Savannah Component Faunal Categories Expressed as Counts and Percentages for MNI and Biomass, 38BU1249.

	MNI		BIOMASS	
FAUNAL CATEGORY	#	%	kg	%
Wild Mammals (Deer, Raccoon)	2	40.00	1.275	86.79
Wild Birds	-	-	0.024	1.63
Aquatic Reptiles (Turtles)	1	20.00	0.022	1.50
Fish (Drum, Sea Catfish)	2	40.00	0.148	10.07
Commensal Species	-	-	-	-
TOTAL	5	100	1.469	100

Table 22.
Summary of the Deptford/St. Catherines/Savannah Component Faunal Categories Expressed as Counts and Percentages for MNI and Biomass, 38BU1262.

FAUNAL CATEGORY	MNI #	MNI %	BIOMASS kg	BIOMASS %
Wild Mammals (Deer, Raccoon)	2	50.00	0.570	82.73
Wild Birds	-	-	0.082	11.90
Aquatic Reptiles (Turtles)	-	-	-	-
Fish (Drum)	1	25.00	0.027	3.92
Commensal Species	1	25.00	0.010	1.45
TOTAL	4	100	0.689	100

Diversity and Equitability of the Prehistoric Faunal Assemblages

Table 24 considers the diversity and equitability of the MNI and biomass calculations for the Deptford and St. Catherines/Savannah faunal collections analyzed for this study. The MNI diversity measure for the Deptford component from 38BU1214 (2.2534) is below the midpoint of the scale, which runs to 4.9.

Table 23.
Rank of the Ten Most Prominent Fauna Species by Biomass and MNI for the Deptford Component from 38BU1214 and the St. Catherines Site at 38BU464.

38BU1214 Species	MNI Rank	Biomass Rank	38BU464 Species	MNI Rank	Biomass Rank
White-tailed Deer	1	1	Drum	1	2
Raccoon	2	2	Sea Catfish	2	3
Drum	3	3	Raccoon	3	4
Diamondback Terrapin	3	4	White-tailed Deer	4	1
Opossum	3	5	Opossum	5	-
Rabbit	3	6	Duck	5	9
Sea Catfish	3	7	Catfish	5	-
Box Turtle	3	8	Corn Snake	5	7
Mud Turtle	3	9	Diamondback Terrapin	9	5
Catfish	3	10	Cooter	9	6
			Box Turtle	9	8
			Mud Turtle[1]	9	10

1. The other species that tied for the ninth MNI rank at 38BU464, but did not make the top ten biomass rankings include rabbit, squirrel, deer mouse, rice rat, turkey, black snake, king snake, and water snake.

to 4.9. The equitability for 38BU1214 is quite high (0.9786 on a scale from 0 to 1). For biomass, the diversity figure for 38BU1214

Table 24.
Diversity and Equitability of the MNI and Biomass Calculations for the Prehistoric Faunal Samples Analyzed for this Study.

SITE	DIVERSITY	EQUITABILITY	N	MNI
38BU1214	2.2534	0.9786	10	12
38BU19	1.7922	1.00	6	6
38BU464	2.1135	0.7055	20	72
38BU1249	1.6095	1.00	5	5
38BU1262	1.3860	1.00	4	4

SITE	DIVERSITY	EQUITABILITY	N	BIOMASS
38BU1214	1.5006	0.6517	10	2.449
38BU19	1.4152	0.7898	6	0.925
38BU464	1.5959	0.5327	20	8.651
38BU1249	0.5260	0.3268	5	1.425
38BU1262	0.8216	0.5927	4	0.596

The Shannon-Weaver (1949:49) formula used to determine the diversity of a sample is

$$H = -\Sigma\, p_i(\ln p_i)$$

where H is the measure of diversity, and p_i is, in this case, either the MNI or the biomass of each species/taxon "i" divided by the total MNI or total biomass as appropriate for the sample. Thus, for each identified species/taxon that has a MNI count, p_i is calculated by dividing the MNI for that species by the total number of MNI from the sample. The diversity measure H is the sum of all the p_i multiplied by the natural log (ln) of each p_i. A similar procedure is used to calculate the diversity index for the biomass, with the biomass figures being substituted for the MNI in the above explanation.

The Sheldon formula (Pielou 1966; Sheldon 1969) used to determine the equitability of a sample is

$$H' = H/(\ln N)$$

where H' is the measure of equitability, H is the Shannon-Weaver diversity measure calculated for the sample, and N is the total number of cases, observations, or, in this situation, species/taxon for which MNI or biomass was calculated in the sample. Equitability is simply the diversity measure divided by the natural log (ln) of N, the number of species/taxon for which the MNI was calculated or the number of species/taxon for which the biomass calculations was made.

is in the lower third of the scale, and the equitability is toward the high side. These figures indicate that there appear to be a number of animal species regularly exploited as food resources by the Deptford inhabitants of 38BU1214, but that there are a few faunal species that supply the bulk of this animal food, primarily deer, raccoon, and drum. For the St. Catherines assemblage from 38BU464, the MNI diversity (2.11135) is below the midpoint of the scale and the equitability is in the middle of the upper half of the scale (0.7055). The biomass diversity for 38BU464 (1.5959) is at the lower third of the scale, and the biomass equitability (0.5327) is near the midpoint of the scale. This would appear to indicate, although a number of faunal species were relied upon as a food resource, a more normal pattern of biomass contribution would indicate that there were two species that were relied upon the most (deer and drum), with a limited number of other species being exploited for a good part of the vertebrate contribution to the faunal food total (raccoon, sea catfish, diamondback terrapin, and cooter), and a number of species being exploited to a lesser extent (box turtle, duck, mud turtle, catfish, opossum, turkey, rabbit and squirrel).

The MNI diversity and equitability calculations for the other St. Catherines/Savannah faunal assemblages from 38BU19 and 38BU1249, and the mixed Deptford/St. Catherines/Savannah materials from 38BU1262 all indicate an even spread among the various identified species, a result of the small sample size. The biomass diversity and equitability figures for these three sites all show more variability with only a few faunal resources being of great import, again reflecting the small sample size present.

Distribution of Identified Deer Bone Elements within the Five Prehistoric Assemblages

The distribution of the identified deer bone elements within each of the five prehistoric faunal collections from Spring Island and Callawassie Island is listed in Table 25. The two faunal collections with the most identified bone elements are the Deptford component from 38BU1214 and the St. Catherines site at 38BU464. This is not surprising given that these are the two largest prehistoric samples in this study. At both sites all segments are represented by at least one identified bone element, except for the forefeet segment at 38BU1214. The skull has the most identified bone elements at both sites, and the distribution pattern suggests that the most, if not the entire, deer carcass was utilized by the prehistoric inhabitants of the two sites. There does not appear to be any selection of one body segment over another. Although the two St. Catherines/Savannah faunal collections from 38BU19 and 38BU1249, and the mixed assemblage from 38BU1262 are small in number, the distribution of the deer bone elements at these three sites does not contradict the pattern of use of the entire deer carcass suggested by the collections from 38BU1214 and 38BU464.

Comparison of the Faunal Category Patterns from 38BU1214 and 38BU464 with Selected Patterns from other Sites in the Region

The faunal MNI and biomass category patterns of the Deptford component from 38BU1214 and the St. Catherines assemblage from 38BU464 can be compared with two other faunal collections from the region (Table 26). One of the sites is 38BU805, a Stallings Island occupation on Hilton Head Island (see Wilson and Wilson 1986) and the other is a Savannah shell midden site (9Cam171) from King's Bay, Georgia (see Smith et al. 1981 as quoted in Reitz and Cordier (1983). The Stallings Island material is earlier than the Deptford component at 38BU1214 on Spring Island, and the Savannah remains from 9Cam171 is probably slightly later than the St. Catherines assemblage from 38BU464. Examining Table 26, a decrease in the amount of biomass contributed by the wild mammals to the total calculated biomass for each site can be noted from the high of 66.5% in the Stalling's assemblage at 38BU805 to 62.9% in the Deptford collection at 38BU1214 to 49.7% in the St. Catherines faunal assemblage from 38BU464 to a low of 33.6% in the Savannah faunal collection at 9Cam171. The fish category shows a corresponding rise from Stalling's Island (13.2% at 38BU805) to Deptford (2.15% at 38BU1214) to St. Catherines (37.9% at 38BU464) and Savannah (56.3% at 9Cam171).

