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Preliminary Archeological Investigations at the Callawassie Island Burial Mound (38BU19), Beaufort County, South Carolina

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

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Through the efforts of Mr. Saenger, approximately 140 school children from Hilton Head Island had the opportunity to observe archeology, and archeologists, in action. Investments such as this in the youth of today will insure the future of archeology which, now more than ever before, is dependent upon public support. This support can only come about through an awareness and an appreciation of, and concern for, our cultural heritage.

On a more personal level, the Brooks and Lepionka families would like to thank Wolfgang, Waltraut and Winfried Saenger for their "southern" hospitality. Visits to the Saenger home were both enjoyable and memorable.

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Subsequent to fieldwork at the mound, an on-the-ground investigation directed by Lepionka and Goldsborough tentatively verified the existence of a village associated with the mound. This endeavor was undertaken on the afternoon of August 26, 1982, with the volunteer assistence of Mr. Bill Hunt, Mr. Joe Joseph and Mrs. Mona Grunden.

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CHAPTER I

INTRODUCTION

Archeological investigations were conducted at the Callawassie Island burial mound (38BU19--Late Woodland Period, St. Catherine's phase) in Beaufort County, South Carolina (Fig. 1), by the Institute of Archeology and Anthropology, University of South Carolina, from February 15 through March 9, 1982. Mark J. Brooks of the Institute staff directed the fieldwork and served as Principal Investigator.

These preliminary investigations are, in large part, the basis for the research design to be implemented in the excavation of the remainder of the mound in the near future. A more detailed, comprehensive report will be prepared upon completion of that final field phase.

Background

In his reconnaissance survey report on the cultural resources of Callawassie Island, Michie (1982) discussed in some detail the environmental setting of the island and presented an overview of previous archeological investigations in the area. This provided a general economic-ecological framework within which to view the archeological survey data obtained from the island.

Six of the 90 prehistoric and historic sites discovered during that survey were recommended for additional, more intensive testing (Michie 1982). One of these sites was 38BU19, the northern half of which was excavated by C. B. Moore (1898).

> "This mound, in the pine woods near the northeastern end of Callawassie Island, was investigated by us with the kind permission of Mr. William Pinckney, the lessee of the island. The mound, lying near a number of small deposits of oystershells, had a flattened appearance, presumably from previous cultivation; a part of the center had previously been dug out. The mound is 3 feet 4 inches in height and 48 feet across the base. The northern half was dug through by us, including considerable adjacent level territory, this last being done in a fruitless search for outlying pits or graves, which are so numerous near some mounds of the Georgia coast.
>
> The mound consisted of dark sand containing a certain amount of clay. Scattered oyster-shells were present throughout. Along the base of the mound, at the level of the adjacent territory, was an irregular layer 8 to 12 inches thick, of crushed oyster-shells and fire-blackened sand. Beginning about 13 feet from the center, this layer increased somewhat in thickness, toward the center, and

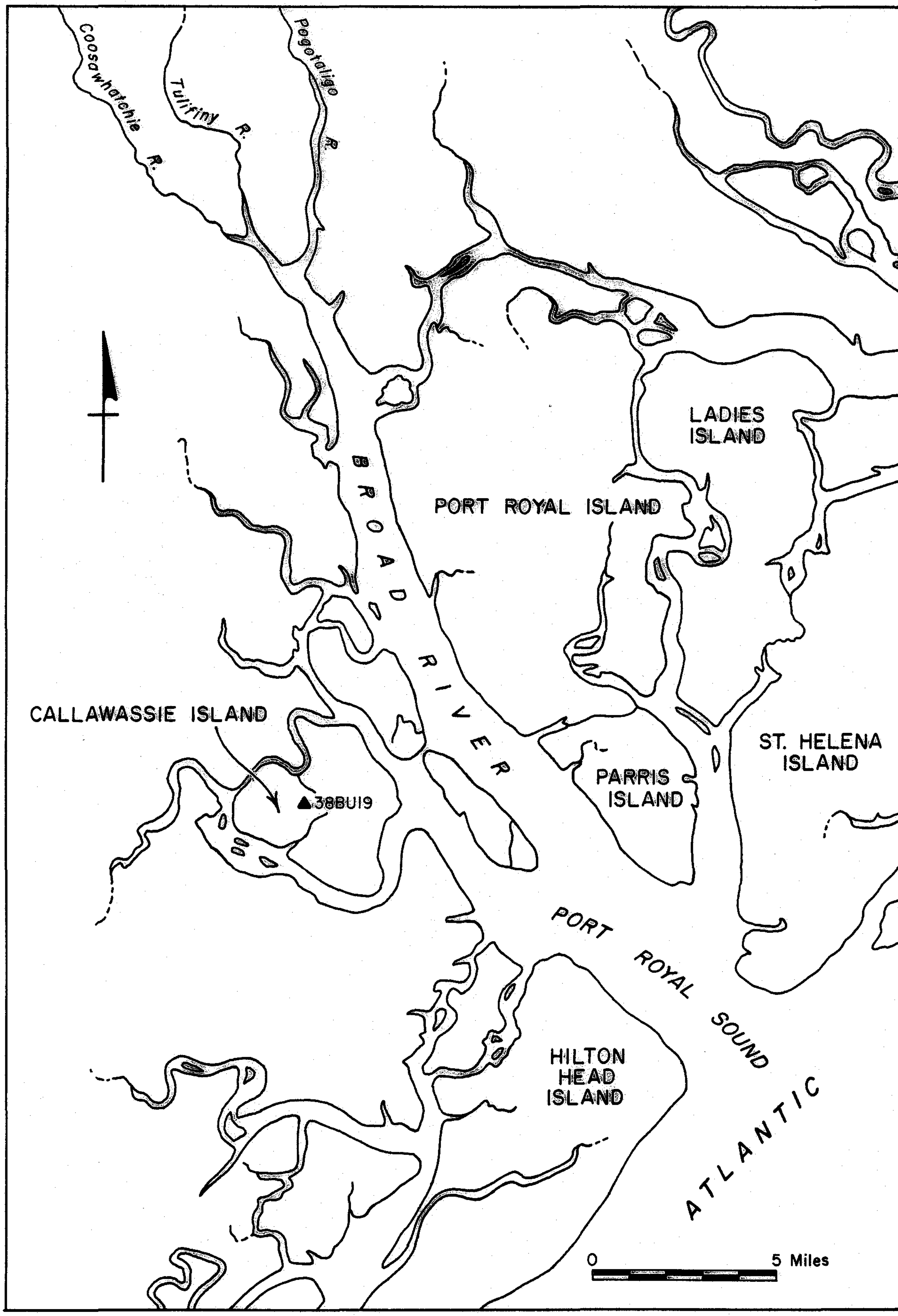


Figure 1: Site 38BU19, Callawassie Island and their relationship to Port Royal Sound, Beaufort County, South Carolina - after Michie 1982.

the oyster-shells lay loosely and unbroken. The superficial portion of the mound, to a depth of about 1 foot, was composed of oyster-shells, with a certain admixture of sand. Well in toward the center, sand alone lay above this layer, but whether or not the layer of sand was due to later cultivation of the mound, we could not determine.

Burials began almost at the margin, nine of human remains and two of dogs.

Burial No. 1, 20 feet N.E. by N. from the center, 2 feet 10 inches down, in a pit 3.5 feet deep, was the skeleton of a female, the trunk on the back, partly flexed, with knees to the left. The skull with all cervical vertebrae but one was missing. There had been no late disturbance. The head, if present, would have pointed E.S.E. There was a well-united fracture of the left radius.

Burial No. 2, 19 feet N.N.E., female, flexed on the right side, head E.S.E., in a grave-pit 3 feet deep, the body slanting upward, 2 feet 4 inches down.

Burial No. 3, a dog, in a small grave of its own, under unbroken layers. The skull and principal bones were sent to Professor Putnam, Peabody Museum, Cambridge, Mass.

Burial No. 4, a young dog. The cranium was sent to Professor Putnam. The remaining bones were badly decayed. In this mound we notice the custom which prevailed in certain mounds of the Georgia Coast, namely: according the honor of sepulture to their canine friends by the aborigines.

Burial No. 5, 17 feet W.N.W., 3 feet down on the margin of a pit 3 feet 8 inches deep, was a skull with two cervical vertebrae. At the same level, but farther into the pit, were several scattered long bones. The skull, sex not determined, has an apical bone and double parietal foramina. It was sent to the Army Medical Museum, Washington, D.C.

Burial No. 6, 16 feet N.N.E., in a pit 4 feet 3 inches down, was the skeleton of a young male, flexed on the right, head E.

Burial No. 7, in the same pit about 1 foot farther out from the center of the mound, on a level just below Burial No. 6, was the skeleton of a child, flexed on the right side, heading E.N.E. The pit containing these two burials was 6 feet 5 inches in depth.

Burial No. 8, 15 feet W.N.W., just below the black base layer, 3 feet down, was the skeleton of an adult of uncertain sex, flexed on the left side, head N.E. by N.

Burial No. 9, 13 feet N.E. by E., on the base, 2 feet 4 inches down, was the skeleton of a male with trunk on back and knees flexed to the right, head S.S.E.

Burial No. 10, 12 feet N.N.E., on the bottom of a pit extending through the base layer, 3.5 feet down, were a tibia, a fibula and the foot bones with scattered bones of the other foot, all under an unbroken layer of oyster-shells.

Burial No. 11, 8 feet N.W. by W., 2 feet down, under a mass of small marine univalves (*Littorina irrorata*) was the skeleton of a female, partly flexed on the right side, head N.E. by E.

No artifacts lay with the burials. Near the surface, unassociated, was a disc of earthenware, evidently fashioned from a fragment of a broken earthenware vessel whose cord-marked decoration was apparent on the disc. These discs, if present at all in Florida, where the discoidal stone seems to be wanting, are extremely rare. They are numerous along the Georgia coast. We found them in still greater numbers along the southernmost part of the coast of South Carolina. It is interesting to know that just such discs are found as far north as Canada, Mr. G. E. Laidlaw having met with great numbers in the ash-beds near Balsam Lake, Ontario. These discs were doubtless used in some sort of game. Mr. Laidlaw thinks it probably resembled our "billy-button," which he has seen among the Crees and Salteaux of the Northwest British possessions. Mr. Steward Culin believes if they were used in a game it was one resembling our "checkers," and cites Mr. Cushing as to the existence of such a game among the Zunis, and Mr. Fewkes as to a like game among the Mokis.

Sherds, which were fairly numerous, were undecorated or cord-marked, save one bearing a rude checked stamp.

In this mound was an unusual structural feature. The mound rested upon undisturbed grayish-sand with a certain admixture of clay, and this stratum was above yellowish brown clay with a slight admixture of sand. At the center of the base of the mound a hole had been dug about 7 feet in diameter, extending down 5 feet 4 inches. In filling the pit, sand from the upper sand layer had been discarded, the material used being clay from the layer below, with a certain admixture of bits of charcoal and occasional oyster-shells. This mass of clay had somewhat the appearance of an altar, but careful search showed neither bones, artifacts nor evidence of the use of fire."

This description by Moore clearly established the importance of the site. Because of its importance and the possibility of vandalism, Three Fountainview Corporation and the Institute agreed that of the six sites recommended for additional testing by Michie, 38BU19 should receive top priority. During our investigations at the site, it became immediately obvious to all concerned that its significance was such that total excavation of the remaining southern half of the mound was warranted. Consequently, Three Fountainview Corporation has secured the mound until completion of the work is possible.

Research Goals

The intent of this preliminary research was to assess the potential of the remaining portion of the mound for yielding data relevant to a wide array of research or problem domains considered worthy of pursuit by practitioners of anthropological archeology as a scientific discipline (e.g. Kuhn 1962; Willey and Phillips 1958; Binford 1962). General problem domains that may be addressed through a consideration of human osteological and burial data include: 1) mortuary practices, 2) status, 3) demography, 4) migration-biological affinity, 5) marriage patterns, and 6) nutrition and health (Ubelaker 1980). Such data, which are rare along the South Carolina coast (e.g. Rathbun et al. 1980), are necessary for comparative studies of temporal and spatial variability in prehistoric populations in the Southeast and elsewhere.

Within an economic-ecological theoretical framework, subsistence-settlement research constitutes an additional, broad problem domain in archeology (e.g. Schneider 1974; Jochim 1976; Cohen 1977; Binford 1968; Birdsell 1968; Earle and Christenson 1980; Smith 1975, 1978). Based on Moore's (1898) information, it was evident that the mound would likely provide valuable site specific data (i.e., artifacts, subsistence remains, mound construction details, features and associated radiometric dates) relevant to on-going studies of prehistoric subsistence-settlement variability on the South Carolina coast (Brooks 1980; Brooks and Scurry 1978; Brooks et al. 1979; Brooks and Canouts 1981; Colquhoun et al. 1981; Michie 1976, 1980, 1982; Trinkley 1981). These data sets should complement and, hopefully, support inferences drawn from the human osteological remains, particularly those inferences pertaining to Late Woodland mortuary practices, status, nutrition and health. Additional insights into specific aspects of socio-economic organization may be obtained as well.

In line with the multi-phase archeological research being conducted on Callawassie Island, the data recovery methods employed in the mound excavation were designed to maximize the collection of data relevant to the above problem domains. From the general conclusions drawn from this preliminary study, it will be possible to deduce a series of specific, interrelated hypotheses to be tested with more refined (focused) data obtained from the mound for that express purpose. Information from the mound, in turn, will be incorporated in a broader subsistence-settlement model to be tested during the investigation of the three shell middens (38BU428, 38BU398, 38BU464--roughly contemporaneous with the mound) recommended for intensive testing by Michie (1982). Also, the probable village associated with the mound, as indicated by the present research (see Chapter IV), should definitely be integrated into the long-term subsistence-settlement research design for Callawassie Island.

Organization of This Report

The field investigations conducted at 38BU19 are discussed in Chapter II. The archeological data are considered in Chapter III. In Chapter IV, the various lines of data are synthesized, tentative conclusions are drawn, and recommendations for future research are presented. Appendices I-IV contain detailed faunal, ethnobotanical, pollen and human osteological data and interpretations.

CHAPTER II

FIELD INVESTIGATIONS AT 38BU19

Introduction

This chapter contains a brief description of the site, followed by a discussion of the data recovery methods. In light of the general research goals presented in Chapter I, the rationale for the specific methods employed is considered.

Site Description

The mound (38BU19) is approximately 15 m in diameter and slightly over 1 m high near its center (Fig. 2). Moore's (1898) excavation of the northern portion of the mound is clearly indicated by the contour lines in Figure 2.

In agreement with Moore's (1898) description, the mound is located toward the northeastern end of the island (Fig. 1), approximately 300 m south of the Chechessee Creek marsh. From the mound, the low-lying terrain (ca. 1.50-3.00 m above sea level) very gently slopes down toward the north, south and east. There is a gentle slope up toward the west and northwest.

While pine is currently the dominant, or at least most conspicuous upperstory (canopy) vegetation in the immediate vicinity of the mound, hickory (*Carya sp.*), magnolia (*Magnolia grandiflora*), sweetgum (*Liquidambar styraciflua*), palmetto (*Sabal palmetto*) and various species of oak (*Quercus virginiana, Q. nigra, Q. laurifolia*) are also present. The existing dominance of pine may be attributed to historic-modern cultivation and fires (Michie 1982), probably in conjunction with the poorly to moderately well drained Eulonia and Tomotley soils associated with this area of relatively low elevation (Stuck 1980).

The understory (sub-canopy) vegetation includes wax myrtle (*Myrica cerifera*) and greenbriar (*Smilax sp.*). A more complete discussion of the various plant communities on Callawassie Island may be found in Michie (1982).

Vegetation on the mound itself included a canopy of palmetto, pine, live oak and sweetgum. A heavy ground cover of various vines, briars and shrubs was also present.

Finally, of probable significance to interpretations of the mound within a broader cultural context is the relatively sparse but continuous shell midden scatter beginning at or near the edge of the mound and continuing for a distance of approximately 100 m toward the west and north-

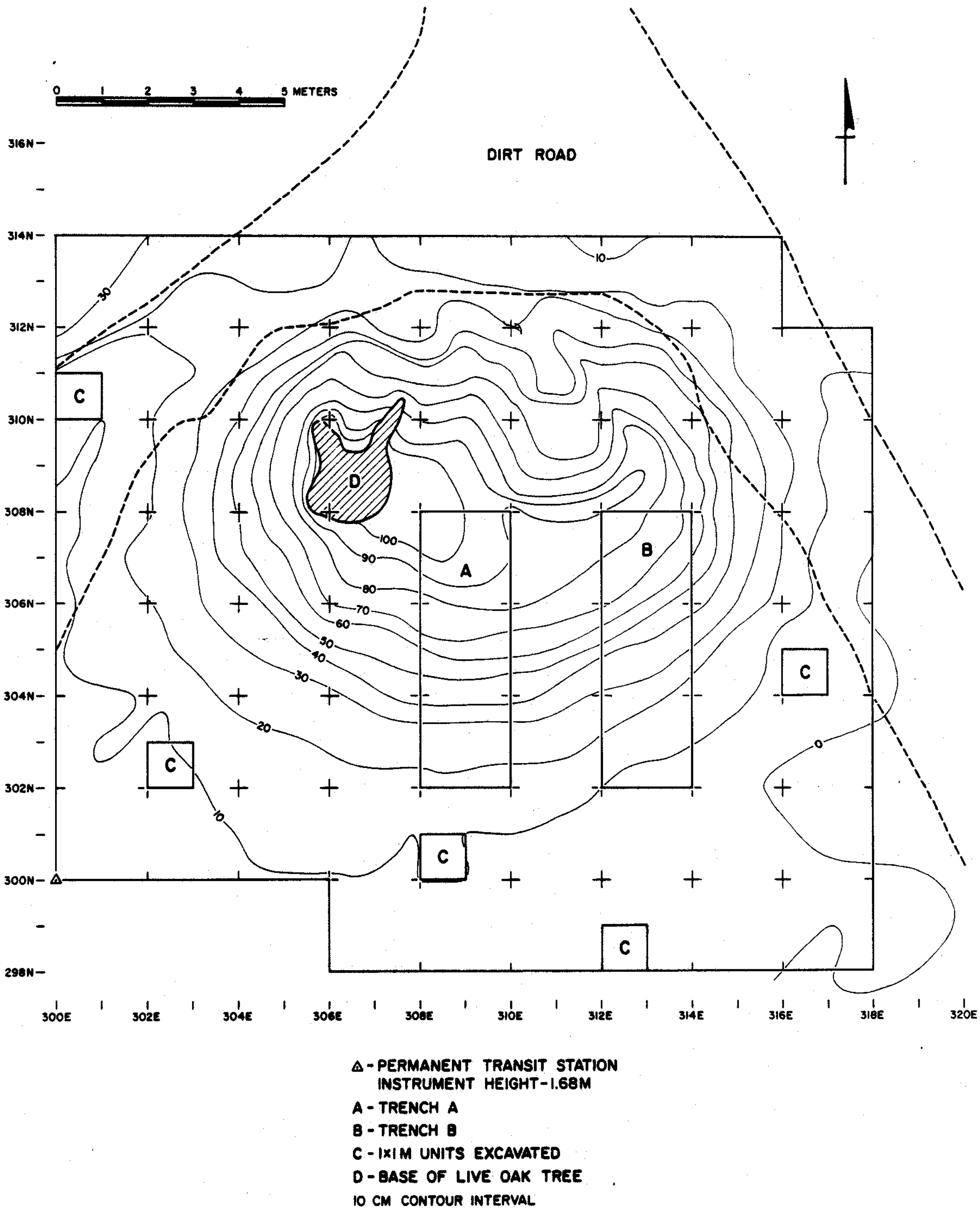


Figure 2: Site 38BU19 - Contour map showing locations of excavation units.

west, corresponding with the slight rise in elevation noted earlier. This shell midden scatter is exposed in the dirt road adjacent to the mound and may represent the general area of a possible village, the existence of which is suggested by habitation refuse used as fill for mound construction (see Chapters III and IV). With regard to a possible village associated with the mound, it may be significant that the nearest known source of freshwater is a shallow, swampy pond (ca. 20 m in diameter and .75 m deep), also located to the west of the mound at a distance of about 500 m (Michie 1982).

Data Recovery Methods

Preparation for Site Testing

The mound was cleared by hand; a grid consisting of 2 x 2 m units was established over the site area, and a contour map of the site was prepared (see Figs. 2 and 3). The permanent transit station at 300N, 300E, provided vertical control during excavation (Fig. 2).

Controlled surface collections were then conducted within the established 2 x 2 m grid units. While the leaf litter obscured the ground surface visibility in most units, a general idea of the artifactual content of the mound fill was obtained prior to excavation.

Figure 3: Site 38BU19 - after clearing - view looking northeast.

In addition, obtaining subsurface data prior to controlled excavations was also desirable. The walls of Michie's (1982) test pit in the north-central portion of the mound (backfill or spoil from C. B. Moore's excavations) was trowelled and examined in order to provide insights into the specific nature of any disturbed deposits that might be encountered during the course of our excavations in the mound. Such data are essential for stratigraphic and contextual interpretations. For the same reason, a 50^3 cm sondage was excavated 30 m south of the mound in order to ascertain the non-cultural, natural soil stratigraphy in the vicinity of the mound.

Excavation Techniques

One by One Meter Units

The southern periphery of the mound was systematically tested through the excavation of five 1 x 1 m units (Fig. 2). This was intended to (1) derive the natural stratigraphy of the area, (2) discover the southern extent of the mound, (3) determine the stratigraphic relationship(s) between the mound edge and the surrounding terrain in order to ascertain details of mound construction, and (4) reasonably determine the presence/absence of burials outside of the mound proper. All four objectives were realized. As expected, based on Moore's (1898) investigations of the northern portion of the mound, neither artifact concentrations nor burials were encountered in these outlying units, enabling us to concentrate on the mound itself during the remaining two weeks of fieldwork.

Given the data desired, 1 x 1 m units were selected. Units of this size would be large enough for obtaining the necessary data, but small enough to be excavated in the limited time available. The 1 x 1 m units excavated were in the southwest quadrant of the 2 x 2 m grid units. The units were designated by the grid coordinates of their southwest corner (see Fig. 2).

Excavation of these units was through "shovel schnitting" (1 cm horizontal shovel cuts) within natural and/or culturally defined levels. The contents of each level were screened through 1/4-inch mesh hardware cloth using a mechanical sifter. Vertical control for the excavation of these levels was maintained through direct transit readings (Permanent Transit Station at 300N, 300E), expressed in *meters below datum*. Each unit was excavated until archeologically sterile deposits were encountered (ca. 30-45 cm below ground surface--Soil Horizons O_1-A_3, Buchman and Brady 1969). The walls were then trowelled and the profiles drawn and photographed.

During excavations, a 30 x 30 cm stratigraphic column was left in the northeast corner of each 1 x 1 m unit. After excavation, the entire column was removed by natural/cultural levels. From each level, two cups of soil were retained, respectively, for palynological and soil chemistry analyses. The remaining contents of each level were retained for flotation, the heavy fraction for faunal analyses and the light fraction for ethnobotanical analyses.

The intent of the stratigraphic columns in the 1 x 1 m and 2 x 2 m units (discussed below) was to provide for the "systematic" (spatially and vertically) collection of subsistence and environmental data from the southern portion of the mound. Such data are necessary for examining intra- and intersite subsistence/environmental variability. With respect to intrasite variability, the data obtained from the stratigraphic columns provide a control for comparisons with similar data obtained from specific features in the mound.

Two by Two Meter Units - Trenches A and B

Two 2 x 6 m trenches (Trenches A and B, Fig. 2), each consisting of three contiguous 2 x 2 m units, were excavated into the mound from the southern periphery toward the center. The central trench (A) was intended largely to ascertain details of mound construction. The trench (B) into the southeastern quadrant of the mound was, based on Moore's excavation data (see Chapter I), intended primarily for burial discovery. Two by two meter excavation units seemed to be the optimal size when considering: (1) the depth of the mound, (2) the need for maximum vertical and areal exposure in the time allotted, and (3) the need for relatively large units in order to enhance the likelihood of discovering burials and to facilitate their exposure and removal.

Excavation of the 2 x 2 m units was generally like that of the 1 x 1 m units. However, because of tree stumps, it was sometimes necessary to locate the 30 x 30 cm stratigraphic columns in the northwest rather than in the northeast corner of the unit (i.e. Units 304N, 312E and 306N, 312E of Trench B).

In each trench, the 2 x 2 m units were excavated successively, starting at the edge of the mound and working north toward its center. In this way, it was possible to use the profiles (especially the north profiles) of each excavated unit to guide the excavation of the next, adjacent unit. Such an approach was essential for effectively dealing with the complex stratigraphy (see Chapter III) exhibited by the mound. Even so, because of the numerous lenses associated with frequent "patch-work" construction, it was not always possible to predict accurately the stratigraphy of the unit based upon that of an adjacent unit. As discussed in Chapter III, this presents a particularly difficult problem when attempting to correlate the stratigraphy of the two trenches, separated by two meters of unexcavated area.

Because of the time factor and the numerous features encountered, it was not possible to completely excavate Unit 306N, 308E of Trench A or Units 304N, 312E and 306N, 312E of Trench B. For the same reasons, both trenches were stopped just short of the interface with Moore's (1898) excavations terminating near the center of the mound.

Upon "completion" of the trenches, their respective profiles were drawn and photographed (see Chapter III) before backfilling. Similarly, the profiles of the walls removed between the 2 x 2 m units during the coarse of excavation were drawn and photographed prior to their removal.

Features

All features encountered were in Trenches A and B (see Chapter III). The excavation techniques employed were necessarily as varied as the features themselves, with the peculiarities of each feature largely determining the specific strategy implemented for its exposure and removal. Generally, the features that were horizontally oriented with the various mound construction levels were isolated, pedestalled and carefully exposed as excavation proceeded from top to bottom. Vertically oriented or pit features (e.g., pit burials) were treated in much the same manner, but were "reamed" from the surrounding matrix into which they intruded.

Excavation of all features was by trowel. With the exception of a standard two gallon soil sample, the fill from each feature was screened through 1/4-inch mesh hardware cloth. The two gallon soil sample collected from each feature was for comparison with the stratigraphic "control" columns. From each two gallon sample, two cups of soil were retained, respectively, for palynological and soil chemistry analyses. The remaining contents of each two gallon sample were retained for flotation, the heavy fraction for faunal analyses and the light fraction for ethnobotanical analyses.

Vertical control was maintained through direct transit readings. All features were successively mapped and photographed during the exposure and removal process.

The final exposure and removal of all burials encountered was conducted on the last two days of fieldwork with the assistance of Dr. Ted Rathbun (Physical Anthropologist--University of South Carolina, Department of Anthropology). The recording of *in situ* skeletal data is essential. Regardless of the care with which burials are removed, valuable demographic and pathological data may be lost due to the fragile nature of many bones. In order to insure minimal damage to the skeletal remains, tools used in contact with the bone were confined to camel's hair brushes, tongue depressors, bamboo splinters and grapefruit knives.

CHAPTER III

ARCHEOLOGICAL SITE DATA

Introduction

The archeological data recovered from 38BU19 are summarized in this chapter. More detailed data obtained from the analyses of the various artifact categories are on file at the Institute of Archeology and Anthropology, University of South Carolina.

Data derived from the palynological, ethnobotanical, faunal and human osteological analyses are presented in Appendices I-IV. In the respective appendices, the analytical procedures employed are discussed and interpretations derived from the data are presented.

Stratigraphic data are presented first in order to provide a contextual framework within which to consider the other data sets. Mound construction details and the stratigraphic relationships of the various features are emphasized. The artifactual data sets (ceramic, lithic, other) are then discussed and the various features encountered during excavation are described.

Finally, the results of the special analyses (palynological, ethnobotanical, faunal, human osteological, human coprolite, C^{14}) are summarized. While special samples were collected for soil chemistry analyses, these analyses were precluded due to budgetary constraints. It is anticipated, however, that such analyses will be conducted in conjunction with the next phase of the mound research.

Stratigraphic Data

One by One Meter Units

All five 1 x 1 m units (Fig. 2) exhibited very similar stratigraphy, largely natural. The edge, or toe, of the mound, however, was discernible in all units.

The natural stratigraphy consisted of a medium gray, loamy fine sand humus (Soil Horizons O_1 and O_2--excavated as Level A) to a depth of 5 to 14 cm below ground surface. This soil horizon(s) graded into a mottled, medium gray-tan loamy fine sand (Soil Horizon A_1,--excavated as Level B), terminating at a depth of 25-33 cm. Below was a mottled gray and light yellow-tan fine sand grading into a light yellow-tan fine sand (Soil Horizons A_2 and A_3, respectively--excavated as Level C) at 35 cm below ground surface. The latter soil horizon extended to varying depths, terminating on an irregular, highly eroded, orange sandy clay substrate (Soil Horizon B_1-B_2).

The substrate was usually well below the archeological deposits and was seldom encountered. However, the irregular substrate surface was sometimes "domed up" very close to the existing ground surface. Such was the case in Unit 300N, 308E, where the substrate occurred at 23 cm below ground surface in the northern portion of the unit.

Fill from mound construction (mound construction Level B, discussed below) extended from the mound into the area of the outlying 1 x 1 m units, feathering out between natural Soil Horizons O_1-O_2 and A_1. This cultural deposit was characterized by a dark gray, fine loamy sand with sparse oystershell and was excavated as Level B.

Trenches A and B

The mound, as indicated by Trenches A and B (see Figs. 4-8), was constructed largely with secondary midden-village refuse deposits. The alternating mound construction layers (strata) and lenses exhibited considerable variability in thickness, areal extent, soil color, texture, and refuse content. Details of mound construction are graphically depicted in Figures 5 and 6. Accompanying these figures are descriptions of the various layers and lenses as they appeared in profile. The corresponding excavation levels are also noted. Five general layers were observed in the mound, forming the basis for excavation Levels A-E. These levels are briefly described, beginning with Level A at the mound surface.

Level A consisted of a medium gray, fine sandy loam humus. In contrast, Level B consisted of a dark gray, fine sandy loam "midden" soil containing large quantities of crushed oyster and lesser amounts of crushed periwinkle shell. Level C was essentially a continuation of Level B, but was much thicker and contained a higher frequency of whole shells.

The general matrix of Level D was one of medium gray-tan, fine sand with relatively sparse oyster and periwinkle shell. Within excavation Level D, however, there was considerable stratigraphic complexity manifest by numerous, often small, horizontally-oriented features and "patch-work" construction lenses of highly variable fill.

Level E consisted of natural, submound Soil Horizons A_1-A_3 (no old O_1-O_2 Soil Horizon was observed). This level was characterized by a light yellow-tan fine sand becoming lighter and more homogeneous (yellow) with increasing depth. Virtually no shell or cultural material was present.

The stratigraphic variability exhibited by Trenches A and B and their constituent 2 x 2 m units was the basis for various subdivisions within Levels A-E during excavation. Essentially, levels A, B and E were excavated as they appeared. Level C was sometimes subdivided arbitrarily because of its considerable thickness. Level D, on the other hand, was variously subdivided on the basis of its internal stratigraphic variability. With respect to Levels A-C and E, it was relatively easy to derive stratigraphic correlations within and between Trenches A and B. However,

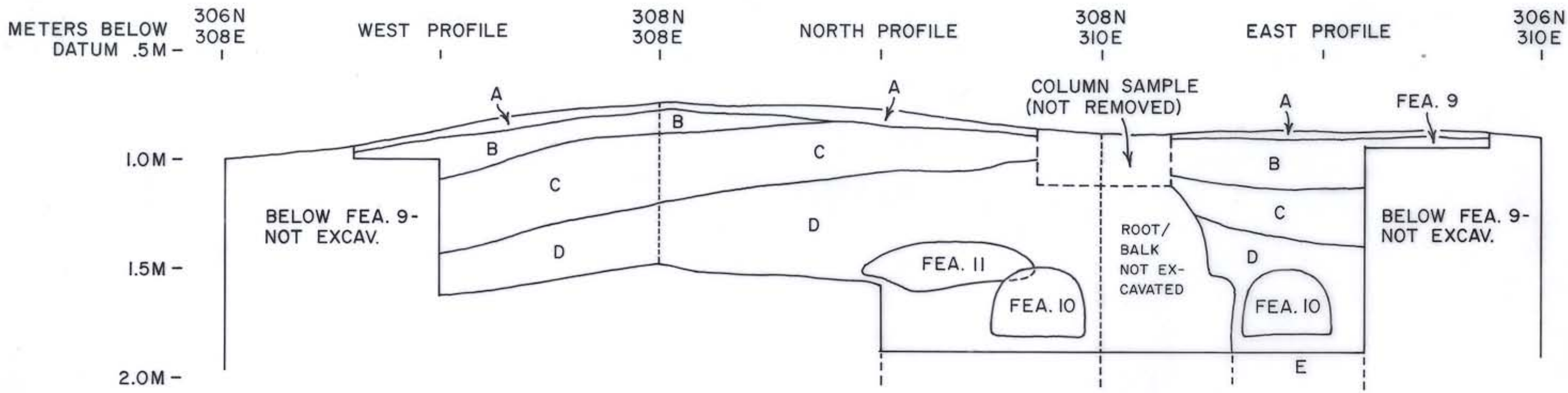
Figure 4: Overview of Trenches A and B, looking northeast.

such was not the case for Level D, due to the highly localized nature of its many constituent lenses.

Following is a general reconstruction of the mound construction sequence. This reconstruction is based largely on Trench A, the central and most completely excavated trench.

As is indicated by Figure 6, Trench A profile, construction of the mound began with the excavation of the area toward the periphery of the mound. Presumably, spoil from these aboriginal excavations into the natural soil horizons was piled toward the center of the mound, probably filling and covering the large, initial, central submound pit reported by Moore (1898). A number of shallow pit burials (e.g. Feature 1 and probably J--Fig. 6, Trench A profile) were then placed into the excavated margins of the mound. These pit burials, and likely the central submound pit as well, were then capped by H (Fig. 6, Trench A profile), completing the first major stage of mound construction. This sequence is very similar to that described by Thomas and Larsen (1979) for what are argued to be Refuge-Deptford period burial mounds on St. Catherines Island, Georgia.

The numerous lenses and features comprising Level D represent a series of burial and burial related events, collectively indicating that the mound was most "intensively utilized" during that interval. This second, and final, stage of mound construction was completed with the addition of layer or Stratum B (Fig. 6, Trench A profile), corresponding with excavation Levels B and C. Presumably, this final shell midden cap was for mound stabilization. Later, intrusive pit burials (e.g. Feature 9, Fig. 5) were placed into the cap.



A- HUMUS-MEDIUM GRAY, FINE SANDY LOAM. EXCAVATED AS LEVEL A.
B- DARK GRAY, FINE SAND WITH DENSE SHELL (MOSTLY OYSTER). EXCAVATED AS LEVEL B.
C- DENSE, LOOSE, WHOLE OYSTER SHELLS WITH VERY LITTLE SAND (MEDIUM GRAY-TAN, FINE SAND). EXCAVATED AS LEVEL C.
D- MEDIUM GRAY-TAN, FINE SAND WITH SPARSE SHELL. EXCAVATED AS LEVEL D.
E- LIGHT YELLOW-TAN, FINE SAND. NOT EXCAVATED.

Figure 5: Trench A, Unit 306N, 308E, profiles

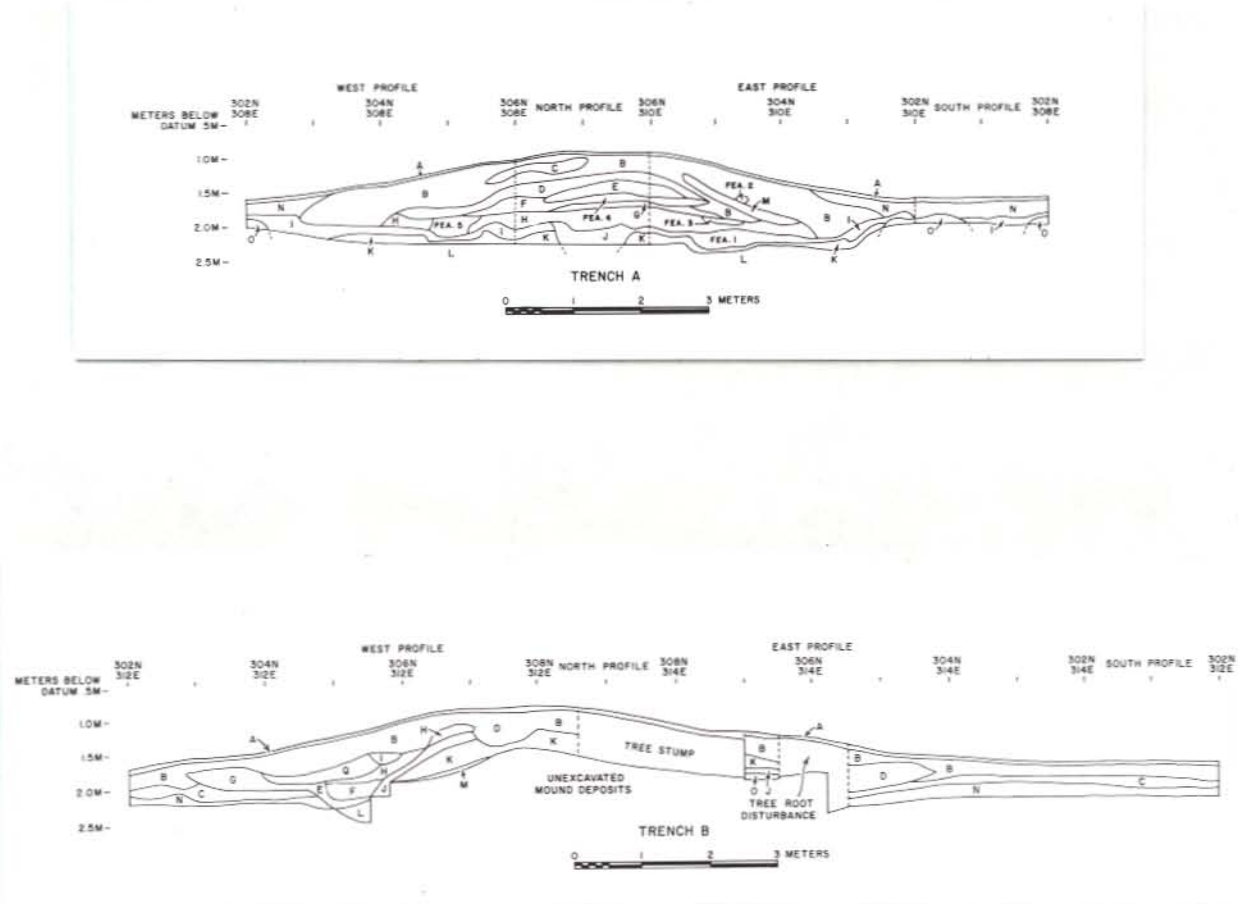


Figure 6: Profiles of Trenches A and B.