One question that can be asked is whether the faunal category percentages for the Stallings material from 38BU805 and the Deptford assemblage from 38BU1214 represent true patterns. That would mean that these sites probably represent occupations by small segments of a larger social system, with larger sites being found elsewhere in the region. The larger sites would be where the various small segments of the population would gather during the more bountiful times of the year, summer through early winter. The smaller sites, such as 38BU805 and 38BU1214 would represent the use of an area during the time of the year when food resources would be more scarce, late winter through spring. During the scarce times of the year, the larger populations that existed during the summer/early winter period would break-up into smaller bands that would disperse across the country-side. The problem with investigating this possibility is the small sample size of the faunal collections from both 38BU805 and 38BU1214, and the lack of information from larger sites in the area. Likewise, data from more of the smaller sites that resemble 38BU805 and 38BU1214 need to be collected for a more thorough analysis of the settlement/subsistence pattern of both Stalling's Island and Deptford peoples within a region to be made.

The St. Catherines faunal collection from 38BU464 is larger than that of either 38BU805 or 38BU1214, but it does not meet the generally held threshold minimum of 200 MNI required to document that a representative sample is being studied (see Grayson 1979;

Table 25.
Bone Element Distribution for the White-Tailed Deer from the Prehistoric Components and Sites on Spring Island and Callawassie Island.

	38BU1214		38BU464		38BU19		38BU1249		38BU1262	
BONE ELEMENT GROUP	#	%	#	%	#	%	#	%	#	%
Skull[1]	8	42.11	15	55.56	1	25.0	2	50.0	-	-
Vertebra[2]	1	5.26	1	3.70	-	-	-	-	-	-
Forelimbs	3	15.79	2	7.41	-	-	-	-	-	-
Forefeet	-	-	1	3.70	1	25.0	-	-	-	-
Hindlimbs	2	10.53	3	11.11	1	25.0	2	50.0	-	-
Hindfeet	2	10.53	3	11.11	1	25.0	-	-	2	66.7
Feet	3	15.79	2	7.41	-	-	-	-	1	33.3
TOTAL	19	100	27	100	4	100	4	100	3	100

1. The skull includes the 1st and 2nd cervical vertebra.
2. The vertebra include the sternum and the ribs.

Table 26.
Comparison of the Faunal Category Patterns from Selected Prehistoric Sites by MNI and Biomass Percentages.

	38BU805		38BU1214		38BU464		9Cam171	
FAUNAL CATEGORY	MNI	BIOMASS	MNI	BIOMASS	MNI	BIOMASS	MNI	BIOMASS
Wild Mammals	29.4	66.5	50.0	62.9	19.4	49.7	1.9	33.6
Wild Birds	17.7	4.5	0.0	5.8	4.2	3.0	0.8	0.2
Reptiles	17.7	14.9	25.0	9.7	5.6	6.8	3.8	8.9
Fishes	17.7	13.2	25.0	21.5	61.1	37.9	88.7	56.3
Commensals	17.7	0.9	0.0	0.0	9.7	2.5	4.7	0.8
Total Percent	100	100	100	100	100	100	100	100
Total MNI	17		12		72		257	
Total Biomass		2.89kg		2.79kg		7.56kg		6.27kg

Faunal Pattern Percentages for 38BU805, a Stallings Island Component, are from Wilson and Wilson (1986:Table 31).

Faunal Pattern Percentages for 9Cam171, a Savannah Component, are from Smith et al. 1981 as quoted in Reitz and Cordier (1983:Table 3).

The Faunal Pattern Percentages for 38BU1214 are for the Deptford Period Component.

The Faunal Pattern Percentages for 38BU464 are for the St. Catherines Component.

Wing and Brown 1979). Still, the information presented by the faunal assemblage from 38BU464 can be utilized as an indicator of general trends and patterns that can be studied by future archaeology. The 38BU464 faunal material lies intermediate between the wild mammal dominated patterns for 38BU805 and 38BU1214, and the fish dominated pattern for 9Cam171. The question that can be asked is whether this transition from the wild mammal dominance at 38BU464 to the fish dominance at 9Cam171 is derived from temporal or spatial factors (or sample size). It is possible that the location of 38BU464 on a Sea Island with a maritime forest habitat possessed a greater variety of habitats from which a wider range of animal resources, especially wild mammals, could be exploited than other sites within an estuarine environment. Another possibility is that the difference is due to time, with the later faunal material from 9Cam171 representing a turn away from as heavy a reliance on the wild mammal faunal resources as noted in the earlier materials from 38BU464. This answer cannot be addressed in greater detail for now because more comparative data is needed concerning the St. Catherines and Savannah settlement and utilization of the Sea Islands and surrounding estuarine environment within locales of a region.

Conclusions Concerning the Prehistoric Faunal Collections

The five prehistoric faunal collections analyzed for this study do not individually possess either 200 MNI or at least 1400 identifiable bone elements, the prerequisites for truly representative faunal samples (see Grayson 1979; Wing and Brown 1979). The fact that these and a number of other faunal samples from the Beaufort County area have been recovered and analyzed using similar archaeological and zooarchaeological techniques provides a good basis against which to compare future research. Questions concerning the settlement/subsistence patterns of the prehistoric Native Americans who inhabited the area and how these patterns varied across time and space certainly cannot be answered now, but it is possible to direct the nature of future inquiry. A number of sites from all prehistoric periods that range in size from small undistinguished shell heaps or middens to the more obvious and larger shell middens should be excavated. The data derived from this work will be useful to compare to that which already exists. The question of whether the small faunal samples found at such sites as 38BU805 (a Stalling's Island site), 38BU19 (a St. Catherines site), 38BU1214 (the Deptford component), and 38BU1249 (a mixed Deptford/St. Catherines/Savannah site) represent small groups of people who in effect act as foragers year-round or are part of a larger group of people that split into smaller groups of people during the scarce resource times of the year in the late winter and spring can be considered in greater detail. Also, the relationship of these smaller sites to the larger sites of the same time period can be further investigated, including the question of whether these larger sites represent habitation sites for large groups of people for a good portion of a year, or whether such sites represent repeated occupation of a favored resource area on a repeated basis over a large number of years. It is hoped that the research reported here contributes to the beginning synthesis of the faunal subsistence patterns and behaviors of the prehistoric inhabitants of the Sea Island area of South Carolina.

Identified Fauna from the Historic Component, 38BU1214

Before considering the results of the zooarchaeological study of the faunal remains recovered from the historic component at 38BU1214, the general uses by historic peoples and habitat preference for each identified species will be considered. Table 27 lists the various animal species identified in the archaeological collection recovered from the excavations within the structure areas and the associated shell middens and features.

Domestic Mammals

Three animal species, cow (Bos taurus), pig (Sus scrofa), and domestic Caprine, are the only domestic mammals identified in the collection that could have been used as food resources. The domestic Caprine present is most likely the sheep (Ovis aries).

Pigs are one of the most important domestic mammals used for food in the Southeastern United States (see Hilliard 1972:92-111). Pigs require little care, as they can be allowed to roam free, or

Table 27.
Minimum Number of Individuals (MNI), Number of Bones, Weight, and Estimated Meat Yield by Species for the Historic component at 38BU1214.

	MNI		NUMBER	WEIGHT	BIOMASS	
SPECIES	#	%	OF BONES	gm	kg	%
Cow, Bos taurus	1	11.11	16	129.0	2.087	31.87
Pig, Sus scrofa	1	11.11	9	35.0	0.645	9.85
Sheep, Ovis aries	1	11.11	8	20.9	0.406	6.20
White-tailed Deer, Odocoileus virginianus	1	11.11	11	23.6	0.452	6.90
Raccoon, Procyon lotor	1	11.11	1	1.8	0.045	0.69
Opossum, Didelphis virginiana	1	11.11	1	0.4	0.012	0.18
Eastern Mole, Scalopus aquaticus	1	11.11	1	0.2	0.006	0.09
Unidentified Mammal	-	-	82	162.3	2.566	39.18
Unidentified Bird	-	-	6	1.8	0.035	0.53
Carolina Diamondback Terrapin, Malaclemys terrapin centrata	1	11.11	1	0.4	0.017	0.26
Drum, Sciaenidae	1	11.11	7	13.9	0.273	4.16
Unidentified Fish	-	-	1	0.1	0.005	0.08
Unidentified	-	-	139	61.3	-	-
TOTAL	9	100	283	450.7	6.549	100

Table 28.
Summary of the Historic Component Faunal Categories Expressed as Counts and Percentages for MNI and Biomass, 38BU1214.