Trench A Profile Descriptions (Figure 6)

A. Humus - medium gray, fine sandy loam - excavated as Level A.
B. Dark gray, fine sandy loam with dense shell (mostly oyster and periwinkle) - upper portion (ca. top 10 cm) consisted primarily of crushed shell and was excavated as Level B - bottom portion consisted primarily of whole shells and was excavated as Level C.
C. Medium gray-tan, fine sand lense (possible south edge of Feature 9).
D. Medium gray-tan, fine sand with relatively sparse oyster and periwinkle shell - excavated as Level D.
E. Dark gray, fine sand with dense oyster and periwinkle shell - cap over F.
F. (Feature 4) Like E, but has bits of packed, red-orange sandy clay (probably substrate in origin, but lightly fired or sun-dried) forming a prepared surface. Disarticulated/fragmented human bone (some calcined) strewn over surface. Excavated as Level D-1.
G. Light gray-tan, fine sand lense with sparse oyster and periwinkle shell. Excavated as Level D-2.
H. Dark gray, fine sand with relatively dense "midden" material, but sparse shell. Excavated as Level D-2.
I. Mottled medium gray-tan and light yellow-tan fine sand. Very sparse shell and cultural material, attributable to root action from above. Excavated as Level E.
J. Mottled medium gray-tan fine sand with very sparse shell and cultural material (probable pit edge - pit not excavated). Excavated as Level E.
K. Light yellow-tan fine sand with virtually no shell or cultural material. Excavated as Level E.
L. Like K, becoming lighter and more homogeneous (yellow) with depth. Generally sterile, archeologically. Excavated as Level E.
M. Medium gray-tan, fine sand lense with sparse shell. Excavated as Level D.
N. Dark gray-tan, fine sand with very sparse or no shell. Excavated as Levels B, C, and D.
O. Red-orange, sandy clay substrate.

Feature 1 - East edge of pit - mottled medium gray and light yellow-tan, fine sand.
Feature 2 - Sherd concentration (stacked horizontally) extending into wall.
Feature 3 - Calcined shell lense.
Feature 5 - East edge of probable pit. Mottled medium gray and light yellow-tan fine sand. Not excavated.

Trench B Profile Descriptions (Figure 6)

A. Humus - medium gray, fine sandy loam. Excavated as Level A.
B. Dark gray, fine sandy loam with variable shell (mostly oyster and periwinkle) density. Upper portion (ca. top 10 cm) contained primarily crushed shell and was excavated as Level B. The lower portion consisted primarily of whole shells and was excavated as Level C.

Trench B Profile Descriptions (Figure 6 - Cont.)

C. Light to medium gray-tan, fine sand mottled with light yellow-tan, fine sand. Excavated as Level D.

D. Mottled, loose, dark gray, fine sandy loam with dense, mostly whole, oyster shell (east edge of probable burial pit - not excavated).

E. Medium brown-gray, fine sand with sparse shell (possible pit associated with Feature 6). Excavated as Area B.

F. Medium gray, fine sand with moderate oyster shell density.

G. Dark gray, fine sandy loam with a moderate oyster shell density and bone. Excavated as Levels B and C.

H. Medium gray, fine sandy loam with a high oyster shell density.

I. Dark gray, fine sandy loam with flecks of charcoal and orange sandy clay substrate.

J. Light tan, fine sandy loam. Excavated as Level D'.

K. Dark gray, fine sandy loam with a high oyster shell density. Excavated as Level D".

L. Dark gray-brown fine sand (possible pit associated with Feature 8). Excavated as Feature 8, pit fill.

M. Medium gray, fine sand. Not excavated.

N. Light, yellow-tan, fine sand. Excavated as Level E.

O. Dark gray, fine sandy loam with crushed shell.

P. Dark gray, fine sandy loam with whole shell and charcoal. Excavated as Levels B and C.

Q. Medium gray-tan, fine sand with sparse shell.

Figure 7: Trench A - view looking northwest

Figure 8: Trench B profile - view looking west

Artifactual Data

Ceramic Data

The ceramic data from the mound are summarized in this section. Other artifacts or materials of clay (i.e., daub; malleated, low-fired clay tempering material) recovered from the mound are also considered.

Most of the ceramics, as well as other archeological materials, were incidentally rather than intentionally included in the mound fill, which was ultimately derived or "borrowed" from midden and/or village refuse deposits. Consequently, little contextual or functional data relevant to the mound itself could be obtained from the ceramics in the mound. However, some interesting patterns did "emerge" from the analysis. From these patterns, inferences are drawn regarding certain aspects of manufacture and use of the ceramics in their *primary* context (Schiffer 1976).

Given their limited value for contributing contextual or functional information, the ceramics should be most useful for providing a first approximation of the temporal range of the mound, with the mound necessarily being contemporaneous with, or later than, the contained ceramics. This initial temporal estimate would, hopefully, be substantiated and refined by subsequent radiometric determinations.

Studies of ceramic temporal variability in the Southeast have, traditionally, focused on change through time in such general vessel attributes as: paste, surface finish, decoration, and form. When dealing with sherds (whole vessels are seldom represented), ceramic analyses have shown that variability in design elements and temper material, when considered in combination, can be related to temporal change. While analyses emphasizing these attributes have been typically qualitative and largely subjective, the resulting ceramic "types" can, when considered in light of radiometric dates, be quite useful as temporal indicators (e.g., Trinkley 1976, 1980; DePratter 1977, 1979). For our purposes, such an approach seemed adequate.

In the following summary, variability in exterior surface treatment and temper are emphasized. These data are presented by provenience in Tables 1-4 (Controlled Surface Collections, 1 x 1 m Units, Trench A and Trench B, respectively). Because of frequent difficulty in obtaining these data from small sherds, sherds whose maximum dimension was less than 1" (2.54 cm) were not analyzed. The number of such sherds was, however, tabulated by provenience (Tables 1-4).

A comparison of Tables 1-4 indicates, taking into account differences in sample sizes, that the ceramic types and their relative frequencies are generally quite similar for different areas of the mound. This suggests that fill for the various parts of the mound was derived from the same or generally similar deposits and argues for the ceramics being roughly contemporaneous. Greater ceramic variability is, however, exhibited between specific excavation units and levels. Presumably, this indicates considerable internal variability within the deposits from which the fill was borrowed. This is in line with a wide range of activities and the differential use of space associated with intensive habitation, usually accompanying fairly settled "village life."

Of the total 1,187 identifiable sherds 1" or greater in maximum dimension, 79.95% are cord marked, followed by plain (15.4%) and fabric impressed (2.95%). With a few minor exceptions, these ceramics are well within the range of variability described by DePratter (1977, 1979) for St. Catherines period ceramics (ca. A.D. 1000-1150) on the North Georgia coast.

Fabric impressed ceramics apparently do not occur on the North Georgia coast. In this regard, it is probably significant that all fabric impressed ceramics from the mound are basal sherds, the larger of which exhibit cordmarking beginning immediately above the base. DePratter (1979, personal communication) suggests that the apparent fabric impressed surface treatment on the bases of some St. Catherines period vessels was actually produced with the edge of a cord-wrapped paddle. While this may be largely correct, at least some sherds from the mound exhibited a very definite warp and weft characteristic of fabric impressed ceramics. The warp and weft pattern is particularly apparent in Feature 12 (reconstructable vessel--to be discussed), where the basal one-third of the vessel is fabric impressed and the upper two-thirds is fine cord marked. These data may indicate that the fabric impressed ceramics from the mound did not result from intentional decoration. Rather, they may have resulted from the manufacturing process, during which the vessel was positioned on a fabric mat or within a shallow fabric basket. Positioning in this manner would facilitate vessel construction, decoration, and transport prior to firing. Decoration resulting from this process could be an intentional by-product of manufacture.

It must also be noted that fabric impressed ceramics do occur along the northern South Carolina coast. These ceramics are both earlier and contemporaneous with the St. Catherines ceramics (South 1976). Consequently, the relatively few fabric impressed ceramics from the mound may simply represent normal regional variation in ceramics.

Slight differences in temper also exist between St. Catherines ceramics of the north Georgia coast and similar ceramics from the mound. Again, normal regional variation, and/or possible temporal differences, are likely involved.

St. Catherines period ceramics are, by definition (DePratter 1979), tempered with small, crushed sherd or low-fired clay fragments less than 3 mm in diameter. Most of the ceramics from the mound are characterized by this type and size range of temper material. This same temper material, however, occurs up to 5 mm in diameter in many sherds, either exclusively or in varying proportions (usually less), with the small size range.

Crushed sherd or low-fired clay temper in the 3-5 mm range is typical of Wilmington ceramics. These ceramics immediately precede in time, and "grade" into, St. Catherines ceramics (DePratter 1977, 1979). Wilmington ceramics in South Carolina are both earlier and contemporaneous with St. Catherines ceramics. Thus, the sherd or low-fired clay tempered ceramics from the mound may represent normal regional variation between the South Carolina and north Georgia coasts, and/or a time of Wilmington/St. Catherines transition. If the latter, then a date of A.D. 1000 or slightly earlier would be expected for these ceramics.

TABLE 1

38BU19 - CERAMIC DATA
CONTROLLED SURFACE COLLECTION

PROVENIENCE				EXTERIOR SURFACE TREATMENT						OTHER CLAY ARTIFACTS		
2X2M Unit	Level Feature	Basal Elevation -Meters Below Datum	Sherds < 1 inch Maximum Dimension	Plain	Cord Marked	Check Stamped	Fabric Impressed	Curvilinear Complicated Stamped	Indeter-minate	Daub	Clay Frags	TOTAL SHERDS
304N, 306E			1									1
304N, 308E					1e							1
306N, 304E									1e			1
306N, 308E			2									2
306N, 312E			1									1
308N, 304E			1	1e								2
308N, 312E			2									2
308N, 314E					1f							1
310N, 308E					1e							1
310N, 310E			2									2
312N, 312E					1e							1
			9	1	4				1			15

TABLES 1-4

CERAMIC DATA - KEY

Dominant Temper Material

a - angular/crushed quartz sand
b - rounded quartz sand
c - angular/crushed quartz pebbles
d - rounded quartz pebbles
e - crushed sherd or low-fired clay fragments, small
f - crushed sherd or low-fired clay fragments, large

TABLE 2

38BU19 - CERAMIC DATA
OUTLYING 1 X 1 M UNITS

PROVENIENCE				EXTERIOR SURFACE TREATMENT						OTHER CLAY ARTIFACTS		
1X1M Unit	Level Feature	Basal Elevation -Meters Below Datum	Sherds < 1 inch Maximum Dimension	Plain	Cord Marked	Check Stamped	Fabric Impressed	Curvilinear Complicated Stamped	Indeter-minate	Daub	Clay Frags	TOTAL SHERDS
298N, 312E	A	1.89	28	2a 2e	2a 1e							35
298N, 312E	B	2.06	54		3e							57
300N, 308E	A	1.85	43		1e			1a				45
300N, 308E	B	2.00	5	2e	1a 3e							11
302N, 302E	A	1.83	28		1a 6e							35
302N, 302E	B	2.01	32	1a	3e	3a						39
302N, 302E	C	2.09	2	1c								3
304N, 316E	A	2.01	50		1a 5e				1e			57
304N, 316E	B	2.22	11									11
310N, 300E	A	1.78	9	2e	1e	1a						13
310N, 300E	B	1.98	31	2e 1a	1a 8e		1e		2e			46
			293	13	37	4	1	1	3			352

TABLE 3

38BU19 - CERAMIC DATA
2X2M UNITS-TRENCH A

PROVENIENCE				EXTERIOR SURFACE TREATMENT						OTHER CLAY ARTIFACTS		
2X2M Unit	Level/ Feature	Basal Elevation -Meters Below Datum	Sherds < 1 inch Maximum Dimension	Plain	Cord Marked	Check Stamped	Fabric Impressed	Curvilinear Complicated Stamped	Indeter-minate	Daub	Clay Frags	TOTAL SHERDS
302N, 308E	A	1.575	48		2e							50
302N, 308E	B	1.65	100	1a 5e	14e						1	120
302N, 308E	C	1.73	102	5e	1a 39e	1a	2e	1a	2e			153
302N, 308E	D	1.975	90	2a 19e	1a 61e	2a	1e	1a	1a 2e	1		180
302N, 308E	E	2.21		1e								1
304N, 308E	A	1.19	42	4e	1a 8e				1e			56
304N, 308E	C-1	1.35	77	3e	1a/39e 4f	2a	1e		2e	2		130
304N, 308E	C-2	1.45	80	3a/11e 1f	1a/56e 16f	1e			1e	2		170
304N, 308E	C-base	1.70	25	2e	2a/7d 34e					1		70
304N, 308E	D	1.82	65	11e	1a/51e 1b/1f					1		130
304N, 308E	D-below Fea.2	1.95	9		1a/13e 3f							26
304N, 308E	D-1/Fea.4a N1/2 of unit	1.80	7	2e	5e							14
304N, 308E	D-1/Fea.4b N1/2 of unit	1.755	23	3e	25e 5f					2		56
304N, 308E	D-2 S1/2 of unit	2.15	44	11e	2a 35e		1e			3		93
304N, 308E	D-2 N1/2 of unit	2.11	19	2e	15e	1e				2		37
304N 308E	E S1/2 of unit	2.23	3									3
304N, 308E	Fea. 1 Pit Fill	2.40			2e							2
304N, 308E	Fea. 2	1.70	12		31a 1e							44
304N, 308E	Fea. 5	2.15	1									1
306N, 308E	B	.99	55	3e	11e				2e			71
306N, 308E	C	1.16	22	8e	29e 1f		2e		1a			63
306N, 308E	C-Fea.12 N1/2 of unit	1.28	8	6e	23e		9e					46
306N, 308E	C N1/2 of unit	1.28	11	2e	17e 1f							31
306N, 308E	D N1/2 of unit	1.54	34	2e	1a 10e		8e			1	1	55
306N, 308E	Fea. 9-Fill	1.05	14	1e	3e							18
306N, 308E	Fea. 10-adjacent fill	1.80	7	3e	4e							14
			898	112	579	7	24	2	12	15	2	1634

TABLE 4

38BU19 - CERAMIC DATA
2X2M Units - Trench B

PROVENIENCE				EXTERIOR SURFACE TREATMENT						OTHER CLAY ARTIFACTS		
1X1M Unit	Level Feature	Basal Elevation -Meters Below Datum	Sherds < 1 inch Maximum Dimension	Plain	Cord Marked	Check Stamped	Fabric Impressed	Curvilinear Complicated Stamped	Indeter-minate	Daub	Clay Frags	TOTAL SHERDS
302N, 312E	A S.W. Quadrant	1.91	31	4a 2e	1a 6e	1a			2e			47
302N, 312E	B S.W. Quadrant	2.18	9		5e							14
302N 312E	A	1.68	8		3e				1e			12
302N, 312E	B	1.81	99	2a 4e	3a 6e/1f	2a		1a				118
302N, 312E	C S.E.	1.95	6	1e	2f/1e					1		10
302N, 312E	D S.E. Quadrant	2.04			1e							1
302N, 312E	D N1/2 of unit	2.07	6	2e					1e	2		9
304N, 312E	A	1.43	15		5e				1e			21
304N 312E	B	1.57	65	4e	2a/28e 1f		2e			1		102
304N, 312E	C	1.82	169	2a 10e	3a/51e 8f		1e 1f		1a 1e	12		247
304N, 312E	D	2.05	92	1b 6e	5a/30e 1f				1a	13		136
304N, 312E	C/D-charred stump area in N.E. Quadrant	2.39	9	3e	4e	2a						18
304N, 312E	Fea. 4	2.02	1		3e							4
304N, 312E	Fea. 8	2.09	5		4e					1		9
306N, 312E	A	1.17	37	2e	21e				6e			66
306N 312E	B	1.48	146	4e	5a/55e 3f		2e		7e 1f			223
306N, 312E	C	1.60	33	2e	11e 1f		3e		2e			52
306N, 312E	D	1.80	51	2e	1a 12e		1e					67
306N, 312E	D	1.85	8		6e 1f							15
306N, 312E	D	2.00	21	1a 2e	16e				1e			41
306N, 312E	Area A	2.36	2	1e	1e							4
306N, 312E	Fea. 7 fill	1.94	1		4e			5e				10
			833	57	329	5	10	1	31	35		1266

Some (20.8%) of the "St. Catherines" sherds from the mound also contain, in varying proportions, lesser amounts of other temper material. These are: 1) angular/crushed quartz sand, 2) rounded quartz sand, 3) angular/crushed quartz pebbles, 4) rounded quartz pebbles (up to 5 mm in diameter), and 5) angular/crushed limestone. A few sherds also contain an occasional, small fleck of shell embedded in the exterior surface, suggesting unintentional inclusion during manufacture, probably occurring in a shell midden or village area.

The considerable variability in temper could be attributed to temporal variability or the "merging" of different ceramic traditions (Michael B. Trinkley, personal communication). Specifically, however, the various lines of data presented in this chapter do indicate that the ceramics from the mound are all roughly contemporaneous and that they were manufactured locally. A ceramic assemblage very similar to that from the mound has been recorded for nearby Pinckney Island (Trinkley 1981).

While most of the ceramics from the mound are generally quite similar to St. Catherines ceramics in terms of paste, surface finish and decoration (DePratter 1979), only the cord marked ceramics (mostly fine cord marked) provide a reasonable body of data pertaining to vessel form. This is possible because of the presence of a relatively large cord marked ceramic assemblage, including one complete and one reconstructable vessel (Features 10 and 12, respectively--discussed later in this chapter). These ceramic data suggest that the cord marked vessels are quite uniform in size and form.

In general agreement with DePratter (1979), the cord marked vessels are cylindrical jars with rounded bases, straight sides, straight to slightly flaring rims, and squared or rounded lips that are occasionally cord marked. Assuming Features 10 and 12 are "typical," the cord marked vessels are about 30 cm high with an inside diameter of 32-35 cm at the lip. The outside diameter at the lip is about 34-36 cm.

In addition to the St. Catherines-like ceramics, a very few quartz tempered check stamped (1.34%) and curvilinear complicated stamped (.33%) ceramics are also present. Both the check and complicated stamped decorations are shallow and sloppily executed, with the design elements ranging from fine to fairly bold. These ceramics are tempered with varying combinations of crushed and rounded quartz sand and pebbles. An occasional crushed sherd or low-fired clay fragment may also be included in the paste, suggesting approximate contemporaneity with the St. Catherines ceramics. Because of the relatively few, small sherds, it is not possible to determine to what temporal period these check and complicated stamped ceramics belong. Based on DePratter (1979), the Savannah period (ca. A.D. 1150-1300) may be most likely.

From the above discussion, it is apparent that there is a general correlation between surface decoration and temper material in the ceramics from the mound. However, as is also apparent, temper material frequently cross-cuts surface decoration. This, and the presence of both "raw" quartz and clay tempering material in the mound fill (discussed below), suggests that all the ceramics from the mound are contemporaneous, and, that they were manufactured locally. This is further indicated by the presence of mica and fiber channels in the paste of all the mound ceramics, regardless of surface decoration or temper type. Donald J. Colquhoun (U.S.C., Department of Geology, personal communication) notes that such inclusions occur naturally in many of the local clays.

Considering the entire ceramic assemblage from the mound, a reasonable date range estimate for that assemblage is from ca. A.D. 900-1300. Assuming ceramic contemporaneity and that the bulk of the assemblage is attributable to the St. Catherines period, then a date of ca. A.D. 1000-1150 is most likely.

While the various ceramics are probably roughly contemporaneous, this, in itself, says little about the actual date range of the mound; only that the mound must be contemporaneous with, or post-date, the material in the fill used for mound construction. However, when considering that the most frequent ceramic type included in the mound fill is probably St. Catherines fine cord marked, and, that the two vessels (Features 10 and 12) that were necessarily intentionally placed in the mound are also probably St. Catherines fine cord marked, then it seems reasonable to conclude that the mound dates to the St. Catherines period. Thus, the fill used in mound construction was likely derived from the midden or village refuse of the people who built, and were interred in, the mound.

In addition to temporal data, the abundant St. Catherines fine cord marked ceramics provide insights into the use of these vessels in their primary context. Frequent sooting on the upper one-half to one-third of the exterior surface of these vessels suggests a general cooking function, with the basal portion of the vessel imbedded in, or just above, the coals. If the vessels were well above the coals, there should be a greater tendency for soot to occur on their bases. Considerable soot may indicate the frequent use of resinous soft woods, i.e., pine, for fuel. Pine charcoal is frequently encountered in at least some St. Catherines period shell middens in the area (Trinkley 1981).

A considerable build-up of carbon residue was often observed on the interior of fine cord marked basal sherds, again suggestive of a cooking function, possibly for the preparation of foods with a high fat or oil content (fats or oils would be most likely to burn and leave a carbon residue). This carbon residue was also frequently observed to be continuous from the interior surface over adjacent edges of broken sherds, indicating not only that the material producing the carbon residue was, or was in, a liquid medium, but also that these vessels often broke in the fire during cooking.

Other non-ceramic materials of clay were also encountered throughout the mound fill. The flat, malleated, low-fired micaceous clay fragments almost certainly represent ceramic tempering material that had not been "ground-up" or crushed for use.

Numerous daub fragments were found throughout the mound. These sun-dried micaceous clay fragments all contained root or fiber channels. Wood impressions were observed on several of the fragments. A few of the daub fragments were of a blue-gray color, suggesting that some of the structures constructed with this material had burned. This is the first evidence for the occurrence of St. Catherines period wattle-and-daub structures (DePratter, personal communication).

The relatively high frequency of daub from the mound fill strongly indicates that fill for mound construction was obtained from the immediate vicinity of fairly substantial structures. It is reasonable to assume that the fill source was very near at hand.

Finally, as alluded to earlier, the relatively high density and diversity of archeological remains in the mound fill is not typical of St. Catherines period shell middens in the vicinity (Trinkley 1981; Michie 1982). Rather, the refuse used in mound construction is more in line with that generated by intensive habitation associated with reasonably sedentary village life (e.g., House and Wogaman 1978; Brooks and Canouts 1981). This proposition should become increasingly tenable as the other archeological data sets are considered.

Lithic Data

Like the ceramics, the lithic assemblage provided little contextual data of direct relevance to the mound. Further, because the possible temporal range of the lithic assemblage is considerably greater than that of the ceramics, temporal inferences based solely on the lithic assemblage would be very tenuous. The general temporal range (discussed below) of the lithic assemblage is, however, compatible with that of the ceramics. This, and the co-occurrence of the ceramic and lithic assemblages throughout the mound fill, suggests that the two assemblages were contemporaneous and associated within the shell midden or village primary use context.

Unlike "typical" St. Catherines period shell middens in the area (Trinkley 1981; Michie 1982), the lithic assemblage from the mound fill indicates a wide range of activities (e.g. raw material procurement, lithic reduction and artifact manufacture, artifact use and maintenance, artifact discard) in line with intensive habitation (House and Wogaman 1978). Such techno-functional data, while not directly relevant to interpretations of the mound itself, are important for an understanding of the broader behavioral and settlement systems of which the mound was a part. In light of this, inferences pertaining to tool use or function in the primary use context are helpful for broader, systemic interpretations. Consequently, a fairly in-depth techno-functional analysis of the lithic assemblage was conducted. The analysis and inferences drawn are briefly summarized here.

The lithic assemblage from the mound is itemized by provenience and by artifact category in Table 5. The relatively small, but diverse, assemblage consists of 47 flakes (debitage), 6 hafted bifaces and 3 modified/utilized flakes. From a techno-functional standpoint, two aspects of the assemblage are particularly noteworthy: 1) the differential utilization of various raw materials, and 2) the functional or use variability exhibited by the bifaces and flake tools.

TABLE 5

38BU19-LITHIC DATA

PROVENIENCE					DEBITAGE		HAFTED BIFACES					MODIFIED AND UTILIZED FLAKES			
Trench	2X2M Unit	1X1M Unit	Level/ Feature	Basal Elevations-Meters Below Datum	Flake Type	Raw material	Biface morphology	Raw material	condition	Resharpened	Use Wear	Flake type	Raw material	modified utilized	Use wear
		306N, 316E	A	2.01	primary	gray white chert									
		304N, 316E	A	2.01	chunk	gray-white chert									
A	302N, 308E		B	1.65	primary	pink quartz									
A	302N, 308E		B	1.65	secondary	coastal plain chert									
A	302N, 308E		C	1.73	chunk	gray-white chert									
A	302N 308E		D	1.975	tertiary	gray white chert									
A	302N, 308E		B	1.65			triangular	coastal plain chert	distal tip missing	yes-both edges just above haft area	None observed				
A	302N 308E		C	1.73			?	Piedmont Ryolite	Basal portion missing	uncertain	None observed				
A	302N, 308E		C	1.73								Flake of bifacial retouch	coastal plain chert	utilized	Nibbling and rounding/ smoothing on dorsal surface of edge opposite platform.
A	304N, 308E		A	1.19	Flake of bifacial retouch	coastal plain chert									
A	304N, 308E		C-2	1.45	chunk	gray-white chert									
A	304N, 308E		C-2	1.45	Flake of bifacial retouch	coastal plain chert									
A	302N, 308E		C	1.73	tertiary	gray white chert									

TABLE 5

38BU19-LITHIC DATA

PROVENIENCE					DEBITAGE		HAFTED BIFACES					MODIFIED AND UTILIZED FLAKES			
Trench	2X2M Unit	1X1M Unit	Level/ Feature	Basal Elevations-Meters Below Datum	Flake Type	Raw material	Biface morphology	Raw material	condition	Resharpened	Use Wear	Flake type	Raw material	modified utilized	Use wear
A	304N, 308E		C-2	1.45	secondary	gray white chert									
A	304N, 308E		C-2	1.45	tertiary	gray white chert									
A	304N, 308E		D-2 N½ of unit	2.11	Flake of bifacial retouch	coastal plain chert									
A	304N, 308E		D-2 N½ of unit	2.11	secondary	coastal plain chert									
A	304N, 308E		D-2 N½ of unit	2.11	secondary	coastal plain chert									
A	304N, 308E		D-2 n½ of unit	2.11	tertiary	coastal plain chert									
A	304N 308E		Fea.1-C Pit fill	2.40	tertiary	coastal plain chert									
A	304N, 308E		Fea.5	2.15	flake of bifacial retouch	coastal plain chert									
A	304N, 308E		C-2	1.45			stemmed	coastal plain chert	only stem present	?	?				
A	304N, 308E		D-below Feat. 2	1.89			triangular	coastal plain chert	whole	yes? both use edges	None observed				
A	304N, 308E		C-1	1.35								tertiary	coastal plain chert	utilized	Nibbling and rounding/smoothing on dorsal surface adjacent to platform
A	304N 308E		D-2	2.15								tertiary	coastal plain chert	modified and utilized	unifacially modified triangular shaped flake. continous edge retouch on dorsal surface edges, adjacent to tip, opposite the platform exhibit nibbling scars.

TABLE 5

38BU19-LITHIC DATA

			PROVENIENCE		DEBITAGE		HAFTED BIFACES					MODIFIED AND UTILIZED FLAKES			
Trench	2X2M Unit	1X1M Unit	Level/ Feature	Basal Elevations-Meters Below Datum	Flake Type	Raw mater-ial	Biface morph-ology	Raw mater-ial	condi-tion	Resharp-ened	Use Wear	Flake type	Raw mater-ial	modified utilized	Use wear
A	306N 308E		B	.99	ter-tiary	coastal plain chert									
A	306N 308E		C	1.28	chunk	sil-icified silt-stone									
A	306N, 308E		C	1.28	pri-mary	sil-icified silt-stone									
A	306N, 308E		D	1.54	Flake of bifac-ial retouch	coastal plain chert									
A	306N, 308E		D	1.54	chunk	gray-white chert									
A	306N, 308E		D	1.54	Flake of bifac-ial retouch	coastal plain chert									
A	306N, 308E		Fea. 10-fill around ves-sels	1.80	sec-ondary	coastal plain chert									
A	306N, 308E		Fea. 10-fill around ves-sels	1.80			tri-angular	gray-white	whole	no	Distal tip exhibits smoothing/dulling on both use edges.				
B	302N, 312E		B	1.81	Flake of bifac-ial retouch	coastal plain chert									
B	302N, 312E		B	1.81	Flake of bifac-ial retouch	gray-white chert									
B	302N, 312E		B	1.81	Flake of bifac-ial retouch	gray-white chert									
B	302N, 312E		B	1.81	ter tiary	gray white chert									

TABLE 5

38BU19-LITHIC DATA

PROVENIENCE					DEBITAGE		HAFTED BIFACES					MODIFIED AND UTILIZED FLAKES			
Trench	2X2M Unit	1X1M Unit	Level/ Feature	Basal Elevations-Meters Below Datum	Flake Type	Raw mater-ial	Biface morph-ology	Raw mater-ial	condi-tion	Resharp-ened	Use Wear	Flake type	Raw mater-ial	modified utilized	Use wear
B	302N 312E		B	1.81	chunk	gray-white chert									
B	302N, 312E		B	1.81	Flake of bifac-ial retouch	coastal plain chert									
B	302N, 312E		C	1.93	Flake of bifac-	coastal plain chert									
B	302N, 312E		B	1.81			tri angular	coastal plain chert	un-fin-ished	no	no				
B	304N, 312E		B	1.57	Flake of bifac-ial retouch	coastal plain chert									
B	304N 312E		C	1.82	ter-tiary	gray-white chert									
B	304N 312E		D	2.05	Flake of bifac-ial retouch	coastal plain chert									
B	304N 312E		D	2.05	sec-ondary	sil-icified silt-stone									
B	304N, 312E		D	2.05	Flake of bifac-ial retouch	coastal plain chert									
B	304N, 312E		Fea.8	2.09	pri-mary	gray-white chert									
B	306N, 312E		B	1.48	prim-ary	gray white chert									
B	306N, 312E		B	1.48	chunk	gray-white chert									
B	306N, 312E		B	1.48	sec-ondary	coastal plain chert									
B	306N, 312E		B	1.48	chunk	sil-icified silt-stone									

TABLE 5

38BU19-LITHIC DATA

PROVENIENCE					DEBITAGE		HAFTED BIFACES					MODIFIED AND UTILIZED FLAKES			
Trench	2X2M Unit	1X1M Unit	Level/ Feature	Basal Elevations-Meters Below Datum	Flake Type	Raw mater-ial	Biface morph-ology	Raw mater-ial	condi-tion	Resharp-ened	Use Wear	Flake type	Raw mater-ial	modified utilized	Use wear
B	306N, 312E		B	1.48	Flake of bifac-ial retouch	coastal plain chert									
B	306N, 312E		B	1.48	chunk	coastal plain chert									
B	306N, 312E		C	1.60	chunk	gray-white chert									
B	306N, 312E		D	1.80	Flake of bifac-ial retouch	coastal plain chert									
B	306N, 312E		D	1.80	chunk	sil-icified silt stone									

Total Debitage 47

Total Hafted Bifaces 6

Total modified/ utilized flakes 3

Five lithic raw materials are represented by the debitage and artifacts. Coastal Plain chert, probably obtained ca. 40 miles away in Allendale County (Albert C. Goodyear and James L. Michie, Institute of Archeology and Anthropology, University of South Carolina, personal communication), was apparently the most frequently used raw material, representing 53.57% (n = 30) of the entire assemblage.

The Coastal Plain chert debitage represents various lithic reduction stages (see Crabtree 1972; House and Wogaman 1978), as indicated by secondary decortication flakes (n = 6), tertiary flakes (n = 2), chunks (n = 1), and flakes of bifacial retouch (n = 14). Of the total of nine artifacts, seven (three triangular bifaces, one stemmed biface, two utilized flakes, one modified/utilized flake) are of Coastal Plain chert.

The second most frequent lithic raw material is a locally occurring, highly weathered and/or poorly silicified gray-white chert (Donald J. Colquhoun, University of South Carolina, Department of Geology, and Keith M. Derting, University of South Carolina, Department of Geography, personal communication). Debitage of this material consists of three primary decortication flakes, one secondary decortication flake, five tertiary flakes, seven chunks and two flakes of bifacial retouch. A single triangular biface is represented. Both the biface and most of the debitage appear to have been heat treated, presumably to enhance the knapping quality of this low-grade chert (Goodyear 1979).

A locally occurring silicified siltstone (Colquhoun and Derting, personal communication) is represented by one primary decortication flake, one secondary decortication flake and three chunks. Pink quartz and rhyolite, both ultimately of Piedmont origin, are represented, respectively, by one primary decortication flake and one distal tip of a hafted biface.

A number of inferences may be drawn from the above data. The broken rhyolite biface fits well with research attempting to correlate the condition of a biface in its archeological context with distance from the raw material source area, especially with regard to highly siliceous cryptocrystalline materials (e.g., Goodyear 1979). That is, the farther from the raw material source area, the greater the likelihood that the biface will be in finished form and that it will have been used until broken or its use-life exhausted, subsequently entering the archeological record.

A similar general correlation exists between biface manufacture-maintenance and the corresponding lithic reduction sequence exhibited by the debitage (e.g., House and Ballenger 1976; House and Wogaman 1978; Goodyear 1979). Generally, debitage resulting from initial reduction (i.e., primary decortication flakes, secondary decortication flakes, tertiary flakes and chunks) occurs near the source area of the material being reduced. With increasing distance from the source area, flakes of bifacial retouch become dominant, associated with the final stages of biface manufacture and maintenance (resharpening).

From this, it is probable that the single primary decortication flake of pink quartz represents the relatively local procurement of that raw material. While quartz is ultimately of Piedmont origin, it does occur in the form of waterworn cobbles in the stream beds of many Piedmont-draining rivers in the Coastal Plain (Tommy Charles, University of South Carolina, Institute of Archeology and Anthropology, personal communication).

Similarly, the dominance of initial stage(s) reduction debitage of the gray-white chert and of the silicified siltstone supports the interpretation that these materials were procured locally. In contrast, the presence of initial stage(s) reduction debitage and the prevalence of flakes of bifacial retouch substantiates the view that the Coastal Plain chert was obtained relatively nearby, but not "locally."

Ordinarily, one would expect the locally available gray-white chert and silicified siltstone to have been used more frequently than the Coastal Plain chert. The observed reverse of this expectation may be attributed, as noted by Goodyear (1979), to an aboriginal preference for highly cryptocrystalline materials. Such materials (e.g., Coastal Plain chert) are more amenable to predictable knapping and are generally more durable from a functional standpoint (e.g., Crabtree 1972; Goodyear 1979).

The hafted bifaces and modified/utilized flakes were examined under a 20x binocular microscope for evidence of use-wear. The attributes examined are consistent with those that have been found to be useful functional indicators (Semenov 1964; Wilmsen 1968; Tringham et al. 1974; Ahler 1979; Keeley 1980; Lawrence 1979; Newcomer and Keeley 1979; Odell 1979, 1980). Attributes recorded for the bifaces, in addition to those in Table 5, were: 1) presence-absence of heat treatment, 2) degree of patination-weathering, 3) medial line length, 4) basal width, 5) maximum thickness, 6) use-edge(s) morphology, 7) use-edge angle(s), 8) weight (g), 9) type(s) of use-wear, 10) surface(s) location of wear, and 11) depth of use-wear. Attributes recorded for the modified/utilized flakes, in addition to those in Table 5, were: 1) flake morphology, 2) presence-absence of heat treatment, 3) degree of patination-weathering, 4) flake condition, 5) platform morphology and angle, 6) type of flake termination, 7) flake area (sq. cm), 8) flake weight (g), 9) number of dorsal flake scars, 10) edge(s) modified, 11) length of retouch, 12) depth of retouch, 13) edge(s) used, 14) length of use-edge(s), 15) depth of use, 16) modified edge angle(s), 17) use-edge angle(s), 18) surface location of retouch, 19) surface location of wear, 20) type of wear, and 21) depth of wear. Based on measures of these collective attributes, respectively, the probable function(s) of the biface and modified/utilized flake tools is summarized below.

Only two of the four triangular bifaces exhibit evidence of post-manufacturing modification. One triangular biface of Coastal Plain chert was resharpened while hafted (Fig. 9a), as indicated by incurvate blade edges and alternate beveling above the haft area. A second triangular biface of gray-white chert (Fig. 9b) exhibits edge smoothing and rounding on the obverse and reverse surfaces of both use-edges, from the distal tip for 3.7 mm toward the base. The location and type of wear are consistent with a piercing and/or cutting function, probably involving relatively soft and resilient material(s) (Semenov 1964; Wilmsen 1968; Ahler 1971; Tringham et al. 1974; Lawrence 1979; Keeley 1980). No evidence of use-wear was observed on the remaining two bifaces due, at least in part, to their fragmentary condition (stemmed biface of Coastal Plain chert, Fig. 9f; indeterminate biface of rhyolite, Fig. 9d).