FAUNAL CATEGORY	MNI #	MNI %	BIOMASS kg	BIOMASS %
Domestic Mammals (Cow, Pig, Sheep)	3	33.33	3.138	79.58
Domestic Birds (Chickens, etc.)	-	-	-	-
DOMESTIC TAXA TOTAL	3	33.3	3.138	79.6
Wild Mammals (Deer, Raccoon, Opossum)	3	33.33	0.509	12.91
Wild Birds (Duck, Quail, Dove, etc.)	-	-	-	-
Aquatic Reptiles (Turtles, Terrapins)	1	11.11	0.017	0.43
Fish (Drum)	1	11.11	0.273	6.92
WILD TAXA TOTAL	5	55.6	0.799	20.3
Commensal Species (Eastern Mole)	1	11.11	0.006	0.15
TOTAL	9	100	3.943	100

they can be penned. Their diet can consist of a variety of food resources, including seeds, roots, fruits, nuts, mushrooms, snakes, larvae, worms eggs, carrion, mice, small mammals, kitchen refuse, feces, and grain. Pigs store about 35% of the calories they consume, and can gain about two pounds for every 15 to 25 pounds of feed (Towne and Wentworth 1950:7-8). Within 18 months, a pig can gain up to 200 pounds, of which about 120 pounds can be consumed. Dressed, a pig carcass can yield between 65% and 80% meat. It is difficult to estimate the size of the pigs that were available to the inhabitants of Spring Island during the late eighteenth century. Prior to 1800 there were no standard breeds of pig (Gray 1933:206). An idea of the possible size of the pigs that were available to the inhabitants of Spring Island in the late eighteenth and nineteenth centuries can be gained from the average weight of 140 pounds for 4,000 southern pigs slaughtered in 1860 (Fogel 1965:206). Pork preserves very well, is satisfying due in part to its high fat content, and is a very good source of thiamine (Towne and Wentworth 1950:249).

Although cattle has been an important meat source during the history of the Southeastern United States, it is in many ways a more burdensome meat resource to raise than pigs (see Hilliard 1972:112-140; Rouse 1973; Towne and Wentworth 1950, 1955). Cows provide less of a return for the energy input provided to raise them (Towne and Wentworth 1950:7-8). Cows feed on grain and grasses, and will not produce good weight gains without quality and quantity sources for both. Also, cattle store only about 11% of the calories they consume and yield only 50 to 60% dressed meat. Balanced against the greater labor required to raise cattle above that required for swine and the fact that beef does not preserve as well as pork (Tomhave 1925:275), there is a demand for fresh beef, cattle hides, and a number of other foods made from milk products, such as milk, cheese, butter, and buttermilk, that can be obtained from cattle (see Hilliard 1972:119-135; Rouse 1973; Towne and Wentworth 1955).

The third domestic mammal that may have served as a food resource is the sheep. Sheep were a minor food resource for Southern populations during the eighteenth century, declining in popularity after that period in the nineteenth century (Hilliard 1972:141-144). Of course, sheep were a source of wool that could be used to make clothing, primarily for home use (Hilliard 1972:141-142).

Wild Mammals

The largest of the wild mammals in the assemblage is the white-tailed deer (Odocoileus virginianus). Apparently deer remained widely available in most areas of the Southeast well into the nineteenth century (Hilliard 1972:74-78). The preferred method of hunting deer was with firearms, which restricted the availability of this food resource for slaves. Permission from the slave owner or overseer would probably be required for slaves to hunt deer and other animals with firearms, and firearms would also have to be available for use by the slaves to hunt. The latter situation would not have been common among slave populations (Hilliard 1972:75-76). Presumably, the only uses that deer would have had for the inhabitants of 38BU1214 were as a food resource, and perhaps for hides. In general, the deer's preferred habitat is the edge of deciduous forests and open fields, although they will move to mud flats around marshes to feed on the grasses found there.

Raccoon (Procyon lotor) bones are present in small number in the historic faunal assemblage from 38BU1214. This mammal served as a food resource for both whites and blacks, although its meat was apparently less prized than that of the opossum (Hilliard 1972:80). Gathering raccoons could be done using firearms and hunting dogs, to which Blacks would presumably have had less access than whites prior to the later portion of the nineteenth century, or they could be obtained by trapping (Hilliard 1972:80). This nocturnal mammal is able to adapt to a variety of habitats, although they prefer wooded areas near water.

Remains of the opossum (Didelphis virginiana) are present in a very small quantity in the faunal sample from the historic component at 38BU1214. The opossum was generally preferred over the raccoon as a food resource because the former could be kept, fattened, and "cleaned out" by "penning and feeding them for several days on milk and bread or roasted sweet potatoes" (Hilliard 1972:80). The preferred habitat of the opossum, a nocturnal animal, is wooded areas near water, but they are often found in and around human settlements.

Domestic and Wild Birds

Surprisingly, there are no identified bird species, wild or domestic, represented by the identified bone elements from 38BU1214's historic faunal collection. The only remains are fragmented bones from unidentifiable birds. This absence is especially striking for the domestic species. Chickens (Gallus gallus) and turkey (Meleagris gallapavo) were both especially prized as food resources by both Black and White populations in the South during the eighteenth and nineteenth centuries (Hilliard 1972:46-47, 80-81). These bird species, along with Canada geese (Branta canadensis) and other wild bird species have all been found at other historic sites in Beaufort County, South Carolina (see Wilson and Wilson 1986, Wilson 1989, Wilson 1990).

Reptiles: Turtles

Only one species of turtle is present in the historic faunal collection from 38BU1214--Carolina diamondback terrapin (Malaclemys terrapin centrata). The diamondback terrapin is a turtle that feeds on marine molluscs and is usually found in an estuarine setting or in brackish lakes and marshes along the coastal strip (Obst 1986:113). The Carolina diamondback terrapin inhabits the Atlantic Coast from North Carolina to Florida (Obst 1986:214). The diamondback terrapin was an important food resource in the southeast (Hilliard 1972:89) that became an accepted delicacy throughout the United States during the nineteenth and early twentieth centuries (Obst 1986:113, 183). The taste of the diamondback terrapin flesh is considered to lie between that of chicken and fish. It was only the enactment of protective legislation 60 years ago that prevented the extinction of the diamondback terrapin (Obst 1986:113).

Pisces

The remains of fish in the historic component faunal material from 38BU1214 is quite small, with only one primarily marine species--drums (Sciaenidae)--being identified. Marine species are those fish that either spawn in the estuary or use the area as a nursery (see Boschung et al. 1983). Members of the drum family include black drum (Pongias cromis), silver perch (Bairdiella chrysoura), seatrout (Cynoscion spp.), spots (Leiostomus xanthurus), red drum (Sciaenops ocellatus), star drum (Stellifer lanceolatus), and Atlantic croaker (Micropogonias undulatus). All of these drums are commonly found in bays and estuaries. The star drum and the Atlantic croaker are good seasonal indicators, being present in the estuarine system from early spring with a maximum availability in the late fall.

Commensal Species

Commensal species include animals commonly found near human occupations that are not generally considered to be food resources. Such animals include pets, pests, vermin, and animals that prey on pests and vermin. The only commensal species present is the Eastern mole (Scalopus aquaticus). The Eastern mole prefers well-drained, loose soils and is found in open or thin woods and in cleared areas of all kinds, especially agricultural lands (Runquist 1979:166). Other commensal species commonly found in historic faunal assemblages at adjacent sites, including rats, mice and snakes (see Wilson and Wilson 1986, Wilson 1989, Wilson 1990), are absent.

Results of the Historic Component Faunal Analysis, 38BU1214

The faunal collection from the historic component at 38BU1214 consists of 283 bone elements and fragments that weigh 450.7 grams. The MNI, number and weight of bone, and the estimated meat yield (biomass) for the faunal sample has been presented in Table 27. A summary of the MNI and biomass calculations for seven faunal categories is listed in Table 28.

As would be expected, domestic mammals--cow, pig and sheep--account for the vast majority of the total biomass. The domestic mammals also have the most individuals (MNI=3) of the faunal categories present, which ties them with the wild mammal category. The absence of chicken, turkey, and Canada geese from the domestic taxa present is surprising, given the presence of these species at nearby historic sites (see Wilson and Wilson 1986, Wilson 1989, and Wilson 1989). The domestic bird species were an important food resource among both White and Black Southern populations during the antebellum period (see Hilliard 1972), which makes their absence from this assemblage most perplexing.

The second most important category according to biomass (with 0.509 kg) are the wild mammals, which have the same Minimum Number of Individuals as do the domestic mammals. The wild mammals present include deer, raccoon, and opossum. Raccoons and opossums are common scavengers that are drawn to crops, trash deposits, hen houses and the like, that are found around human settlements. These two small wild mammals could have been obtained through the use of traps. Deer are usually found in forests and along forest edges, and are drawn to certain crops grown by people. It is possible that the deer present in the historic faunal assemblage from 38BU1214 could have been taken directly by the slave population or provided as a ration to the slave population. This will be discussed in greater detail in the discussion below on bone element distribution.

The third most important faunal category in terms of biomass (with 0.273 kg) are the fish, although the category is represented by a MNI of only one. The only identified fish present is the drum (Sciaenidae), a predatory species that is common in the waters of the estuarine system surrounding Spring Island. The low MNI for this fish suggest that drums were not obtained by nets or seines, but by hook-and-line.

The fourth ranked faunal category according to biomass (0.017 kg) are the reptiles, and like the fish, they have a MNI of only one. The Carolina diamondback terrapin is the turtle species identified for this category. Carolina diamondback terrapins are found in the estuarine/marsh areas adjacent to Spring Island. During the eighteenth and nineteenth centuries, diamondback terrapin comprised a good portion of the slave diet in coastal areas (Quitmyer 1985b:20). These aquatic reptiles could have been caught using handlines, traps, or by hand.

Of note is the fact that no wild bird species could be identified in the historic faunal sample from 38BU1214. Previous research at a nineteenth century freed Black community on Hilton Head Island (Wilson and Wilson 1986:301) and at a nineteenth century slave site on Daufuskie Island (Wilson 1989:183) have disclosed the presence of ducks (Anas spp), terns (Sterna spp.), rock doves (Columba livia), mourning doves (Zenaida macoura), and bobwhite quail (Colinus virginianus) in faunal samples recovered from the two sites. However, at 38BU96, a slave site that dates to the late eighteenth and nineteenth centuries within Cotton Hope Plantation on Hilton Head Island, no identifiable wild bird species were present. The faunal collections from all of these sites and from 38BU1214 were obtained using similar archaeological field techniques. It would appear that wild birds were not part of the faunal resource procurement system of the inhabitants of 38BU1214. Given the eighteenth century associations of 38BU1214 and of 38BU96, it is possible that this absence or low use of wild bird resources is characteristic of slave populations of this early period. It is also possible that the absence at both sites is due to sample bias given the relatively small numbers of identified bone elements and MNI present.

The only true commensal species identified in the historic faunal assemblage from 38BU1214 consists of the Eastern mole. This commensal species would have been found in the agricultural fields worked by the slaves or in the cleared areas around the habitation structures of the slaves.

Diversity and equitability indices were calculated for the total biomass and MNI present in the historic faunal assemblage from 38BU1214 (Table 29). The diversity of the sample based on MNI is in the mid-range of the scale (2.1969 on a scale that goes to 4.9), and the equitability is at the highest end of the scale (1.00). This indicates that although there are a number of different animal species present, each one was utilized equally as a food resource. These numbers obtained for the MNI diversity and equitability are indicative of the small size of the faunal sample from 38BU1214. The diversity measure for biomass is quite low

(1.4017) and the equitability (0.6379) is toward the mid-point of the scale (0.50). This is interpreted to indicate that a more normal pattern of obtaining biomass from the animal species is represented by this collection with one species -- cow -- contributing the most biomass, a number of species -- pig, deer, sheep and drum -- contributing moderate amounts to the biomass total, and a number of species -- raccoon, opossum, diamondback terrapin, unidentified bird, and unidentified fish -- contributing small amounts to the total.

The distribution of identified bone elements by body segment for the cow, pig, sheep, and deer remains from 38BU1214 is shown in Table 30. The low number of identified bone elements hinders the discussion of this topic. However, the absence of skull bone elements for the cow, pig, and sheep is noticeable, especially given the presence of these bone elements at other slave sites in the region (see Wilson and Wilson 1986; Wilson 1989; and Wilson 1990). Preservation of the skull bone elements does not appear to be the problem because a number of the bone elements of the skull, especially the teeth, generally preserve well in archaeological contexts. One possible explanation for this absence is that absence is that these three meat resources--cow, pig, and sheep--were made available to the slave inhabitants of 38BU1214 as rations. It may be that these rations were obtained by purchase or barter from off the plantation, given the absence of skull fragments which would have remained at the source and distributed in a different manner. The deer remains, although very low in number, possess skull elements, which suggests that this meat resource was obtained through the plantation's internal resource procurement system. It is possible that the deer was taken as the result of the slave inhabitants of 38BU1214, the overseers for whom these slaves worked, or the owners of the plantation. The important fact here was that the entire deer was available for use by the slave inhabitants of the site, not just selected skeletal segments as the bone element distribution for the cow, pig and sheep suggest. The word of caution here is that this discussion is based on a very small number of identified bone elements.

Comparison of the 38BU1214 Historic Faunal Assemblage with other Historic Faunal Samples

Given that the archaeological remains at 38BU1214 are from a plantation (here used to include planter, overseer, and slave habitations), it would seem reasonable to assume that the faunal collection will more closely resemble faunal samples from the slave components of other plantations and from identified Afro-American sites in rural settings, rather than patterns from urban sites or white habitations at a plantation. The research goal is to assess the congruences and differences among the patterns, and attempt to address questions concerning changing faunal exploitation and use patterns over time from the eighteenth through the nineteenth centuries.

Table 29.
Diversity and Equitability of the MNI and Biomass Calculations for the Historic Faunal Sample from 38BU1214.

SITE	DIVERSITY	EQUITABILITY	N	MNI
38BU1214, Historic Component	2.1969	1.00	9	9

SITE	DIVERSITY	EQUITABILITY	N	BIOMASS
38BU1214, Historic Component	1.4017	0.6379	9	3.943

The Shannon-Weaver (1949:49) formula used to determine the diversity of a sample is

$$H = -\Sigma\ p_i(\ln\ p_i)$$

where H is the measure of diversity, and p_i is, in this case, either the MNI or the biomass of each species/taxon "i" divided by the total MNI or total biomass as appropriate for the sample. Thus, for each identified species/taxon that has a MNI count, p_i is calculated by dividing the MNI for that species by the total number of MNI from the sample. The diversity measure H is the sum of all the p_i multiplied by the natural log (ln) of each p_i. A similar procedure is used to calculate the diversity index for the biomass, with the biomass figures being substituted for the MNI in the above explanation.

The Sheldon formula (Pielou 1966; Sheldon 1969) used to determine the equitability of a sample is

$$H' = H/(\ln\ N)$$

where H' is the measure of equitability, H is the Shannon-Weaver diversity measure calculated for the sample, and N is the total number of cases, observations, or, in this situation, species/taxon for which MNI or biomass was calculated in the sample. Equitability is simply the diversity measure divided by the natural log (ln) of N, the number of species/taxon for which the MNI was calculated or the number of species/taxon for which the biomass calculations was made.

Table 30.
Bone Element Distribution Pattern for the Cow, Pig, Sheep, and Deer Remains from the Historic Component at 38BU1214.

	COW		PIG		SHEEP		DEER	
BONE ELEMENT GROUP	#	%	#	%	#	%	#	%
Skull[1]	-	-	-	-	-	-	2	40.0
Vertebra[2]	-	-	1	33.3	1	25.0	-	-
Forelimbs	-	-	1	33.3	-	-	1	20.0
Forefeet	-	-	-	-	1	25.0	-	-
Hindlimbs	1	33.3	-	-	1	25.0	2	40.0
Hindfeet	-	-	1	33.3	-	-	-	-
Feet	2	66.7	-	-	1	25.0	-	-
TOTAL	3	100	3	100	4	100	5	100

1. The skull includes the 1st and 2nd cervical vertebra.
2. The vertebra include the sternum and the ribs.

Reitz (1984:14-15) proposed a number of hypotheses about the vertebrate faunal composition of the diet of Carolina urban and rural sites that date from the late eighteenth into the middle of the nineteenth century. In general, urban residents apparently utilized more domestic species, especially birds. As a consequence, wild animals were utilized to a lesser extent at urban sites and fewer wild species were exploited. Table 31 shows the MNI percentages determined for each of seven general faunal categories (Domestic Mammals, Domestic Birds, Wild Mammals, Wild Birds, Reptiles, Fish, and Commensals) at 38BU1214 with composite percentages computed by Reitz (1984:24; 1988) for Urban, Rural, and Slave contexts in the southern Atlantic Coastal Plain, for a possible eighteenth-nineteenth century slave habitation or work area (38BU96) on Hilton Head Island, for a nineteenth century slave row (38BU634) located on nearby Daufuskie Island, and for Mitchelville, a late nineteenth century freed Black community on Hilton Head Island.

The absence of any identified domestic bird species immediately sets the 38BU1214 assemblage apart from the other patterns. The absence of identified wild bird remains is also found at 38BU96, the other slave site with a possible late eighteenth century component. The domestic mammal category is elevated even over that noted for the Urban Pattern, which has a high percentage of 28.9. Likewise, the wild mammal category for 38BU1214 is higher than the other patterns, although it is not much higher than the figure (29.7%) noted for 38BU634. The percentage (11.1%) noted for the reptiles is higher than that for the other slave sites (38BU96 and 38BU634), but it does fit with the Mitchelville, Rural and Slave Pattern percentages. Also of note is the very low percentage for fish at 38BU1214 when compared to all the other patterns. The commensal MNI percentage (11.1) is similar to that noted for 38BU634, Mitchelville, and the Urban Patterns.