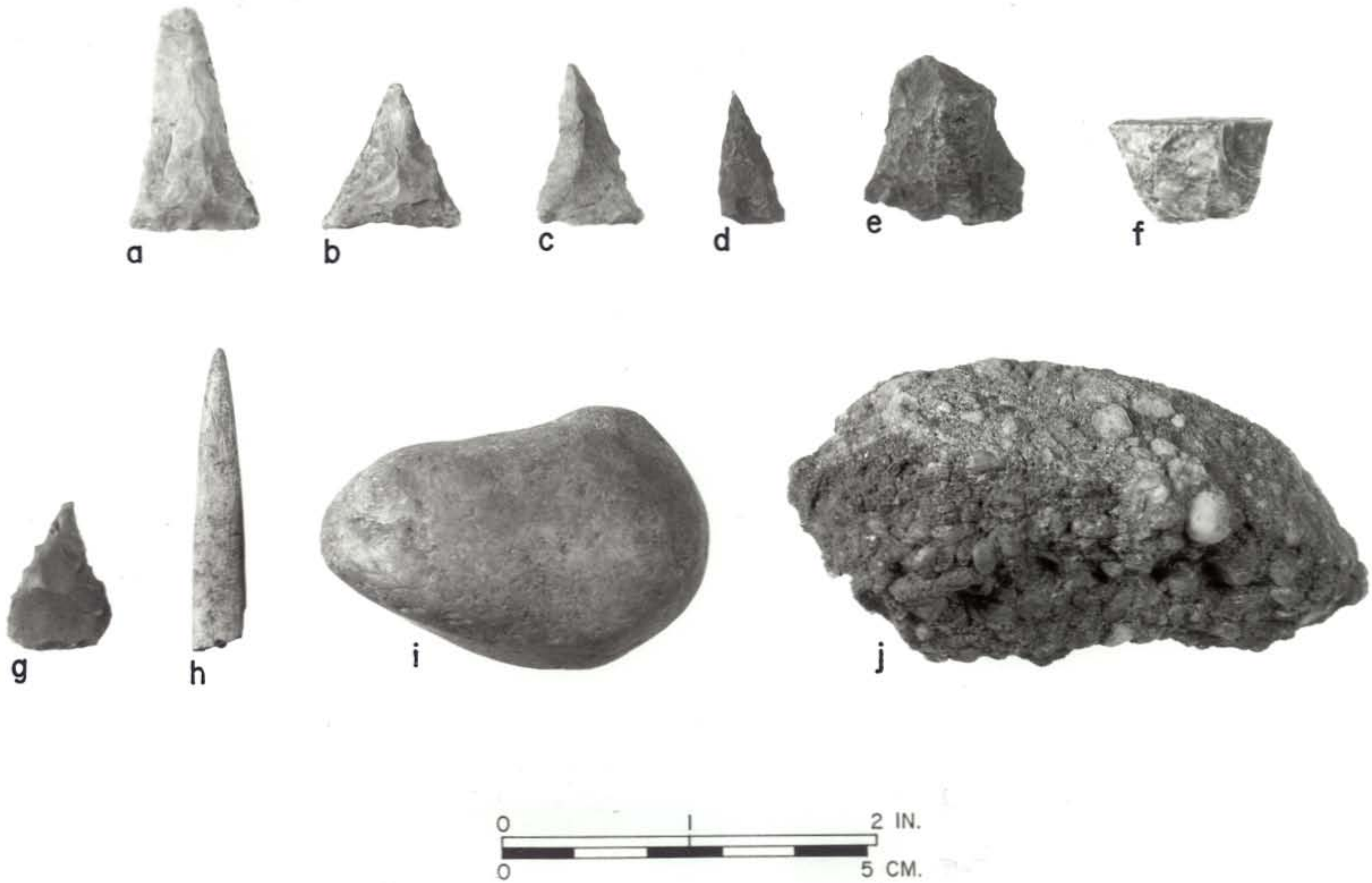


Figure 9: Non-ceramic artifacts from 38BU19 - a) resharpened triangular biface of Coastal Plain chert, b) triangular biface of "local" chert, c) triangular biface of Coastal Plain chert, d) biface of rhyolite, distal tip, e) unfinished triangular biface of Coastal Plain chert, f) base of stemmed biface of Coastal Plain chert, g) unifacial flake tool of Coastal Plain chert, h) bone pin, distal tip, i) quartz cobble hammerstone/ceramic polishing stone, j) quartz conglomerate crushed for ceramic tempering material.

Triangular bifaces in the Southeast variously date from ca. A.D. 1 through the historic contact period (e.g., Coe 1964). Triangular bifaces very similar to those from the mound have been observed in the interior Lower Coastal Plain of South Carolina in a Late Woodland-"Mississippian" context (Green and Brooks n.d.; Derting and Brooks 1981). Such a context is consistent with the ceramics from the mound.

Finally, one modified (unifacially retouched--see Fig. 9g) and two utilized flakes of Coastal Plain chert are present in the lithic assemblage from the mound (Table 5). The use-edges of all three flake tools exhibit fairly steep edge angles ($45-75^{o}$) and, on the dorsal surface, nibbling scars and some edge rounding/smoothing. These combined data suggest a general scraping function involving fairly dense, but resilient, materials, probably green bone or wood (Semenov 1964; Lawrence 1979; Keeley 1980; Newcomer and Keeley 1979; Odell and Odell-Vereecken 1980; Tringham et al. 1974).

Other Artifacts

A few additional artifacts were found at various locations throughout the mound fill. These include: 1) a bone "pin" fragment, 2) a utilized quartzite cobble, 3) two silica cemented quartz conglomerate fragments, and 4) several rounded quartz pebbles.

The bone pin fragment (Trench A, Unit 304N, 308E, Level D-2, 2.15 M.B.D.--see Fig. 9h) is represented by a distal tip 42.1 mm in length, 7.4 mm in width at the break (jagged and irregular) and 2.9 mm in thickness (lenticular in cross-section). Smoothing and polishing obliterated all of the original bone surface. Based on size, manufacture from a deer long bone is likely.

Intermittent, fine parallel striae are present on the edges of the pin. The striae are perpendicular to the length and are most prevalent around the tip. It is likely that the striae represent manufacturing abrasions that were not entirely removed by subsequent polishing associated with the final stage of manufacture and/or use. If the striae did result from use, then a function involving a rotary motion is indicated. Such use, however, is inconsistent with the flat, lenticular cross-section which, with a rotary motion, would promote breakage (snapping). Use as a fid for weaving may be more likely. Multiple functions, of course, can not be precluded.

The utilized quartzite cobble (Trench B, Unit 304N, 312E, Level C, 1.82 M.B.D.--see Fig. 9i) is elongated and roughly oval (51.2 mm in length, 35.9 mm in width at the widest end, 31.7 mm in maximum thickness at the center), weighing 79.9 g. Two well-defined smoothing facets occur on adjacent surfaces (obverse and one side). The largest (obverse) facet is 33.6 mm by 30.2 mm. The side is 34.2 mm by 19.4 mm. These smoothing facets may indicate use as a polishing or smoothing stone in ceramic manufacture.

The remaining surfaces and edges of the cobble exhibit continuous and extensive battering and crushing up to ca. 1.8 mm deep. This is especially prevalent on the ends and one intervening edge. Thus, a second general function as a hammerstone is indicated. If the cobble was used in ceramic manufacturing, as suggested above, then this use-wear pattern may have resulted from crushing clay and/or quartz temper material. Use as a "hard" hammer in lithic reduction (e.g., Crabtree 1972) or use for a wide range of generalized pounding functions are additional possibilities.

In interpreting the probable use of this cobble, it may be of significance that contemporary Indian potters in the Southwest, and probably elsewhere, have specialized tool kits for ceramic manufacturing. The tools of these kits are used solely for ceramic manufacturing related activities and are quite task(s) specific. The tool kits are so highly valued by their owners that they are often passed down from mother to daughter. Similar situations exist for other specialized tool kits (A.E. Dittert, Arizona State University, Department of Anthropology, personal communication; Spring 1976). Therefore, through a tenuous analogy with the Southwest, if the quartzite cobble was part of a specialized tool kit, e.g., for ceramic manufacture, then it is likely that all uses of the cobble would relate exclusively to ceramic manufacturing.

The two silica cemented quartz conglomerate fragments (Trench A, Unit 302N, 308E, Level C, 1.73 M.B.D. and Trench B, Unit 306N, 312E, Level A, 1.17 M.B.D., respectively) contain various rounded quartzes ranging from less than 1 mm to ca. 10 mm in diameter. The larger fragment (107.2g--see Fig. 9j) has a portion of the original, "stream-worn" cortical surface. Although these conglomerate fragments are of Piedmont origin (Colquhoun and Derting, personal communication), it is uncertain whether or not they were river-transported to the general vicinity of the site. The aboriginal use of this material is equally uncertain. However, it is speculated that the conglomerates and the five isolated quartz pebbles (.25-1.2g) from the various mound fill deposits represent uncrushed raw material for the quartz sand and pebble tempered ceramics.

Feature Data

The twelve features encountered in Trenches A and B (see Fig. 10) are briefly described. More specific data are presented in Appendices I-IV. Unlike most of the data sets described in this chapter, the features represent intentional placement within the mound; therefore, the features provide a body of data that can be most directly related (behaviorally and/or biologically) to the prehistoric population that constructed the mound.

Feature 1

Feature 1 represents an adult female burial located in Trench A, along the eastern margin of Unit 304N, 308E (Fig. 11). This partially articulated, extended burial was placed face-down in the bottom of a shallow pit extending below the mound base (Level E). The skull, if it were present, would have been oriented to the north toward the center of the mound. The pit was capped by Level D-2 (see Fig. 6).

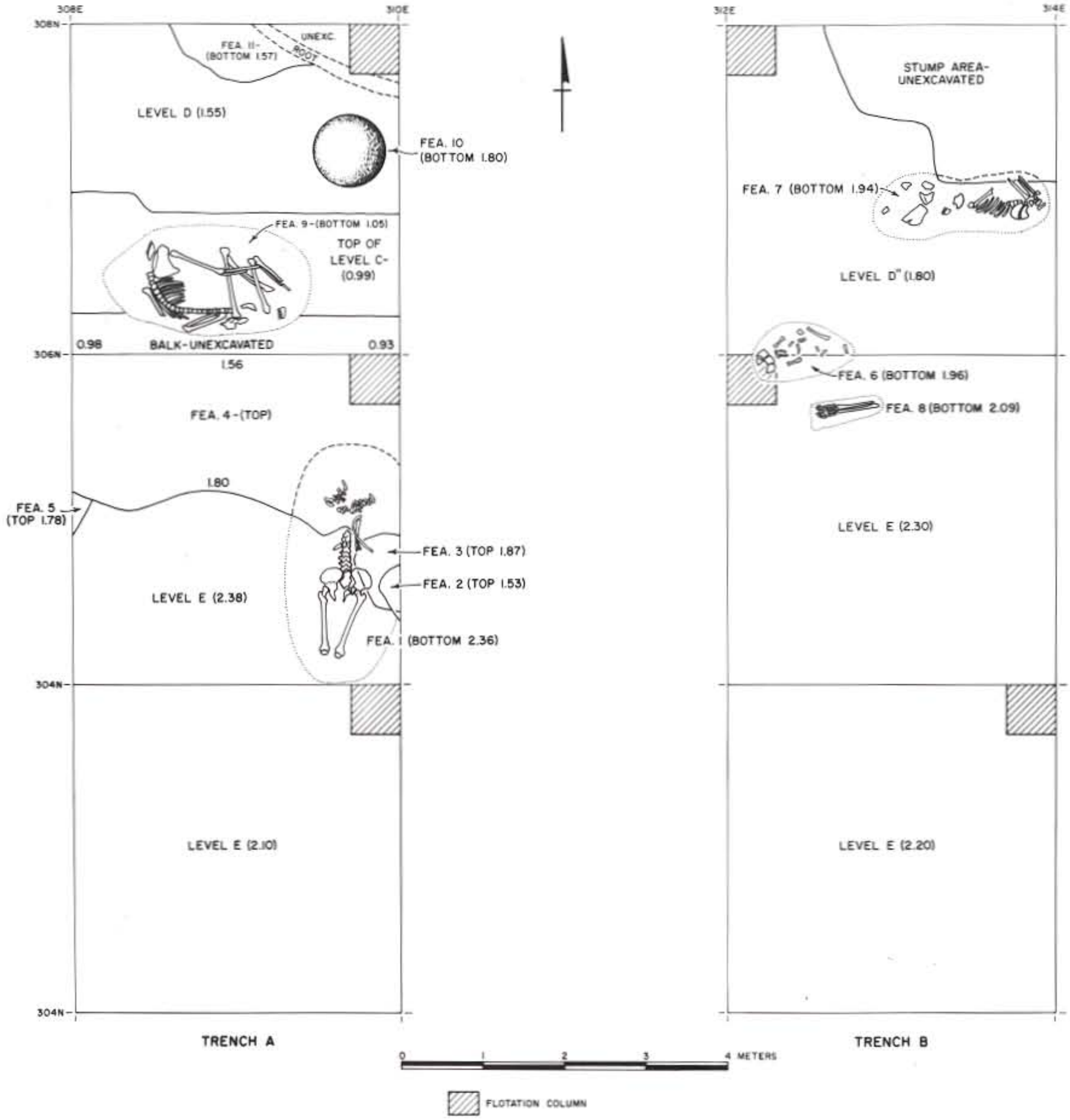


Figure 10: Plan View of Trenches A and B showing feature locations.

Figure 11: Feature 1 (Burial) - view looking north.

The pit fill consisted of a mottled, medium gray and light yellow-tan fine sand. Although some ceramic and lithic materials (see Tables 3 and 5 respectively) were present in the fill, there was no indication of intentionally placed artifactual grave goods. There was, however, a notable quantity of crab claws and shell throughout the pit fill that may or may not have been intentionally included.

After completion of the human osteological analyses, the left femur of Feature 1 was submitted for radiocarbon dating (see Special Analyses this chapter). Based on stratigraphic data, Feature 1 should date to the initial phase of mound construction.

Feature 2

This feature consisted of a large concentration of horizontally "stacked" St. Catherines fine cord marked ceramics (Table 3), located at the base of Level C in the east wall of Trench A, Unit 304N, 308E (see Fig. 6). An attempt at vessel reconstruction indicated that portions of at least two different vessels were present.

Feature 3

A calcined shell lense located in the east wall of Trench A, Unit 304N, 308E, was designated as Feature 3. This lense intruded into the top of Level D-2 (see Fig. 6). The homogeneity of the deposit and its "crisp," well-defined edges suggest *in situ* burning.

Feature 4

Feature 4 was a horizontal lense located in the north one-half of Unit 304N, 308E, Trench A (see Fig. 6). It extended into the north, east and west walls of the unit. This feature (excavated as Level D-1) consisted of a dark gray, fine sand with dense oyster and periwinkle shell. Included in this matrix were bits of packed, red-orange sandy clay (probably substrate in origin, but lightly fired or sun-dried) forming a prepared surface. Disarticulated and fragmented human bone was strewn over this surface with no apparent patterning. Some of the bone was calcined.

Feature 5

Feature 5 was the east edge of a probable burial pit located in the west wall of Trench A, Unit 304N, 308E (see Fig. 6). The pit fill consisted of a mottled, medium gray and light yellow-tan fine sand, suggesting that this feature, like Feature 1, extended down into submound soil. Only the upper east edge of Feature 5 was excavated.

Feature 6

This feature represented the complete skeletal remains of an infant from birth to six months of age. The burial was located in Trench B at the interface of Units 304N, 312E, and 306N, 312E, toward the base of Excavation Level D. A relatively shallow pit burial is indicated (see Fig. 6). The burial was interred on the back and slightly to the left, with the head toward the west. The pit fill consisted of a medium brown-gray, fine sand with sparse shell. A few ceramics appear to have been incidentally included in the pit fill (see Table 4).

Feature 7

Feature 7 represented the complete skeletal remains of a child (8 to 9 years of age), flexed on the left side with the head toward the west. This feature was located in Trench B near the center of Unit 306N, 312E. Stratigraphically, it was toward the base of Excavation Level D" (dark gray fine sandy loam with a high oyster shell density). The flexed position of the burial and its location near, but not at, the base of Level D", may indicate a pit burial originating at the top of Level D. However, no direct evidence of a pit was observed. The few ceramics (see Table 4) recovered while exposing the burial were, apparently, incidentally included in the Level D fill.

Feature 8

A nearby complete right lower arm and hand of an adult male was designated as Feature 8. This feature was located in Trench B in the northwest portion of Unit 304N, 312E, near the base of Excavation Level D. A shallow pit with a dark gray-brown, fine sand fill is indicated (see Fig. 6). The few ceramics (see Table 4) and the single primary decortication flake of gray-white chert (see Table 5) recovered while exposing the burial were, presumably, inadvertently included in the pit fill.

Feature 9

Feature 9 represented the reasonably complete skeletal remains of an adult female. The burial was flexed on the left side and oriented east-west, with the skull (only fragments were present) toward the center of the mound to the north (Fig. 12). This feature was located in Trench A, Unit 306N, 308E, barely into the top of Excavation Level C in the south-central portion of the unit. Although there was no discernible pit outline, a pit burial is indicated by the tightly flexed position, especially of the upper torso, and by the relatively superficial location of the burial just into the top of Level C (ca. 5-10 cm below the mound surface). The few ceramics around the burial (Table 3) were likely incidental inclusions in the fill.

Figure 12: Feature 9 (Burial) - view looking south.

After completion of the osteological analyses, both femora, both patellae, the left calcaneous, and the shaft of the right fibula of Feature 9 were submitted for radiocarbon dating. The location of Feature 9 suggests that it was an intrusive burial deposited sometime after the final phase of mound construction. It should, therefore, provide a minimum age for the terminal phase of the mound.

Feature 10

Feature 10 was represented by a complete, inverted St. Catherines fine cord marked vessel at the base of Level D, centrally located adjacent to the west wall of Unit 306N, 308E, Trench A (see Figs. 5 and 13). This vessel is 29 cm high and 36.2 cm in diameter at the lip (see Fig. 14). As discussed earlier in this chapter, sooting occurs on the upper one-third to one-half of the exterior surface of the vessel. The contents (processed through 1/16-inch mesh screen in the lab) of the vessel, or burial urn, consisted of a tooth bud and a phalange of a ca. six month old human fetus and a notable quantity of crab claws and shells. There was no apparent pit associated with the vessel. Rather, it appeared to have been placed in the mound in conjunction with the Level D construction fill. The few ceramics (see Table 3), the secondary decortication flake of Coastal Plain Chert and the triangular biface of gray-white chert (see Table 5) recovered during the exposure of the vessel were apparently incidentally included in the Level D fill.

Figure 13: Fine cord marked vessel, inverted, containing the remains of a human fetus. View looking east.

Feature 11

Feature 11 was a shell lens composed of Stout Tagelus (*Tagelus plebeius*), centrally located along and extending into, the north wall of Unit 306N, 308E, Trench A. Stratigraphically, it was midway into Level D (see Fig. 5). This feature was not removed.

Feature 12

Feature 12 was a sherd concentration representing a single St. Catherines fine cord marked vessel (see Table 3). This concentration was

Figure 14: Feature 10 - St Catherines fine cord marked vessel.

Figure 15: Feature 12 after partial reconstruction. Note the fabric impressed base and the fine cord marked body.

located in Trench A in the north-central portion of Unit 306N, 308E. It was adjacent to, and at the same level (D) as, Feature 11 (see Fig. 5). Additional sherds from this vessel were associated with Feature 4 (Level D-1) in Unit 304N, 308E, immediately to the south. Stratigraphic continuity between the two units is indicated for Levels D and D-1, respectively.

The partially reconstructed vessel is shown in Figure 15. The vessel was originally in excess of 25.5 cm high and 34.4 cm in diameter toward the rim. As discussed earlier in this chapter, the exterior surface treatment consists of a fabric impressed base and a fine cord marked body. The interior base of the vessel is smudged and contains a build-up of carbon residue extending over the edges of the broken basal sherds.