In summary, the composition of the late eighteenth century faunal assemblage from the slave structure at 38BU1214 does not conform to any of the faunal assemblage patterns noted for other urban, rural, or slave sites of the South Atlantic coast. Certainly, the small size of the sample available from the site is affecting the developed pattern and the comparison with other faunal assemblages. This question can only be resolved through further research utilizing larger faunal samples from sites across a number of different time periods. For now, the information from 38BU1214 tentatively suggests that early slave populations were supported in part through meat rations of cow (perhaps salt beef), pork (perhaps salt pork), and sheep (purchased from off the plantation) supplemented by meat from wild mammals that were obtained within or adjacent to the plantation's environs by the inhabitants of the plantation. In addition to these wild mammal sources of meat, local resources of reptiles and fish were also utilized to some extent. It is interesting to consider the relatively large percentage shown for the reptile category at

Table 31.
Comparison of Selected Historic Assemblage Faunal Categories by MNI.

FAUNAL CATEGORY	38BU1214	38BU96	38BU634	MITCHELVILLE	URBAN	RURAL	SLAVE
Domestic Mammals	33.3	9.6	14.1	19.1	28.9	17.2	20.5
Domestic Birds	0.0	7.7	6.3	12.8	19.7	4.1	3.0
Wild Mammals	33.3	13.5	29.7	10.6	8.1	19.2	24.7
Wild Birds	0.0	0.0	9.4	8.5	7.6	3.0	2.1
Reptiles	11.1	7.7	4.7	12.8	5.4	13.7	10.4
Fish	11.1	57.7	25.0	25.5	19.7	38.4	36.6
Commensals	11.1	3.8	10.9	10.6	10.6	4.3	2.8

Data for the Slave Pattern are derived from Reitz (1984:Table 7).

Percentages for the Urban and Rural Patterns are from Reitz 1988 and are for materials from late eighteenth and early nineteenth century coastal contexts.

The Mitchelville Pattern is from Wilson and Wilson (1986:Table 39).

The 38BU634 Pattern is from Wilson (1989:Table 31).

The 38BU96 Pattern is from Wilson (1990:Table 29).

38BU1214, which is represented by Diamondback terrapin. Diamondback terrapin comprised a good portion of a slave's diet in coastal areas dating back to before the nineteenth century, and there are some reports of slaves becoming dissatisfied with this fact (Quitmeyer 1985a:20). This dissatisfaction could be reflected in the decline in the composition of reptiles (comprised primarily of Diamondback terrapin) through time from 11.1% at the eighteenth century slave structure at 38BU1214, to 7.7% at the late eighteenth/nineteenth century slave site at 38BU96, and a low of 4.7% at the mid-nineteenth century slave row at 38BU634. The rebound noted for reptiles in the free Black community at Mitchelville could be explained as necessity requiring that reptiles be used as a meat resource given the different restrictions on other meat resources that existed for these peoples.

Conclusions

As with the other faunal assemblages examined for this study, the faunal collection from the historic component at 38BU1214 does not possess either 200 MNI or 1400 identified bone elements, and therefore cannot be considered to be a truly representative sample (see Grayson 1979; Wing and Brown 1979). However, as with a number of other historic faunal assemblages from the Beaufort County area of South Carolina, some general statements can be made concerning the state and general trends in the faunal subsistence practices of the South Carolina Sea Island slave populations. Also, it is hoped that some direction can be given to future research concerning this topic.

As with a number of other faunal assemblages in the vicinity

(38BU96, 38BU634, and Mitchelville) the faunal collection from 38BU1214 differs from what is expected based on defined Urban, Rural, and Slave faunal category patterns. For 38BU1214, the question immediately becomes whether the perceived differences are due to temporal factors if sample size is not the primary influence. The low number of domestic and wild birds identified in the 38BU1214 faunal assemblage is consistent with the low numbers of these species found in the defined Slave faunal pattern, although the complete absence in the former is not. It is possible that the earlier slave sites did not utilize or have access to bird food resources, whether because the domestic birds were not available or because the technology and time required to obtain the wild bird resources were not available. Given the relatively large portion of the MNI and biomass totals that domestic mammals comprised, another potential pattern that can be investigated at other early slave sites is that the domestic mammals were part of rations purchased off the plantation to support the slaves inhabiting the slave row. In contrast, the wild mammals and aquatic reptiles present could have been obtained by traps in and adjacent to the slave's habitation and work areas, which is similar to what appears to occurred at other African-American sites of the antebellum and postbellum periods in the area. Fishing also is apparently of small import to the slave inhabitants of 38BU1214. The major changes that occur over time seem to be that "home-grown" animal resources, including both domestic mammals and birds, become widespread among slave populations; that fishing becomes a more important food resource; that aquatic reptiles enjoy a steady decline in popularity until necessity revives their importance in the postbellum era; and that wild birds remain a low contributor to the faunal food resource total through time.

These conclusions can only be viewed as suggestions for now. Given the inadequate sample size of the historic faunal collection from 38BU1214 and from the other antebellum and postbellum African-American sites that have been investigated in the Beaufort area to date, a more definite statement on any one era and on the entire progression of fauna use through time will have to await further research. It does not matter whether the faunal samples from these future historic sites are small or large, for they will contribute in their own way to the growing database on the faunal subsistence patterns of the African-American inhabitants of the Sea Islands of South Carolina and the adjoining regions.

SYNTHESIS

Michael Trinkley

Prehistoric Archaeology

The investigations on Spring and Callawassie islands include data recovery excavations at a series of five sites and the intensive survey of portions of Callawassie Island. As a result of these investigations it is possible to develop a somewhat clearer understanding of the settlement, subsistence, and material culture which characterizes the Woodland phase in this portion of Beaufort County. As with many archaeological studies, what is documented most conclusively is how little we know or understand about these early Native American groups in the South Carolina Low Country. This study, and others like it, however, will begin to open new avenues of research to explore the diversity of coastal groups.

Artifactual Remains

Pottery is the most common artifact recovered from the investigated sites, with materials identified spanning the Early Woodland through South Appalachian Mississippian periods. The bulk of the collections, however, relate specifically to the Deptford, St. Catherines, or Savannah phases as defined for the southern South Carolina coastal area.

An examination of the paste of the Deptford, St. Catherines, and Savannah wares failed to reveal startling new evidence. It did, however, confirm the suspicion that the Deptford wares have considerable variability in paste inclusions and that this variability declines through time. Tempering in Deptford wares ranges from a fine sand to a very coarse sand, all sub-rounded. This suggests that, as in the earlier period, the Deptford potters were using locally available clays. There is little, if any, evidence of intentionally selecting or modifying clays to achieve a uniform content of inclusions.

By the Savannah phase, however, the temper consists almost exclusively of sub-rounded coarse sand. Virtually no very coarse sand inclusions were observed during this study. While it appears that the Savannah phase potters continued to use locally available clays, there is greater uniformity in the paste, perhaps documenting increasing attention to the preparation of the clay.

The St. Catherines pottery has consistently fine to medium inclusions of clay grog. All of these inclusions appear to be fully oxidized. Although not fully examined by this studied nor quantified, examples of material which would be typed as either Deptford or Savannah were found with clay inclusions typical of St. Catherines. This may suggest that the existing typological constructs represent a continuum of indigenous change along the South Carolina coast.

A detailed examination of the cordage used on the Deptford, St. Catherines, and Savannah wares was also undertaken. As has been previously discussed, studies of prehistoric cordage in the Southeast are uncommon, in spite of the abundance of "Middle Woodland" cord marked wares. The investigation was initially undertaken with the expectation that distinct cordage elements would be associated with the Deptford, St. Catherines, and Savannah wares. In fact, the study revealed that there is a great deal more similarity between the various types than there is any difference.

Only simple twisted cordage was found. The Z or left twist is always more common that the S or right twist. With but one exception a soft twist was always more common than a hard twist. Further, while there was some variation in the diameter of the cordage used, this variation is minor, ranging from 0.5 to 4.0 millimeters, and when correlated with the tightness of the twist, appears to have no typological significance.

Figure 43 compares the percentage of soft and hard Z and S twisted cordage by site and type. The range of variation appears to be related more to sample size than to any meaningful typological difference. This, coupled with the gross paste analysis, continues to support the contention that the Deptford, St. Catherines, and Savannah wares form a continuum, revealing only minor changes through time.

It is therefore not surprising that the radiocarbon dates obtained from these investigations show considerable overlap between supposedly distinct typological entities. Table 44 compares these dates (as well as those reported in Trinkley 1981) with those traditionally associated with the phases.

The Deptford materials appear to extend to approximately A.D. 930, overlapping the earliest St. Catherines date of A.D. 750, while the St. Catherines phase may continue to at least A.D. 1385. These dates, while certainly requiring further support, lend credence to the results of the typological study. These investigations also reveal an absence of Wilmington materials in the Callawassie and Spring Island area.

It appears that a strongly traditional, indigenous Middle Woodland population existed in the Beaufort area, accepting some aspects of the new Late Woodland and South Appalachian cultures to the south, but retaining much of their own technology (such as pottery). This may help to explain the relative infrequency of

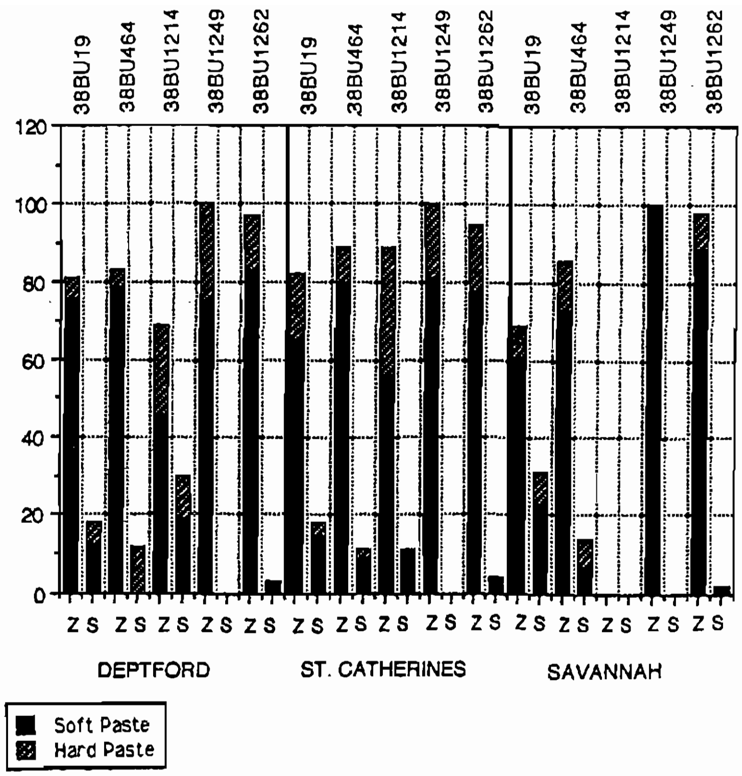


Figure 43. Comparison of pottery by percent of Z and S twists, by soft and hard twist.

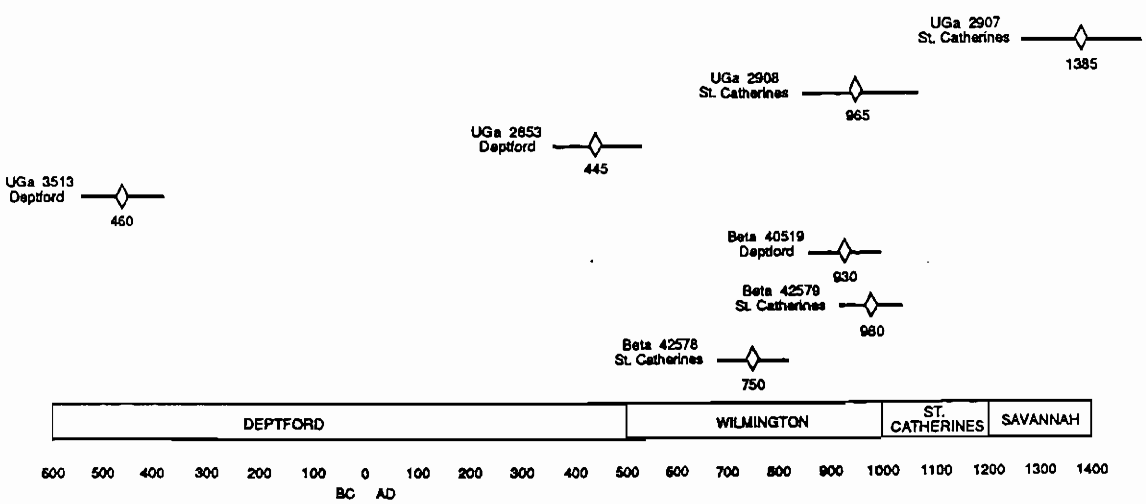


Figure 44. Radiocarbon dates from the Beaufort area.

typical South Appalachian Mississippian markers such as complicated stamped pottery in the area immediately north of the Savannah River.

Lithics are less common at the examined sites that pottery, and reflect the use of locally (Spring and Callawassie area) and regionally (southeastern lower coastal zone) available materials. Few examples of exotic resources are present, suggesting a reliance on relatively short-distanced trade networks. The materials recovered represent primarily debris from reworking tools, with fairly small quantities of non-cortical flakes represent working of blanks prepared elsewhere. Although reflecting very small samples, the lithics provide some of the more convincing evidence for possible seasonal rounds or, minimally, use of inland extractive sites.

The projectile points identified with the St. Catherines and Savannah materials are best classified as Roanoke Large Triangular (Coe 1964). Found in North Carolina contexts ranging from A.D. 500 to 1500, these points may form a continuum of size reduction, culminating with the Clarksville Small Triangular points of the protohistoric period.

Evidence of other specialized stone tools, such as scrapers, is lacking, although Lawrence has identified what appear to be oyster shell scrapers in Deptford and St. Catherines/Savannah contexts. While detailed wear and utilization studies of these shells have not yet been undertaken, they appear to represent readily available replacements for the more difficult to procure stone implements.

The only other artifacts identified in this work are several drilled oyster shells. These items, which appear to decorative or ornamental, are associated with the Deptford occupation and have been found at only one site. Unfortunately, as with the shell scrapers, the shear bulk of the shell common to these sites makes the identification of shell tools difficult at best.

Subsistence

The examination of faunal materials from the investigated sites was hampered by the mixing of the various components and the small sample sizes. Several observations, however, are worthy of attention. In particular, examination of Low Country collections is suggesting that while the same diversity of species was exploited, there is a gradual decrease the biomass provided by mammals, with a corresponding increase in the contribution of fish over time. Whether this reflects a trend toward the increasing reliance on fish, or is simply a reflection of the sites' position in the larger settlement pattern, cannot be answered without much more extensive research. It does, however, serve to illustrate the importance of examining a variety of coastal sites, even those