Special Analyses

Introduction

Palynological, ethnobotanical, faunal, human osteological, human coprolite and radiometric samples from the Callawassie burial mound were submitted to specialists for analyses. The results of these analyses are briefly summarized in this section. More detailed data and interpretations are presented for the palynological, ethnobotanical, faunal and human osteological analyses in Appendices I-IV, respectively.

As discussed in Chapter II, special samples were obtained from stratigraphic columns and features for palynological, ethnobotanical, and faunal analyses. Because of time and budgetary constraints, only a small number of the samples collected were analyzed.

Of the 43 column and feature samples collected, only 10 samples were submitted for each of the analyses. In order to insure comparable data, samples from the same column and feature proveniences were sent to each of the specialists. Because of the likelihood that the specialists would not be able to analyze all 10 of their respective samples, it was necessary to assign priorities (Samples 1-10) to each group of samples submitted. The priorities were the same for each group. Assigning priorities insured that samples from the same proveniences considered "most important" (highest priorities) would be analyzed by each specialist.

Samples from only one column (30 x 30 cm column in Unit 304N, 308E) were submitted. This column was selected because it represented the best defined stratigraphic sequence. Samples from this column should, therefore, provide the best control for comparison with the various features.

Sample selection from the stratigraphic column and from the features was determined by the relative amounts of subsistence and organic materials present (observed after flotation) in the samples. Those samples with the relatively highest amounts of these materials were selected.

The samples selected from the 304N, 308E, stratigraphic column were from Level C (Sample #1), Level D-1 (Sample #2), Level D-2 (Sample #6), and Level C-2 (Sample #7). The feature samples selected were from Feature 1

(Sample #3), Feature 6 (Sample #4), Feature 7 (Sample #5), Feature 3 (Sample #8), Feature 9 (Sample #9), and Feature 10 (Sample #10).

The flotation light fraction from the above samples was submitted for ethnobotanical analyses and the heavy fraction for faunal analyses. The pollen samples from those proveniences were processed by the palynologist.

Because of the small sample sizes, caution must be exercised in interpreting the data resulting from these analyses. However, these preliminary data do, as intended, provide insights into the types and variability of subsistence and environmental data present within the midden/village refuse deposits from which the mound fill was obtained. Because the midden/village refuse deposits and the mound are likely attributable to the same human population, these subsistence and environmental data are especially relevant to questions posed by the analyses of the human remains from the mound concerning nutrition and health. Until it is possible to examine *in situ* deposits in the midden/village area, subsistence and environmental data obtained from the present analyses and from future research at the mound will have to suffice.

The variability observed in these subsistence and environmental data within and between the various mound strata and features also enhances our ability to discern and to correlate details of mound construction. Similarly, insights into the differential use of the secondary deposits used for mound construction can be obtained from these data.

All human osteological remains from the burial features were analyzed. An inventory, by provenience, of the disarticulated and fragmented human bone occurring "loose" in the mound fill was also prepared.

The human coprolite fragments recovered from the mound fill (Unit 304N, 308E, Level D-2, 1 fragment; Unit 304N, 312E, Level C, 2 fragments) were analyzed for evidence of parasites in order to supplement the human osteological and subsistence data relevant to questions of health and nutrition. These coprolites, and others recovered from the mound in the future, will probably also be analyzed in order to obtain subsistence data.

Human bone from Features 1 and 9 was submitted for radiocarbon dating. These samples should date the initial and terminal phases of mound construction, respectively, effectively "bracketing" the period of mound use. Because of the secondary nature of the mound deposits, only the articulated human remains (necessarily intentionally placed in the mound) were suitable for obtaining an accurate date range for the mound.

Palynological Data

There was insufficient pollen for a statistically valid sample. Pine (*Pinus*), hickory (*Carya*), knotweed (*Polygonum*) and compositae were represented by a total of 16 pollen grains in 7 samples. Pine and hickory pollen are transported by wind, often over considerable distances. Consequently, the presence of these pollen in the mound fill and features provides little subsistence or environmental information.

Polygonum and compositae are insect pollinated and, therefore, probably grew in the immediate vicinity of the site. These mesic to hydric adapted species are present in the area today (Michie 1982). *Polygonum*, in particular, occurs in the small, intermittent pond (noted earlier) located about 500 m west of the mound. It also occurs in the low swampy area near the salt marsh north of the site (Michie 1982).

There is some evidence that *Polygonum* may have been of economic importance (Ford 1978; Asch and Asch 1979; Crawford 1980). It has been suggested that perhaps *Polygonum erectum* was cultivated or encouraged in Late Woodland times in the Lower Illinois valley. The seeds and greens of this weedy plant are edible (Asch and Asch 1979).

Ethnobotanical Data

Although there were insufficient identifiable plant remains for a statistically valid sample, the ethnobotanical data are informative. The species represented are: Kochne Pepper Vine (*Ampelopsis arborea*); Yaupon holley (*Ilex vomitoria aiton*); Partridge berry (*Mitchella repens* L.); *Polygonum* sp.; Blackberry or Dewberry (*Rubus* sp.); Catbriar or Greenbriar (*Smilax* sp.); Blueberry (*Vaccinium* sp.); and Muscadine (*Vitis rotundifolia Michaux*).

All of these species are present in various habitats on Callawassie Island today. The fruiting time for these species ranges from May through November.

It may be significant that, with the exception of the *Mitchella repens* and the *Smilax*, all of the plant remains were carbonized. This may indicate prehistoric utilization, rather than natural inclusion in the primary midden/village refuse deposits. The inclusion together of these species from diverse habitats (see Appendix II) and the known or suspected prehistoric use of most of these species (Ford 1978; Asch and Asch 1979; Crawford 1980) support this supposition.

It may also be significant that *Rubus* sp. typically occurs in disturbed areas. Such areas would necessarily be present under conditions of intensive human habitation.

Faunal Data

Again, statistically valid statements are not possible due, at least in part, to inadequate sample sizes. However, a number of observations are suggestive. The data suggest that the aboriginal diet consisted, by weight, of about two-thirds invertebrate meat to one-third vertebrate meat. In terms of calories, the respective meat contributions to the diet were about equal.

All of the identifiable shellfish occur in various habitats within the marsh/estuarine environment. The food shellfish species represented are: Marsh Periwinkle (*Littorina irrorata*); Atlantic Ribbed Mussel (*Geukensia demissa*); Quahog/Hard-shelled Clam (*Mercenaria* sp.); Channeled Whelk (*Busy-*

con canaliculatum); Basket Shell (*Nassarius* sp.); Mud Whelk (*Ilyanassa obsoleta*); Eastern Oyster (*Crassostrea virginica*); and Stout Tagelus (*Tagelus plebuis*).

Unlike most southeastern coastal shell middens that appear to consist primarily of oyster shell, Tagelus clams were the most frequent mollusc species represented at site 38BU19. This species contributed 53% of the total meat weight and 43% of the total meat caloric value. Of the molluscs identified, Tagelus clams require the greatest collection effort. The natural occurrence of this species is in burrows as much as 50 cm deep in the sandy mud bottoms and banks of tidal creeks. Consequently, these clams must represent a purposeful, rather than a casual, collection effort. A high meat yield per clam and a greater ease of extracting meat from the shell (compared with the other molluscs identified) would, with a high Tagelus density, probably make the gathering effort worthwhile.

Although only 2% of the faunal sample were vertebrates, their meat weight amounted to 36% of the total. Terrestrial animals (squirrel, raccoon, deer, bird, lizard, snake and box turtle), all relatively common in upland areas adjacent to the marshes, apparently contributed a minor portion to this meat weight.

Most of the vertebrates represented were fishes (72% MNI, 65% estimated meat weight), all of which are found in estuarine or saltwater environments. Although some of these fish occur in the estuaries year-round, most are out of the estuaries during the colder months. In particular, the presence in the sample of catfish, killifish and juvenile drums (*Leistomus, Micropogonias*) indicate, a predominantly spring and/or summer fishing schedule. The use of nets, baskets, or weirs to capture the smaller fish is also indicated. The crab claws recovered, and the growth lines of *Mercenaria* valves examined (see Appendix III), tend to strengthen the argument for more intensive fishing and mollusc-gathering activities during the spring-summer season. However, the fish and mollusc data do suggest the minimal occurrence of these activities during the colder months as well.

Human Osteological Data

Although the sample size is small, the skeletal material from 38BU19 reflects a relatively healthy, robust group intermediate in morphology between diffuse hunter-gatherer societies and fully settled agricultural ones. This is suggested by a comparison with skeletal data from Larsen's (1982) agricultural and preagricultural populations on the Georgia coast. The intermediate morphology of this Callawassie population was not unexpected, given the time period indicated.

The average age at death for the adults (28 years) is intermediate between preagricultural and agricultural groups on the Georgia coast. The age at death is younger, however, than at site 38BU9 (Late Archaic-Early Woodland), which represents a preagricultural group on the coast of South Carolina (Rathbun et al. 1980).

Generally, the Callawassie population was closer in morphology to agricultural groups along the Georgia coast than to earlier South Carolina coastal peoples. Stature estimates indicate that the Callawassie males are closer in size to the preagricultural Georgia groups and the females closer to agricultural groups.

Considerable mechanical stress to the arm, hand and back areas was observed. This pattern is most often observed in preagricultural groups and is compatible with shellfish gathering and net pulling activities. Degenerative changes at the joints for Callawassie females is also closer to the preagricultural pattern documented along the Georgia coast.

A diet more compatible with preagricultural groups is indicated by the teeth. The teeth also indicate a significant developmental interruption at about age 3, probably associated with weaning difficulties. This late age at weaning is also characteristic of preagricultural groups.

Childhood illness at other times is indicated by multiple slight hypoplasias. The pattern, however, was not of a cyclical nature.

Evidence for slight anemia was also indicated. The severity, however, was nothing like that of Late Woodland groups heavily dependent on maize. Intestinal parasites (see Coprolite data below) and/or the effect of phosphorous-rich seafood could be contributing factors.

Both adult females (Features 1 and 9) exhibited some localized periosteal reaction from infection. The reaction appears to have resulted from trauma and not from systemic afflictions.

Chronic infections were not indicated by the Callawassie burials. Similarly, there was no evidence of repeated acute infections or frequent nutritional deprivation.

Finally, burial practices without discrimination against the inclusion of subadults is more in line with preagricultural groups than fully agricultural ones. With regard to burial practices, the use of an ossuary or charnel house is indicated by partially articulated burials (Features 1 and 8) showing no evidence of post-burial disturbance or cut marks on the bone.

Human Coprolite Data

Preparation for the analysis of coprolites usually involves the rehydration of dried specimens through immersion in water for 3-5 days at 37° C (Van Cleave and Ross 1947; see also Heizer and Napton 1969 and Bryant and Williams-Dean 1975 for specific applications of the Van Cleave-Ross method). Because of calcification, however, it was necessary for the three specimens from 38BU19 to remain in a solution of 0.5% Trisodium Phosphate (TSP) for four weeks at room temperature. This modification by Fred Hornick (University of South Carolina, Department of Biology) of the Van Cleave-Ross method has been found to be successful in the study of similarly preserved coprolites (see Rathbun et al. 1980; Trinkley 1981).

After rehydration, pulverized pieces of the specimens were examined by microscope. There were 20-30 slides examined at 400X and 1000X for each specimen. Based on color, odor and content, it would appear that only the specimen from Unit 304N, 308E, Level D-2, was actually a coprolite.

The coprolite contained no evidence of parasite infestation. However, it cannot be reasonably inferred from the single coprolite specimen that this human population was parasite free. It is known that earlier populations in the area did have parasites that likely caused, or contributed to, an anemic condition (Rathbun et al. 1980). If, however, this Callawassie population was parasite free, or relatively so, then the slight anemic condition evidenced by the skeletal remains may have resulted from a phosphorus-rich, seafood diet (phosphorus inhibits the absorption of iron). The faunal data presented earlier would support such an inference.

A considerable body of subsistence-environmental data was inadvertently obtained from the single coprolite specimen. A number of pollen grains of the same species (probably pine--a positive identification will be made in the future), plant cell wall fragments, and a fish rib were observed.

If the pollen observed in the coprolite was pine, then the coprolite was likely produced in the spring. This is consistent with the seasons of occupation indicated by the other subsistence-environmental data.

The plant cell wall fragments indicate that, in addition to seeds and berries, the pulpy part of at least one plant was also consumed. The presence of a fish rib is also consistent with the subsistence data presented earlier.

Radiometric Determinations

Every effort was made to obtain C^{14} determinations for the bone (submitted to Dr. Richard Pardi, Queens College Radiocarbon Laboratory, CUNY, Flushing, New York) from Features 1 and 9. However, there was insufficient collagen in the samples, probably due to leaching.

No date was obtained for Feature 1. Feature 9 yielded an erroneous date of 6,160 + 100 C^{14} Years Before Present. Pardi (personal communication) suggested that the most likely source of contamination was the Duco cement that had been used to mend the bone for the osteological analyses. Personnel of the Queens College Radiometric Laboratory were aware of the potential problem and foresaw no difficulty in removing the cement prior to analysis. In any event, it was subsequently learned that even if the cement had been entirely removed, insufficient collagen would have precluded a C^{14} determination.

Hopefully, future efforts will result in an accurate C^{14} date range for the mound. For now, the ceramic data from the mound make it reasonable to assume that the mound dates to the St. Catherines period (ca. A.D. 1000-1150).

CHAPTER IV

CONCLUSIONS AND RECOMMENDATIONS

Research Conclusions

In this final chapter, the various lines of archeological data are integrated within the analytical framework established by the human osteological-burial and subsistence-settlement problem domains outlined in Chapter I. Tentative conclusions are based on a consideration of our present data from the mound, Moore's earlier data, and previous archeological and ethnohistorical research along the Georgia and southern South Carolina coast. These conclusions, in turn, provide a foundation for recommendations for future research at 38BU19. The recommendations presented supplement those provided by Michie (1982) for Phase II testing.

Human Osteological and Burial Research

While the preservation of human bone from the mound was excellent, the relatively small skeletal sample obtained precludes any definitive conclusions, especially ones pertaining to marriage patterns and migration-biological affinity. With respect to the latter, inferences are further hampered by insufficient cranial data. However, the osteological data do suggest a relatively robust population whose physical and health-nutritional characteristics are intermediate between those observed for preagricultural and agricultural prehistoric groups along the Georgia coast. Prehistoric human skeletal data from South Carolina are, at present, insufficient for definitive comparisons.

A few tentative inferences may be drawn with respect to mortuary practices, status, demography, and health-nutrition. Mortuary practices, status and demography are, because of their highly interrelated nature, considered together. Implications for health and nutrition, while not unrelated to the above, are considered separately for convenience.

A number of observations based on the combined burial data (Moore's and ours, see also Fig. 16) are relevant to inferences pertaining to mortuary practices, etc. These data indicate that: 1) there was a large, central submound pit, 2) most subsequent burials were placed in pits associated with various mound construction levels, 3) most of the reasonably complete burials were in a flexed position, with the head oriented in an easterly direction or, for those burials in the southeast quadrant, toward the center of the mound, 4) there were apparently many more burials placed in the eastern half of the mound than in the western half, 5) burials tend to cluster spatially, with the burials in each cluster apparently cross-cutting age and sex lines, 6) adult female and child/fetus burials were about equal in number (five each of the combined burials that could be reasonably identified as to sex and relative age), with only two definite

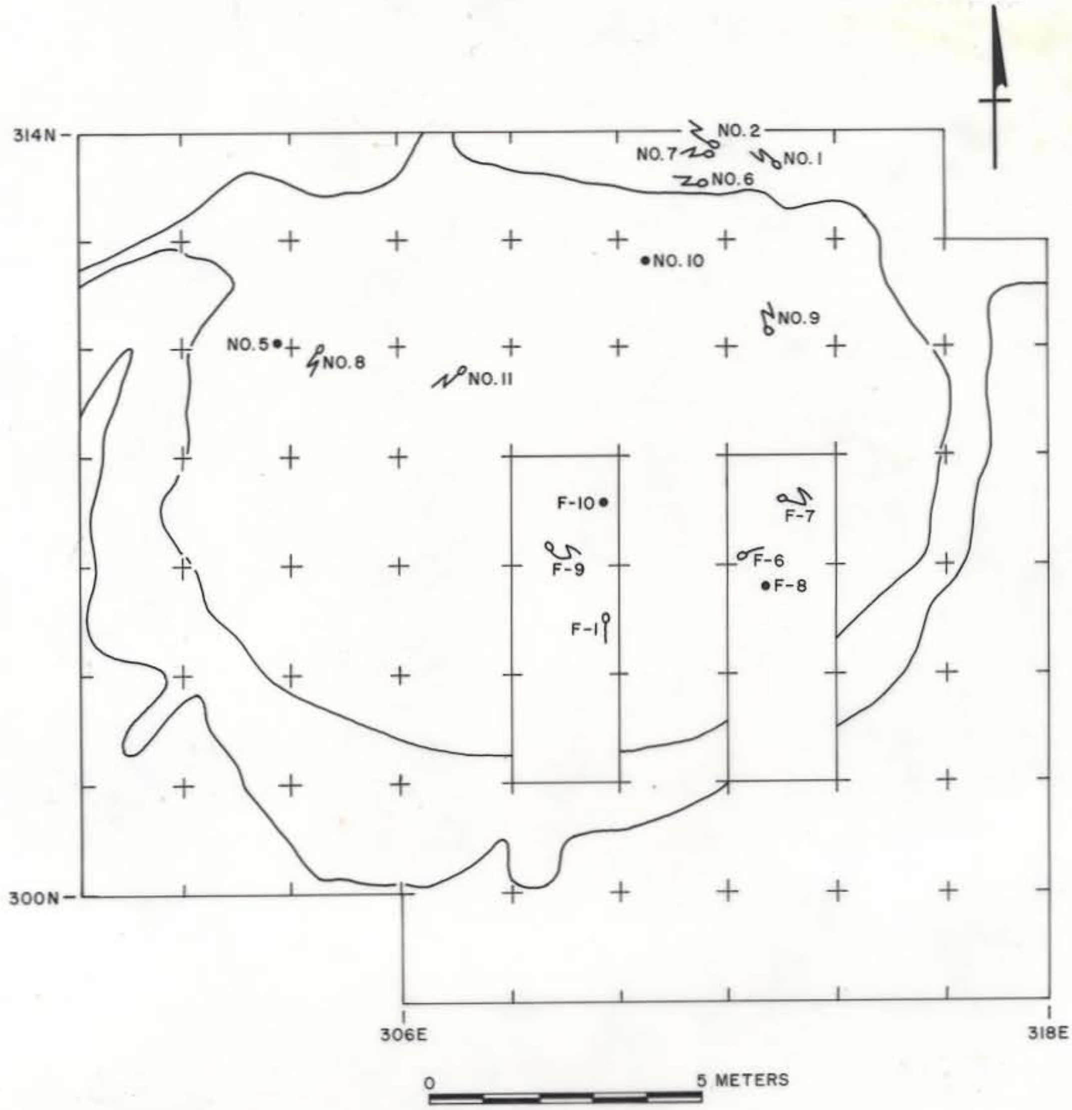


Figure 16: Location and orientation of burials recovered thus far from the mound

<u>Moore's Burials from the North Half of the Mound</u>

No. 1 - Female
No. 2 - Female
No. 5 - Skull and two cervical vertebrae
No. 6 - Young male
No. 7 - Child
No. 8 - Adult, uncertain sex
No. 9 - Male
No. 10 - Tibia, fibula, foot bones
No. 11 - Female

<u>Our Burials from Trenches A and B</u>

F- 1 - Adult female
F- 6 - Infant
F- 7 - Child
F- 8 - Adult male, complete right lower arm
F- 9 - Adult female
F-10 - Fetus in cord marked vessel

adult males, 7) with the possible exceptions of Feature 10 (fetus in an inverted St. Catherines fine cord marked vessel with a quantity of crab shell) and Feature 1 (adult female with a quantity of crab shell in apparent association), there is no indication of grave goods, and 8) most, if not all, of the burials (at least the adults, regardless of sex) were "stored" in an ossuary or charnel house for varying lengths of time prior to burial (see Chapter III, Feature Data--Feature 4 in particular may relate directly to an ossuary or charnel house function. See also Ubelaker 1974).

St. Catherines period burial mounds have been investigated on the Georgia coast (DePratter and Howard 1980; Caldwell and McCann n.d.; Waring 1968; Caldwell 1952, 1971; Holder 1938; Thomas and Larsen 1979; Larsen 1982). Based on the available descriptions (most of these mounds have not been thoroughly or systematically excavated), these mounds do not appear to be as stratigraphically complex as the Callawassie mound. There are, however, a number of shared characteristics that may be of some interpretive value relevant to the above general observations for the Callawassie mound.

Mounds attributable to this period were characteristically constructed over centrally located pits that contained mass deposits of cremated human bone or were occasionally left empty (Caldwell and McCann n.d.; Waring 1968). According to Moore's (1898) description, the central pit of the Callawassie mound was apparently empty. While the significance of the empty pit is unknown, the cremated bone usually in such pits is thought to represent high status burials (Caldwell and McCann n.d.; Waring 1968), possibly associated with a lineage head (Fairbanks 1965).

Child and infant burials became more common during this period. It has been suggested that the St. Catherines period marks a shift in socio-political organization, such that the status of individuals buried in mounds was ascribed rather than achieved (Holder 1938; Caldwell 1971; DePratter and Howard 1980). While this may be so, the osteological data from the Callawassie mound also tend to indicate a high infant-child mortality rate for this period (see Chapter III and Appendix IV). This is probably associated with stress involved in an economic "shift" from labor-intensive hunting and gathering to incipient horticulture (the combined data for this inference are summarized later in this chapter). A shift in socio-political organization and, hence, status criteria, would almost certainly accompany this economic change process.

The excavated mounds of this period contain limited grave goods (Holder 1938; Caldwell 1952, 1971; Waring 1968). This may indicate little status differentiation between most individuals. Whether or not the crab shell apparently associated with Features 1 and 10 is a status indicator is uncertain.

Cremations in pottery vessels appear for the first time during this interval (Caldwell 1952). The remains of the human fetus in the vessel (Feature 10) did not appear to be cremated, however. While the significance of the associated vessel is uncertain, it is clear that if differential status is indicated for the fetus, it would necessarily have to be of an ascribed nature.

With respect to the other burial patterns observed at the Callawassie mound, there are no apparent mortuary differences by age or sex with regard to pit vs. construction level-associated burials or flexed (left or right side) vs. unflexed burials. The tendency for burials, again regardless of age or sex, to be located in the east side of the mound with the head oriented in an easterly direction or toward the center of the mound may indicate a relationship with a broader, Southeastern Woodland period mortuary complex (e.g., Fairbanks 1965; Sears 1953, 1954, 1958, 1962). Presumably, the eastern orientation is a pattern ancestrally related to the ethnohistorically documented ceremonial-ritual focus on the sun by many Southeastern groups, such as the Natchez of the Lower Mississippi Valley and the Timucua of North Florida (e.g., Spencer and Jennings 1965). While the significance, if any, of the head direction toward the center of the mound is uncertain, it does not seem unreasonable to speculate that is is somehow related to the central, submound pit, possible in deference to the high status individual(s) interred (actually or ritually) in the pit.

A consideration of Moore's (1898) and our data (see Fig. 16) indicates the relatively discrete spatial clustering of burials: one cluster each in the northwest (3 burials), northeast (6 burials) and southeast (6 burials thus far) quadrants of the mound. The southwest quadrant of the mound may, upon investigation, contain a cluster as well.

Within each cluster, the burials: 1) cross-cut age and sex lines, 2) occurred in association with various mound construction levels at different depths (as indicated by the cluster in the northeast quadrant, there was at least one instance where a later burial was intruded into an earlier one), and 3) were "stored" for differential lengths of time in a charnel house prior to burial, as indicated by differential degrees of articulation. When considering the combined data (spatial clustering, no discrimination by age or sex, burial at different times), it is tempting to speculate that the burial clusters may represent a situation functionally similar to contemporary, individual family or lineage segment "cemetery plots." Within each cluster or plot, the specific easterly head direction of an individual may, with respect to the position of the sun, indicate the time of year that that individual was buried.

Speculating further, given the ceremonial-ritual emphasis on the east, it may be that those burial clusters in the eastern quadrants represent the relatively "more important" families-lineage segments. If this is so, then, an individual's status may be indicated not by associated grave goods or mode of burial, but rather by where the individual is buried. Again, the contemporary family cemetery plot with its status implications may represent an analogous situation.

The above inferences (speculations) are in line with others presented, suggesting that status was largely of an ascribed nature. Based on the archeological data from the mound and ethnohistorical data (e.g. Jones 1978), it is likely that lineages, as well as their constituent families, were ranked along socio-economic lines. It is also likely that individual family-lineage members were "subtly" ranked by age and sex.

In terms of the age-sex structure indicated by the burials, it is inferred that the approximately equal number of adult females and children, in contrast with relatively few adult males, is due not to differences in status, but rather to differences in mortality. As indicated by Appendix IV, a higher incidence of death for adult females and children may be attributed to difficulties associated with childbirth (both adult females--Features 1 and 9--in our sample had had children) and to frequent childhood illness, respectively. Assuming a reasonably "normal" age-sex structure for the population, and that adult males did not live on the average much longer than adult females, then the relatively few adult males buried in the mound might also indicate that the mound was constructed over a relatively short-interval of time.

The use of an ossuary or charnel house, as strongly indicated by the burials themselves and Feature 4 (see Chapter III), is especially relevant to an understanding of change through time in both mortuary practices and male-female status differences. These differences, in turn, may be related to changes in social organization accompanying economic shifts (i.e., change from predominantly hunter-gatherer to predominantly agricultural-based subsistence systems).

It is well documented by ethnohistoric accounts of Guale groups in the area that ossuaries or charnel houses (and presumably associated burial mounds) were typical components of the larger "towns" or villages (e.g. Jones 1978). These accounts also indicate that treatment of the dead was highly variable according to age and sex. The "principal men are kept apart in a chapel or temple separated from the other community, and also on small islands" (Oviedo 1959 in Jones 1978). In addition, there is some indication that certain women had significant roles in these highly stratified, kinship-oriented (matrilineal), agricultural-based (to some questionable degree), chiefdom-level societies (Jones 1978).

In contrast, the indication that at least most individuals interred in the Callawassie mound received no "special treatment" tends to suggest fewer and/or more subtle status differences, at least for those segments of society represented by the burials recovered. If this is so, it may be inferred that the level of socio-economic complexity was less than that indicated for the Guale groups in the area during the historic contact period. This is consistent with Rathbun's (Appendix IV) interpretation of the osteological data, which indicate a hunter-gatherer-early agricultural transition.

From the perspective of health and nutrition, ultimately related in large part to subsistence patterns (discussed below), the skeletal material from 38BU19 reflects a relatively healthy, robust group intermediate in morphology between diffuse hunter-gatherer societies and fully settled agricultural ones. Life was shorter (average age of 28 years for the adults) than in modern societies and mechanical stress was significant. Childhood mortality was relatively high, a general pattern similar to other groups at this stage of cultural development. Chronic disease and repeated dietary insufficiencies are not indicated. Slight anemia, however, is indicated and may most likely be attributed to a diet with a significant seafood component.

Although our skeletal sample is small, the data do not indicate differential access to subsistence resources that would reflect major status differences. The nutritional and health differences observed appear to be largely age-related, which is a basic childhood vs. adult pattern inherent to some degree in any population. Possible differences in patterns of trauma and mechanical stress between the adult females and male may indicate a simple sexual division of labor consistent with the stage of cultural development suggested.

Subsistence-Settlement Research

Subsistence Pattern

Subsistence data from the mound fill and features, it has been argued (see Chapter III), ultimately relate to a nearby St. Catherines period village (see settlement discussion below) associated and contemporary with the mound. Because villages of this period have received little attention (DePratter and Howard 1980; Steed 1970; Caldwell and McCann n.d.), there are few subsistence data available for comparison. The known subsistence remains from St. Catherines period shell middens and villages include mulluscs (oyster, clam, mussel) and rarely deer, turtle, squirrel, opossum and fish (Steed 1970; Larsen 1982; see also Trinkley 1981). No definite evidence of cultigens has been observed, although they (principally corn) commonly occur during the subsequent Savannah and Irene periods (DePratter and Howard 1980; Larsen 1982). As indicated by the subsistence remains from the Callawassie mound, the above general data more likely reflect inadequate recovery techniques than an accurate portrayal of St. Catherines period subsistence resource variability.

The ethnobotanical data from the mound, (see Chapter III and Appendix II) indicate the use of a wide variety of plant resources, principally seeds and berries. The human coprolite recovered indicates that the pulpy part of at least one plant was also consumed. The seeds and berries represented are available from May through November in a variety of habitats on Callawassie Island. Evidence of cultigens (i.e., maize, beans or squash) was not recovered. Multi-seasonal habitation and a labor-intensive gathering economy are indicated by these data.

The faunal data (see Chapter III and Appendix III) suggest that molluscs (principally *tagelus* clam) contributed most to the meat diet, followed by fish and terrestrial animals, respectively. These resources were available in the marsh/estuarine and adjacent upland environments of Callawassie Island. A predominantly spring-summer subsistence pattern is indicated for fishing and mollusc gathering. Seasonal data are not available for the various terrestrial animals represented. The gathering, in particular, of *tagelus* clams, periwinkle and crabs also implies a labor-intensive economy.

The combined subsistence data suggest a rather labor-intensive subsistence economy emphasizing the gathering of wild plant and animal resources. Multi-seasonal habitation and a reasonably settled village life are also indicated. The high density and diversity of artifacts from the mound fill (reflecting a wide range of economic activities) support this inference.

The subsistence-economic pattern inferred is consistent with the preagricultural-agricultural transition suggested for the St. Catherines period by the osteological-burial data from the mound and by similar data from the Georgia coast (Larsen 1982). A "transitional" adaptation is also suggested by the available settlement data.

Settlement Pattern

As with subsistence, little is known of St. Catherines period settlement. However, sedentary villages with substantial structures surrounded by midden heaps of refuse are apparently present on the Georgia coast (DePratter and Howard 1980).

Unlike earlier sites, Wilmington and St. Catherines period sites on the coastal islands of Georgia occur, not only along island margins, but also within interior island areas. Although the sites are still relatively small and dispersed, they are more clustered than earlier (DePratter 1975, 1976; Larsen 1982).

During the subsequent Savannah and Irene periods, sites became larger and less scattered. The number of Savannah period habitation sites decreases, but the number of inhabitants of major communities increases (DePratter and Howard 1980; Larsen 1982). Later, during the Irene period, large "towns" on coastal islands continue to exist, with significant portions of major habitation areas in island interiors (Pearson 1976, 1977, 1978, 1979).

Thus, prior to the Wilmington and St. Catherines periods, settlement appears to have been characterized primarily by isolated, short-term occupation. Milanich (1971) attributes these small settlement areas to the nuclear family occupation of small, seasonal settlements. The settlement pattern observed for the Wilmington and St. Catherines periods, with site clustering and an initial shift to interior island areas, apparently represents a transition between earlier settlement patterns and the later Savannah-Irene patterns. The latter presumably represent permanent, year-round village settlement (Larsen 1982).

Larsen (1982) views the shift in settlement after the St. Catherines period as accompanying a shift in the mode of subsistence that involved a greater agricultural-based component focusing on corn. The need for extensive areas of suitable land for agricultural purposes may account for a greater emphasis on settlement in interior island areas. If this is so, the trend toward clustered and interior island settlement observed for the St. Catherines period may, in part, be indicative of incipient horticulture.

Ethnohistoric settlement data for the Guale may provide some insight into the socio-economic aspects of St. Catherines period settlement. The larger Guale villages are described by Jones (1978) as "dispersed towns." These towns were apparently characterized, in part, by maize plots and houses in the general vicinity of the town center. This is taken by Jones (1978) to imply a movement of maize plots and homesteads around a nucleus as a reasonable adaptive solution to shifting cultivation (necessary due to rapid soil depletion). The regular presence of some form of mortuary structure in the town center is likely (Jones 1978).

Using the above archeological and ethnohistorical data as a comparative base, it is apparent that the available St. Catherines period settlement data from Callawassie Island are quite similar. Numerous, small St. Catherines period shell middens occur along the island margin, usually on high ground adjacent to tidal creeks (Michie 1982). Settlement components on the interior of the island include the burial mound with a probable village area in association. Site 38BU464 (shell midden near the pond ca. 500 m west of the mound) and the midden scatter observed in the dirt road immediately to the north and west of the mound are probably associated with the village. The deposits of oyster shell noted by Moore (1898) in the vinicity of the mound may have represented refuse associated with specific, outlying homesteads within the village area. The archeological and ethnohistorical settlement data presented earlier (DePratter and Howard 1980; Jones 1978) tend to support this interpretation.

After completing the draft report on this present research, a preliminary on-the-ground survey tentatively verified the existence of a village beginning immediately to the north and west of the mound. Two transects with posthole or 30 x 30 cm shovel tests spaced at 10-m intervals were implemented, starting at the west edge of the mound and proceeding for distances of 50 and 70 m to the north and west, respectively. The contents of the shovel tests were screened through one-quarter inch mesh hardware cloth. As expected, differential densities of materials similar to those from the mound were recovered. One probable post mold and a shell-filled pit were also discovered during this limited investigation.

Thus, as with the osteological-burial and subsistence data, the St. Catherines period settlement data from Callawassie Island also indicate a population in transition. Whether or not incipient horticulture accompanied the initial shift toward interior island settlement during this period remains uncertain. However, this shift, and the possibility of scattered homesteads associated with the deeper and better drained soils to the north and west of the mound, are certainly suggestive of incipient horticulture.

Summary

The Callawassie burial mound was constructed during the St. Catherines period (ca. A.D. 1000-1150) and appears, in large part, to reflect a pan-southeastern Woodland period mortuary complex. The mound was initiated with the excavation of a large, central pit, presumably for the burial (actual or ritual) of a high status individual(s). There was little indication of status differences, either by age or sex, between individuals interred during subsequent mound construction.

Bodies were apparently "stored" in a charnel house for varying periods of time between mound construction activities. Burial position within the mound was either flexed (most common) or prone, usually in pits associated with the various mound construction levels.

There is a tendency for individuals (all ages and sexes) to have been buried in the eastern half of the mound and to be facing in an easterly direction with the head toward the center of the mound. Further, it is indicated that each quadrant of the mound contains a major burial cluster, cross-cutting age and sex lines. It has been tentatively suggested that these burial clusters may represent individual families or lineage segments that were "assigned" specific burial areas within the mound. Given the apparent emphasis on the east, those burial clusters in the southeastern and northeastern quadrants, it has been speculated, may represent families or lineage segments of relatively higher status.

Although there was a high mortality rate, especially for adult females and children, the skeletal remains from the mound do not indicate chronic disease or repeated dietary insufficiencies. The slight anemia observed may be attributed to a diet with a phosphorus-rich seafood component. A sexual division of labor between adult males and females may be indicated by possible differences in patterns of trauma and mechanical stress.

The combined osteological data indicate a population intermediate in morphology between diffuse hunter-gatherer societies and fully settled agricultural ones. Subsistence-settlement data support this interpretation.

Subsistence, artifactual and stratigraphic data obtained from the mound strongly suggest that the mound was constructed with refuse from a nearby village. These data also indicate that the mound and village are probably contemporaneous.

Various lines of data were presented, suggesting that the village area is located immediately to the west and northwest of the mound, possibly extending for a distance of 500 m toward the pond to the west. Within this general village area, dispersed homesteads with associated midden refuse heaps are probable. It has been suggested that the dispersed homesteads may be attributed to incipient horticulture associated with this "transitional" population. Although the presence of incipient horticulture has not been directly confirmed by the subsistence data obtained from the mound, the overall subsistence pattern indicated is certainly in line with such a possibility.

The artifactual and subsistence data from the mound indicate multi-seasonal, village habitation involving the labor-intensive exploitation (primarily collecting) of a wide variety of floral and faunal subsistence resources. These resources were obtained from nearby marsh-estuarine and terrestrial habitats; minimally from May through November. This period of occupation is consistent with the seasons that would be involved with incipient horticulture.

Finally, the seasons indicated for habitation by the subsistence data are those during which freshwater is currently available in the intermittent ponds on the island (Cynthia Aulbach-Smith, University of South Carolina, Department of Biology--personal communication). However, year-round habitation cannot be precluded. Although there are no known permanent freshwater sources on the island today (Michie 1982), the modern water table is significantly lower than in the past because of industrial consumption. DePratter (personal communication) notes that there was sufficient groundwater on the Georgia coastal islands during the historic period to support even European occupations with increased water demands for stock.

Recommendations for Future Research

This preliminary research, it is felt, has more than demonstrated the potential of the Callawassie mound for providing a broad range of data relevant to human osteological-burial and subsistence-settlement problem domains. As is obvious from the present study, very little is known currently about the prehistoric coastal peoples of the St. Catherines period. That which is known is based largely on previous studies along the Georgia coast. Therefore, the mound, in conjunction with other St. Catherines period sites on Callawassie Island, provides an important data base with which to examine regional bio-cultural variation as it is manifest on the South Carolina coast during this period.

It must be emphasized that the conclusions drawn in this present research are very tentative. These conclusions, however, will be the basis for a series of interrelated hypotheses to be tested with osteological-burial data obtained from the mound in the future. Larger, statistically valid samples are necessary for "adequate" hypothesis testing. In view of the mound's considerable research value and the planned development of the area in the near future (making the long-term security of the mound highly unlikely), it is strongly recommended that the complete excavation of the mound be a top priority in the future archeological work on the island.

While the subsistence and artifactual data from the mound provided important contributions to our knowledge of St. Catherines period subsistence-settlement, the major contribution of these data were their clear indication of an intensively occupied village associated with the mound. The possibility of a village being associated with the mound was apparently not considered during the reconnaissance survey of the island (Michie 1982).

Only through an examination of the *in situ* village deposits can we obtain reliable subsistence data and an understanding of the village's internal structure as it relates to the day-to-day behavioral activities of its inhabitants. Consequently, it is recommended that the future archeological research on Callawassie Island include a consideration of the village area. Initially, this should involve a few days to delineate the area of the village and to obtain a first approximation of the range and variability of its internal structure (e.g., evidence of structures, features, specific activity and refuse disposal areas, etc.). Recommendations for additional work would depend upon the nature of the data obtained from the village during its initial investigation. It would be most cost-effective to conduct simultaneously the remaining work at the mound and the preliminary investigations of the adjacent village area.