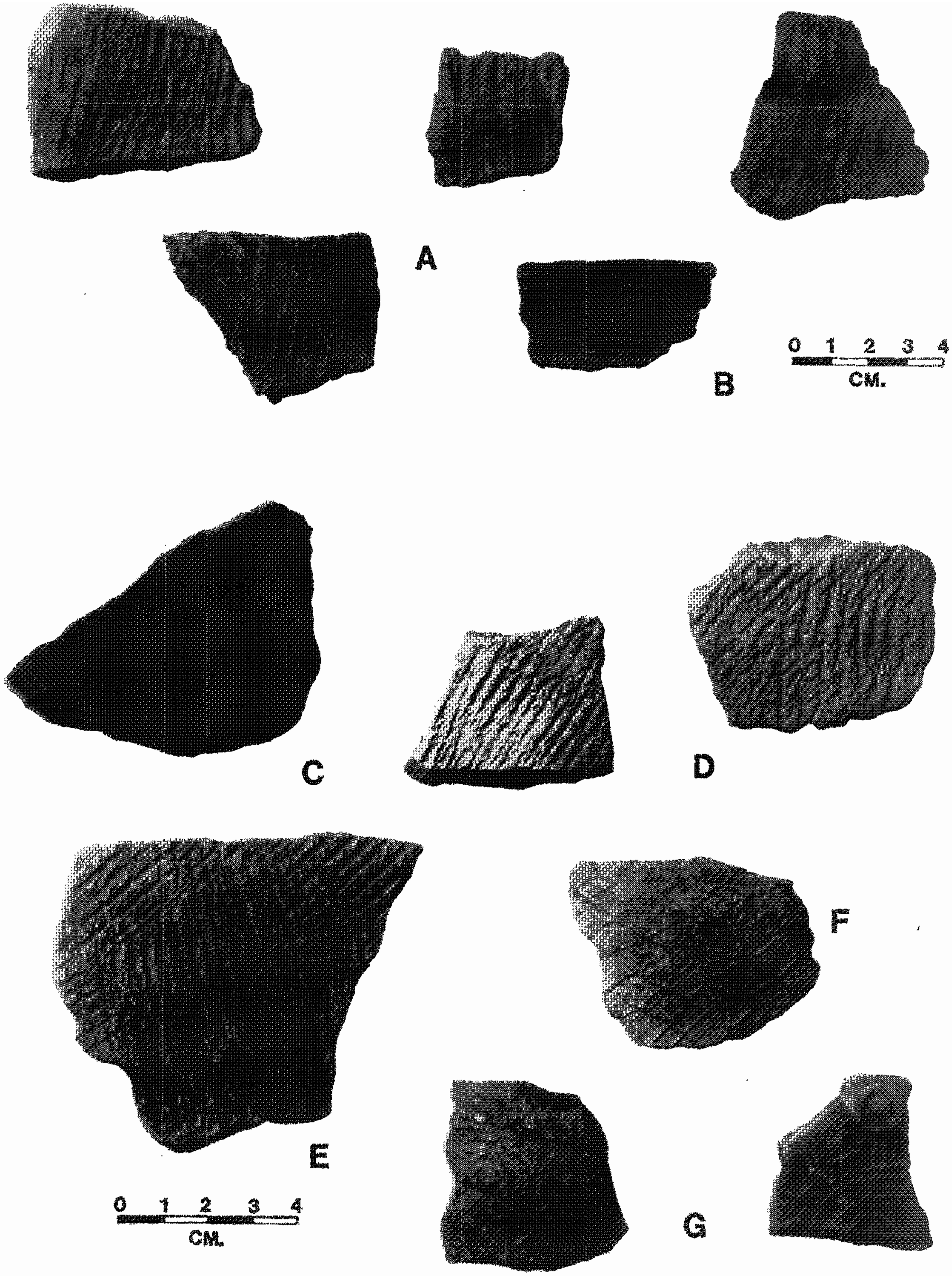


Figure 45. Pottery recovered from Callawassie excavations. A, Deptford Cord Marked; B, Deptford Check Stamped; C, Deptford Geometric Stamped; D, St. Catherines Cord Marked; E, Savannah Cord Marked; F, Savannah Check Stamped; G, Irene Complicated Stamped.

which appear to be small and "unimportant."

While not precluding occupation at other times of the year, many of the fish, bird, and turtle species identified are most common in the Beaufort waters during the spring, summer, and fall. One of the few mammalian species useful for seasonality studies is the male white-tailed deer. Preserved crania with hard antler development would date from the fall and winter, since deer in South Carolina typically shed their antlers from January through March. Although the faunal study verified that the deer were being brought to the sites intact, none of the cranial material indicated antler development.

Turning to the shellfish, it appears that all of the oysters represent collection from local intertidal and shallow subtidal waters. Many of the samples indicate that the shells were exposed to heat, presumably to allow easier opening of the bivalves. Some also evidenced notching consistent with the use of a tool to aid in their opening.

Seasonality of the oysters provides an indication of probable spring and summer occupation by the Deptford groups at 38BU1214 on Spring Island. On Callawassie Island, similar spring and summer occupation is suggested for 38BU464 and 38BU1262, although possible year-round occupation is suggested for 38BU19.

Ethnobotanical samples from all of the examined sites were disappointing. In spite of efforts to collect organically rich soils from feature contexts, the recovery of carbonized remains was exceedingly low and the only carbonized plant food remains consist of hickory nutshell (which occurred at every site investigated).

While hickory nut masts are produced in the late fall and winter, the nuts may be collected after this period and may be stored for a considerable period of time. Consequently, their use as seasonal indicators must be cautious.

In sum, the prehistoric sites examined reveal a diffuse faunal subsistence base, with some indication of an increasing focus on fish resources through time. Plant foods, while probably used, are poorly represented in these collections. Shellfish not only are the most noticeable feature of these sites, but also appear to have made the greatest contribution to the diet in terms of biomass.

This later issue is difficult to assess and interpret. A number of efforts have been made in the past, although none have been particularly trustworthy. The Spring Island and Callawassie excavations carefully maintained records of total shell weight (7746 pounds for 38BU464 and 3056 pounds for 38BU1214) and attempted to determine the constituents of the middens on a percentage of weight basis (oyster accounts for 58.5% of the 38BU464 shell, for a total weight of 4531 pounds and for 90% of the

38BU1214 shell, for a total weight of 2750 pounds).

Quitmyer (1985c:40) proposes an allometric regression formula for the calculation of estimated meat weight or biomass of oyster using the known shell weight (see Wilson's previous discussions of allometry for additional background on this technique). Using this formula ($\log y = \log a + b(\log x)$, where y = meat weight in grams, x = shell weight in grams, a = y intercept, and b = slope), it has been possible to calculate the biomass contribution of the oyster recovered from excavations at these two sites. By confining the calculations to excavation areas with known shell weights, it is possible to compare the results to the biomass calculations obtained earlier in this study by Wilson for the faunal remains.

The allometric regression formula suggests that the biomass of oyster at 38BU464 is 223.7 kg, compared to a faunal biomass (excluding shellfish) of 8.7 kg. The oyster biomass at 38BU1214 is calculated to be 138.0 kg, compared to a faunal biomass (excluding shellfish) of 3.9 kilograms. At these sites the meat weight, or biomass contribution, of oyster is from 25 to 35 times greater than the contribution of other faunal materials. It would appear that at 38BU464 and 38BU1214 the collection of shellfish was clearly the primary subsistence activity, with mammals and plant foods playing a relatively minor role.

Continuing the discussion of subsistence beyond these already tenuous suggestions is difficult. It is known that shellfish, when compared to most mammals, supply relatively little protein (per 100 gms oysters provide approximately 66 calories and 8 gms of protein while deer meat provides 126 calories and 21 gms of protein, and terrapin provides 111 calories and 19 gms protein). Shellfish are relatively nutritious when compared, however, to a corn diet (which contains 63 calories and 2 gms protein per 100 gms) (Hutchinson 1928; Watt and Merrill 1963; White 1953). The abundance and relative healthfulness of shellfish may explain the very late introduction of agriculture on the South Carolina coast.

More importantly, there seems to be no reason why large, permanent groups could not be supported by the subsistence base identified by these investigations. Using the estimated average carrying capacity of 40 deer per square mile (or 0.2 deer per acre) and 522,720 oysters $\geq$ 2 inches per acre (Shelford 1963:80; Vernberg and Sansbury 1972:275), it is possible to calculate that, on the <u>average</u>, deer provide 9.1 kg of biomass per acre, compared to 522 kg of biomass per acre for oysters. Corn, using simple cultivation techniques, is likely to yield 20 bushels an acre, or about 1.4 kg of biomass per acre.

Shellfish were plentiful, available year-round, easy to gather, and self-replenishing. They offered higher yields, on a per acre basis, than either deer or corn. By allowing division of labor, at whatever level, it would be possible to ensure an adequate food supply with minimal interruption throughout the year.

Settlement

Examination of the survey results from Spring and Callawassie islands has revealed that the two islands have a very similar distribution of components, although Spring Island has produced slightly higher percentages of sites evidencing Deptford, St. Catherines and Savannah components than Callawassie (Figure 8). The reason for this is not entirely clear at present, although it may be related to the greater acreage available on Spring Island.

The survey data also reveals that the bulk of the prehistoric sites on Callawassie are situated on what are today poorly drained soils. As previously discussed, a large proportion (about 71%) of Callawassie consists of poorly drained soils, so it is to be expected that about 29% of the Deptford and St. Catherines sites would be found on high, sandy soils if the settlement pattern were unaffected by soil drainage. This, of course, is exactly the situation. In other words, since well drained soils were not chosen over the poorly drained areas, factors other than drainage were of primary importance in the settlement system.

Clearly one factor of considerable importance was proximity to the marsh. In fact, the St. Catherines component at 38BU1262 was found on exceptionally low, moist soils, immediately adjacent to the marsh edge.

These investigations suggest that sites such 38BU1214, 38BU1249 and 38BU1262 represent short-term occupations by small groups almost exclusively oriented toward the harvesting of shellfish. Site 38BU1214 represents a series of Deptford middens. Stratigraphy of these middens, as well as their discrete placement, suggests that small groups occasionally visited the site for the primary purpose of shellfish collection. Although a probable activity area was identified at the site, no evidence for more permanent structures was found. Similarly, 38BU1262 represents discrete Deptford middens with no evidence of long-term occupation. A similar settlement system is evidence at both of these sites during the St. Catherines phase.

Site 38BU464 appears somewhat distinct. Not only is the site larger, but during the Deptford occupation at least one structure was present and features (primarily shell pits) are more common. Examination of the faunal remains has also suggested a longer, more intense occupation at 38BU464 when compared to sites such as 38BU1214 and 38BU1262, during both the Deptford and St. Catherines phases.

Site 38BU19 is clearly distinct from all of the other sites, at least during the St. Catherines and Savannah phases. Excavation has yielded abundant features, post holes, and daub (probably from structures). The shellfish analysis has strongly suggested evidence of oyster collection during the entire year. In addition, a burial mound is documented for this site, implying a more permanent settlement.

These investigations offer an imperfect view of settlement from the late Early Woodland through the Late Woodland and they are most successful in demonstrating the need for intensive studies at a much larger sample of shell midden sites. The currently available date suggest the gradual evolution from a "foraging strategy during the Deptford phase where people move from resource to resource with a few, probably temporary, residential base camps to a "collecting strategy" during the St. Catherines phase, where the community is organized into smaller task groups which go out to collect resources, returning to large, probably more permanent, residential bases (see Binford 1980:10-12). Although a characteristic of the "collecting strategy" tends to be the storage of food for at least part of the year, the abundant coastal ecosystem may have eliminated, or greatly reduced, this necessity (alternatively, the ubiquity of hickory nutshells may provide some evidence of this practice).

Using this model, sites such as 38BU19 appear to represent at least semipermanent "collector" settlements or large residential bases. Sites such as 38BU464 may represent base camps for "foragers" or smaller "collector" settlements. Sites such as 38BU1214, 38BU1262, and 38BU1249 all represent temporary encampments for collection/foraging activities. As further work is conducted in the Beaufort area it should be possible to further refine these concepts.

Future Research

The investigation of prehistoric Native American sites on Callawassie and Spring islands has documented that even "small, common" shell middens represent an important part of the total settlement system and must be examined if we are to understand the diachronic and synchronic diversity of the Woodland Period. Many of the current uncertainties regarding the period from 500 B.C. through A.D. 1200 are the result of our failure to adequately record and examine the extent of site diversity along the South Carolina coast. Even the work which has been conducted at sites such as 38BU464 and 38BU1214 will probably, with time, be found to be insufficient to thoroughly examine the variability of these sites.

Given the range of significant research topics, including chronology, technology, settlement, subsistence, human adaptation, and social organization, future research at sites may benefit from the collection of much larger samples than is currently common. As Brooker has noted for historic sites, history exacts demands on those who would study it and costs upon those who would be custodians. A failure to accept those demands and pay those costs will result in losses which, at the time, seem minor -- a small shell midden here and there. But over time these loses will cost us our ability to decipher the meaning of the past and our heritage will have been destroyed.

Historical Archaeology

Although these investigations were primarily directed toward the exploration of prehistoric Native American sites, excavations at 38BU1214 have provided very significant data on an isolated African-American settlement from the late eighteenth century, the survey of Callawassie Island yielded information on the historic settlement pattern, and Brooker's discussions of site 38BU409 provide the first detailed, published account of sugar manufacturing in South Carolina.

38BU1214

The structure discovered at this site is of a type infrequently identified during archaeological investigations. The structure evidences very minimal building techniques, with a small floor area (perhaps 80 to 100 square feet), a lack of foundations (suggesting a light pole construction), a wattle chimney daubed with mortar (being little more than an open hearth), and likely a thatched roof. The architecture recalls South Carolina's earliest European settlements, although Brooker would point out that this may be a false analogy since building modes in the Low Country rarely, if ever, followed straight line evolutionary paths. The structure, with its extremely rudimentary construction, was a matter of expedience and it appears very similar to the structures near the Callawassie Sugar Works (38BU409) briefly discussed by Brooker in this volume.

Artifacts are as fundamental as the architecture, with the majority representing simple kitchen items -- primarily eighteenth century ceramics (including a high proportion of Colono ware sherds). Architectural remains include only 24 nail fragments, while all of the other items combined account for only 15 specimens. The artifact pattern at the structure most closely resembles that developed for other eighteenth century slave settlements in South Carolina.

The faunal materials associated with this site are likewise anomalous. Although the sample size is quite low, domestic animals account for a third of the individuals represented in the collection, a much higher percentage than typical for slave sites and even higher than expected for urban sites. Although wild mammals are also abundant (and found in greater numbers than expected at a slave settlement), fish (which would be locally available) are uncommon. The most common domestic animal present in the collections is cow, although the absence of skull fragments suggests that beef was provided as rations.

Although these sites appear to be largely absent in archaeological studies, at least two similar structures were identified during the archaeological survey of Spring Island (Trinkley 1990b). They are attributed to isolated slave houses, perhaps belonging to individuals responsible for tending fields or other specialized functions. On Callawassie Island, Brooker suggests that similar structures near the Sugar Works housed slaves required to tend the sugar processing on a seasonal basis. At 38BU1214 there is little to suggest a long-term occupation and the nature of the architecture suggests a structure which was intended to be occupied for a few years at the most.

The faunal assemblage tends to support the interpretation that 38BU1214 represents a highly specialized site. The bulk of the animals present at the site appear to have been provided as rations, with the occupants taking little advantage of the nearby estuarine resources. The limited sample size may be the result of disposal practices, although they may also be explained by a short occupation or by the heavy reliance on rations.

The historic structure at 38BU1214 represents an important part of the plantation landscape, and a part about which little is known. Given the ephemeral architectural and cultural remains it is not surprising that so few such sites are found. In fact, it is more surprising that three were found during the Spring Island survey. The excavations of one, however, indicates that they deserve much greater attention in the future.

Callawassie Sugar Works (38BU409)

The excellent discussions on the Callawassie sugar works by Brooker require little additional discussion. Although this study was unable to incorporate the archaeological data from Lepionka's earlier investigations, Brooker has been able to document the only archaeologically known and architecturally studied sugar works in South Carolina. For this reason alone the study is an invaluable contribution to South Carolina archaeology. Beyond this, the investigations at 38BU409 begin to document the extraordinary diversity which comprises South Carolina plantations.

It is unfortunate that the historic sites on Callawassie are now lost to further research. The little that we know about them, combined with the historical research, hints at what would have provided extraordinary evidence of evolutionary development. Callawassie, as a single plantation consisting of the entire island, would have had the potential to provide information on the changing landscape, agricultural activities, architecture, slave life, and the effects of changing economic fortunes on the archaeological record. Even at the sugar mill it is regrettable that the archaeological investigations did not include soil compaction studies, trace mineral analysis, and phyolith examinations to better document the process of sugar production specific to this site.

Perhaps the only area of potential disagreement with Brooker's study concerns the dating of the mill. Brooker assumes a construction date of about 1828 based almost entirely on the account of Edward Barnwell and the assumption that had the mill been built earlier Barnwell would have mentioned it in his Southern Agriculturalist article. An alternative explanation is that the Callawassie mill was abandoned at the time of Barnwell's writing and it was therefore of no concern. It may have proven to be such an economic disaster that he chose to ignore it. Barnwell may have been interested in success, not the reporting of failure.

There may be some circumstantial evidence pointing to an earlier, rather than later, date for the Callawassie site. The probable (although not proven) owners of Callawassie during the late 1820s were the Kirks. At the mid-range of plantation society, the Kirks do not appear to have been speculators, engaging in "dangerous" new ventures. Like most South Carolina planters, they placed their faith in "King Cotton."

Two of Callawassie's earlier owners, James Hamilton and later John Cuthburt, were very wealthy, influential men in South Carolina. Hamilton became Governor of South Carolina and eventually moved to Texas where he was involved in land speculation. Cuthburt was a member of the South Carolina House and later Lieutenant Governor. Either of these individuals (owning the island from 1813 through perhaps 1826) appear more likely than the Kirks to engage in what Moreno Fraginals (1976) termed the "intellectual adventure" of sugar making. Sugar was a high risk venture requiring skill, luck, capital, and an ability to gather data from a wide variety of sources.

There seems to be nothing in the construction of the Callawassie works which would require it to be built in the second quarter of the nineteenth century. In fact, the anomalies of construction discussed by Brooker might just as well support a construction date in the first quarter of the century -- during the period of experimentation and the ownership of Hamilton or Cuthburt.

Further supporting this alternative interpretation is some indication of building activity in the mill area by the time of Bythewood's 1812 map (Figure 3), yet there is no evidence of structures by 1852 (Figure 4). A mill built in the first quarter of the century might well be in ruins by 1852, although it seems less convincing that a mill built about 1830 would not be shown on a map from 1852.

Clearly, the dating of the Callawassie mill cannot be determined with any degree of assurance at this time. Perhaps the artifacts recovered by Lepionka would help answer this question. Perhaps more intensive excavations are necessary if the problem is ever to be solved.

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Chicora Foundation, Inc.
PO Box 8664 ▪ 861 Arbutus Drive
Columbia, SC 29202-8664
Tel: 803-787-6910
Fax: 803-787-6910
www.chicora.org