Whereas the mound and associated village should receive top priority, the other sites recommended by Michie (1982) for Phase II testing are still of considerable importance. In light of what has been learned, or at least suggested, by the present research, the St. Catherines period shell middens, in particular, assume an even greater significance. Through a detailed understanding of the function(s) of the various site types in the St. Catherines period settlement system, we can begin, through a comparison with earlier and later systems, to comprehend more fully the broader temporal and spatial aspects of the adaptive process(es) operative.

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APPENDIX I

CALLAWASSIE ISLAND BURIAL MOUND (38BU19): POLLEN ANALYSIS

by

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INTRODUCTION

Seven pollen samples from the burial mound on Callawassie Island, South Carolina, were analyzed. Three column samples and four feature samples were analyzed in order that comparisons could be made between the two types of samples.

The purpose of the analysis was to (1) determine the local vegetation types and (2) to correlate changes in vegetation with the available archeological data.

Methods

The pollen samples were seived through a 2 mm mesh screen to remove oyster shell. Samples were prepared by treating each sample with 10% HCl to remove carbonate, concentrated HF to remove silicate, and 10% KOH to remove the "humic acids." Samples were seived again to remove large fibers and treated with acetolysis solution (acetic anhydride and sulfuric acid) to remove cellulose. Pollen were then concentrated, stained with safranin O, and mounted in glycerin jelly.

Pollen were identified and counted from the processed slides using a transmitted light microscope at a magnification of 400X.

Results

Processed Sample Descriptions

Sample #1) Column Sample, 304N, 308E, Level C., 1.12 MBD.
Sample contained abundant charcoal and plant fragments. One *Pinus* grain was observed.

Sample #3) Feature 1 - pit fill, 304N, 308E, 2.04-2.40 MBD.
Sample contained abundant charcoal fragments and no pollen.

Sample #4) Feature 6 - fill, 304N, 312E, 2.02 MBD.
Sample contained some charcoal and plant fragments and one *Pinus* grain.

Sample #5) Feature 7 - fill, 306N, 312E, 1.94 MBD.
Sample contained some charcoal and one *Pinus*, one *Carya* (Hickory), one *Polygonum* andd four Compositae grains.

Sample #6) Column Sample, 304N, 308E, Level D2, 2.01 MBD.
Sample contained abundant charcoal fragments and two Compositae grains.

Sample #7) Column Sample, 304N, 308E, Level C2, 1.28 MBD.
Sample contained abundant charcoal and plant fragments. Four Compositae and one *Polygonum* sp. grains were observed.

Sample #8) Feature 3-fill, 304N, 308E, 1.96 MBD.
Sample contained some charcoal fragments, no pollen.

Conclusions

Observation of seven samples led to very little palynologic information. No sample contained enough pollen to represent a statistically valid sample. Some inferences can be made, however. The types of pollen found in the samples were consistent and consisted of pine, hickory, *polygonum* and composites. The *polygonum* and composites probably grew in the immediate area as they are insect pollinated as opposed to wind pollinated. Pine and hickory can be transported over considerable distances.

All feature samples were essentially barren with the exception of Feature 7. It contained the most grains (seven) of all the samples.

APPENDIX II

CALLAWASSIE ISLAND BURIAL MOUND - PLANT REMAINS

by

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During late winter of 1982, the Institute of Archeology and Anthropology, University of South Carolina, excavated a portion of a Late Woodland burial mound on Callawassie Island. Mark J. Brooks of the Institute provided the University of South Carolina Herbarium with light fractions obtained from nine flotation samples for the identification of plant remains.

Abundant root materials of contemporary vascular plants were removed prior to sorting, reducing the samples to snails, charcoal, carbonized and non-carbonized plant materials and a small amount of bone. The plant remains were then separated from the rest of the sample for identification.

The plant remains were identified by utilizing the resources of the main collection of the USC Herbarium which contains 30,000 specimens of plants, the seed collection which contains almost 1,000 specimens, and the combined experience and knowledge of the authors.

Only a very small amount of the plant remains were intact; therefore, due to the fragmentary nature of the material, many species could not be identified. With the exception of *Mitchella repens* and *Smilax*, all of the remains were carbonized.

DESCRIPTION OF THE SAMPLES

Sample #1

Vitis rotundifolia (1)
Ilex vomitoria (2 halves of fruit)
Mitchella repens (1)
Polygonum (?) trigonous achene (1)
Unidentifiable intact material (1)

Sample #2

Unidentifiable fragments (4)

Sample #3

Unidentifiable fragments (5)

Sample #4

Unidentifiable intact material (1)

Sample #5

Mitchella repens (1)
Ampelopsis arborea (1)
Unidentifiable fragments (4)

Sample #6

Vaccinium sp. (4)

Sample #7

Smilax sp. (1)
Ampelopsis arborea (1 fragment)

Sample #8

Rubus sp. (18)
Ampelopsis arborea (3)
Unidentifiable fragment (1)

Sample #9

Unidentifiable fragments (7)

The following is an annotated checklist of the plant species identified from the flotation samples. General habitat and flowering times are adapted from Radford, Ahles and Bell (1968). Specific information about the occurrence of these taxa on Callawassie Island is from Aulbach-Smith (1982).

Ampelopsis arborea (L.) Koehne   Pepper Vine

A. arborea occurs in low woods and marshes of the coastal plain of South Carolina and is in flower and fruit from June to October. On Callawassie Island it is most abundant along roadsides and the intermittent ponds, but also occurs in the pine-mixed hardwood and oak-mixed hardwood forest.

Ilex vomitoria Aiton   Yaupon holly

I. vomitoria occurs in the maritime forests of the outer coastal plain and is in flower from March to May and in fruit from October to November. It is very common in all communities on Callawassie.

Mitchella repens L.   Partridge berry

M. repens flowers from May to June and is in fruit from June to July. It occurs in rich or low deciduous woods throughout the state and on Callawassie Island occurs in the lowland mixed hardwood, pine-mixed hardwood, oak-mixed hardwood and live oak hammock communities.

Polygonum sp.

Polygonum is a large genus occurring throughout the state in various habitats which are usually mesic to hydric. It is in flower and fruit during the summer and fall. The most abundant species on Callawassie Island is *P. punctatum*, the dominant herb in intermittent ponds. *P. densiflorum* also occurs in a few of the ponds.

Rubus sp.   Blackberry or Dewberry

Rubus is usually found in disturbed sites throughout the state. It flowers from March to May and fruits from May to July. *Rubus* is found on Callawassie in scattered sites.

Smilax sp.   Catbrier or Greenbrier

Smilax flowers in the spring and summer and generally fruits in the fall. Five species occur on Callawassie Island.

Vaccinium sp.   Blueberry

Vaccinium flowers in the spring and fruits in the fall. On Callawassie Island *V. arboreum* (sparkleberry) occurs on the eastern end in the pine-mixed hardwood forest. *V. atrococcum* (black highbush blueberry) occurs in the southern magnolia forest, live oak hammock and the lowland mixed hardwood forest.

Vitis rotundifolia Michaux   Muscadine

V. rotundifolia flowers in May and June and fruits from August to October. It occurs throughout Callawassie Island in various habitats.

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APPENDIX III

THE IDENTIFICATION AND ANALYSIS OF A SAMPLE OF THE FAUNAL REMAINS EXCAVATED FROM THE CALLAWASSIE ISLAND BURIAL MOUND (38BU19)

by
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Introduction

Faunal samples (flotation samples--heavy fraction) recovered from the Callawassie Island Burial Mound were small but sufficient to suggest differential resource uses within the marsh/estuarine environment surrounding the island. Invertebrates as well as vertebrates were analyzed, providing a more complete picture of the prehistoric use of available animal resources.

Methods

Identification and analysis of seven faunal samples were completed (Table 1). The comparative skeletal collection at the Florida State Museum zooarchaeological laboratory was used for identification. Preliminary sorting and identifying were made by David Smith, while Carolyn Rock completed the final identifying and analysis. The study was supervised by Dr. Elizabeth S. Wing.

Preliminary identification was conducted by a student employed by the museum. This museum contribution, a total of $321 for 94.5 hours, enabled the completion of much more material than would have been realized with the existing contract. Sorting and complete identification by an experienced zooarchaeologist would have taken about two days per provenience.

Data recorded for each faunal sample included Number of Fragments, Minimum Numbers of Individuals and Weight. Due to the fragmented nature of the unidentified fish bone, fragment counts included only elements other than spines or ribs that could be identified. For the same reason, fragment counts for bivalves included only valve hinges, and for univalves only the apex or aperture. Percentages for vertebrates (bone) and invertebrates (shell) were treated separately to facilitate comparison with data from other reports. Unidentified bone and shell were listed separately and not included in the percentages.

Also recorded were usable meat weight computations. Meat weights provide an estimate of how much food each animal could have provided. This report utilizes the two most accurate methods of calculating meat weights: scaling by skeletal mass allometry and scaling by dimensional allometry

TABLE 1

LIST OF FAUNAL SAMPLES COMPLETED

Square	Level	Sample No.
304N 308E	C_1 -1.12	1
304N 308E	C_2 -1.28	7
304N 308E	D -1.45	2
304N 308E	D_2 -2.01	6
304N 308E	Fea. 1 2.04-2.40	3
304N 312E	Fea. 6 -1.61	4
306N 312E	Fea. 7 -1.94	5

(Wing and Brown 1979: 127-131). Skeletal mass allometry uses the weight of the archeological bone recovered to determine the weight of meat that would have been associated with it. Dimensional allometry uses a linear dimension (width of femur head, atlas, etc.) to determine the meat weight of the entire animal. The allometric equation for either method is $y = ax^b$, or put another way, log y = b(log x) + log a, where y = the estimated weight of usable meat, x = skeletal/shell weight or dimension, and a and b are constants. Table 2, developed by Hale and Quitmeyer (1982), lists the constants determined for each taxon. Skeletal/shell mass allometry uses weight as its independent variable, whereas dimensional allometry uses a dimension. For some taxa several different dimensions are listed because some of the more favorable dimensions (those with a higher r^2 value, showing a higher degree of correlation to meat weight) may have been missing.

Dimensional allometry required the measurements of a dimension of each individual represented in each provenience. Where more than 10 individuals of one taxon were represented, only 10 were measured and an average taken. The average was then multiplied by the MNI.

For some taxa no appropriate dimensions were available (or no allometric data were available for the elements identified), and alternative methods were used to arrive at individual meat weights. The proportional biomass method (Wing and Brown 1979: 130) correlates weight or dimension with a known weight/dimension--mean weight ratio from an animal of the same species. The average meat weight method simply uses the average meat weight derived from a known sample. Table 3 lists the three methods of obtaining total meat weights and the animals treated by each method. Although the proportional and averaging methods are less accurate than scaling, they do at least provide rough estimates of total meat weights for each individual.

TABLE 2

SELECTED ALLOMETRIC CONSTANTS

log y = b(log x) + log a   log y = meat weight

Vertebrates	Variable (x)	Y-intercept (log a)	Slope (b)	r^2
Mammals	bone weight	1.4106	0.8127	0.96
Birds	bone weight	1.2440	0.8422	0.98
Turtles	bone weight	1.6466	0.5299	0.74
Snakes	bone weight	1.0599	0.9404	0.98
Boney Fish	bone weight	1.3811	0.8943	0.96
Siluriformes	bone weight	1.1493	1.0447	0.96
Sciaenidae	bone weight	1.3347	0.9910	0.94
	atlas width	0.7405	2.3383	0.93
Mugil	bone weight	1.8612	0.6086	0.77
Invertebrates				
Geukensia demissa	shell weight	-0.2161	0.8008	0.85
Crassostrea virginica	shell weight	-0.7648	0.9671	0.97
	Left Valve: anterior scar length	-2.9978	2.1563	0.90
	valve length	-3.7995	2.2112	0.90
	valve width	-2.5649	2.8327	0.85
	hinge length	-2.5649	2.6491	0.80
Tagelus plebeius	shell weight	0.2888	0.9876	0.95
	hinge width	0.0751	2.4928	0.80
Mercenaria sp.	shell weight	-0.4957	0.9396	0.95
	hinge width	-1.2798	2.4948	0.90
Littorina irrorata	shell weight	-0.3418	0.9379	0.97
	shell weight	-3.8735	2.7654	0.97
Busycon canaliculatum	shell weight	-1.0655	1.5279	0.92

TABLE 3

LIST OF TAXA AND METHODS USED
TO OBTAIN INDIVIDUAL MEAT WEIGHTS

Dimensional Scaling Method	Proportional Method	Averaging Method
Brevoortia sp. (atlas)	*Sciurus* sp.	*Procyon Lotor*[1]
Bairdiella/Stellifer	Bird	*Odocoileus virginianus*[2]
Leiostomus xanthurus	*Terrapene carolina*	Iguanidae[1]
Mugil sp. (vertebrae) (atlas)	Colubridae	*Geukensia demissa*[3]
Crassostrea virginica	*Arius felis*	*Busycon canaliculatum*[3]
Tagelus plebeius	*Bagre marinus*	
Mercenaria sp.	*Fundulus* sp.	
Littorina irrorata	*Cynoscion* sp.	
Ilyanassa obsoleta	*Leiostomus xanthurus*	
	Micropogonias undulatus	

[1]Population Sample taken from Florida State Museum Zooarchaeology Laboratory files.
[2]Average size of sea island deer used (30 kg live weight; 24 kg meat weight).
[3]Population Samples collected and analyzed by Hale and Quitmeyer (1982)

Results

Table 4 lists all proveniences and the species recovered from each provenience. Tables 5-11 are species lists for the individual proveniences, and Table 12 provides a summary species list. A total of 366 bones and 1,871 shell valves or apex/apertures were identified. Unidentified fragments amounted to 20.0% of the total bone and 21.3% of the total shell. Non-food molluscs are listed separately in Table 13. These tiny shells had probably been attached to the edible molluscs or debris nearby and were carried back unintentionally. The ubiquitous land snails were presumably intrusive animals.

TABLE 4

LIST OF SCIENTIFIC AND COMMON NAMES OF SPECIES IDENTIFIED AT 38BU19

Scientific Name	Common Name	304N 308E L. C1	304N 308E L. 62	304N 308E L. D	304N 308E L. D2	304N 308E Fea. 1	304N 312E Fea. 6	306N 312E Fea. 7
Vertebrates								
U.D. Mammal		x		x	x		x	x
U.D. Large Mammal		x			x			
U.D. Small Mammal						x		
Sciur us sp.	Squirrel				x			
Procyon lotor	Raccoon		x	x				
Odocoileus virginianus	White-Tailed Deer		x					
MAMMAL		x	x	x	x	x	x	
U.D. Bird			x		x			
U.D. Turtle			x					
Terrapene carolina	Eastern Box Turtle							x
U.D. Lizard				x	x	x		
Iguanidae	Iguanid Lizards			x				
Colubridae	Non-poisonous Snakes	x	x					
REPTILE								
Chondrichthyes	Sharks/Rays	x	x					
Rajiformes	Rays		x					
Osteichthyes	Boney Fishes	x	x	x	x	x	x	x
Clupeidae	Herrings		x			x		
Brevoortia sp.	Menhaden		x			x		
Siluriformes	Catfish	x	x	x		x	x	x
Ariidae	Salt-water Catfish	x	x	x	x			
Arius felis	Sea Catfish	x						
Bagre marinus	Gafftopsail Catfish	x		x				
CATFISH		x		x	x	x	x	

TABLE 4 (Cont.)

Scientific Name	Common Name	304N 308E L. C1	304N 308E L. 62	304N 308E L. D	304N 308E L. D2	304N 308E Fea. 1	304N 312E Fea. 6	306N 312E Fea. 7
Cynoscion sp.	Seatrout/Weakfish			x				
Leiostomus xanthurus	Spot		x			x		x
Micropogonias undulatus	Atlantic Croaker		x	x		x		x
Pogonias cromis	Black Drum		x					
Mugil sp.	Mullet			x		x		
FISH		x	x	x	x	x	x	x
Invertebrates								
U.D. Crabs		x	x	x	x	x	x	x
Geukensia demissa	Atlantic Ribbed Mussel	x	x	x	x	x	x	x
Crassostrea virginica	Eastern Oyster	x	x	x	x	x	x	x
Tagelus plebeius	Stout Tagelus	x	x	x	x	x	x	x
Mercenaria sp.	Quahog/Hard-shelled Crab	x	x	x	x	x	x	x
Littorina irrorata	Marsh Periwinkle	x	x	x	x	x	x	x
Busycon canaliculatum	Channeled Whelk			x				
Nassarius sp.	Basket Shells		x		x	x		x
Ilyanassa obsoleta	Mud Whelk	x	x		x			
Non-Food Invertebrates								
Balanus sp.	Acorn Barnacle		x	x	x			x
Mytilidae	Mussel*	x	x					
Astarte nana	Southern Dwarf Astarte	x	x		x	x		
Urosalpinx sp.	Oyster Drill			x				
Mitrella lunata	Lunar Dove Shell	x						
Olivella sp.	Dwarf Olive				x			
Odostomia impressa	Impressed Odostome	x	x	x	x		x	x
Melampus loidentatus	Common Marsh Snail			x				
Land Snails		x	x	x	x	x	x	x

*smaller than Geukensia

Seventeen of the 366 bones (4.6%) were burned. Burned bones were distributed fairly evenly among taxa except catfish (8 of 33 burned) and large mammal (3 of 3 burned). Of the invertebrates, 3% of the oyster and tagelus clam valves were burned, as well as 12% of fragments counted for periwinkles, ribbed mussels and crabs. About 10% of the unidentified shell was burned. Burning could be a function of cooking methods, preservation, simply closeness to a fire, or a combination of all three. Other types of bone or shell alterations such as gnawing, butchering or tool use did not appear to be present.

Invertebrates provided at least 1,107 individuals and vertebrates at least 25. To determine whether the faunal sample was large enough to reflect an accurate account of species utilized, graphs were made plotting the relationships between the number of taxa and the MNI represented (Wing and Brown 1979: 118-119) (Fig. 1). Invertebrates consisted of about the same number of species whether the MNI count was at 25, 425, or even 1,100. Tables 5-12 show consistently similar percentages among the taxa, revealing an adequate invertebrate sample in terms of species representation.

Figure 1b shows that for vertebrates, however, a new taxon is added with every new MNI, even when the "Combined Species List" data are included. This and the continuous shifts in MNI percentages from each provenience (Tables 5-11) reveal that the vertebrate sample is not adequate for comparisons between proveniences, nor are there sufficient data to provide a detailed interpretation of the taxa for the total sample. An MNI of perhaps 100 vertebrate individuals would be a more adequate sample. Even if sample sizes were large enough, proveniences could not be compared because they came from within a mound that had been constructed with fill taken perhaps randomly from a village area. The three features likewise could not be compared since they were all burials and the fill was once again probably secondary deposition. Therefore this report will concentrate on the results provided by Table 12, the total sample. Despite the insufficient data available for vertebrates, at least some general trends can be suggested and these compared with the invertebrate sample.

The two usable meat weight estimates (Tables 5-12) provide a guideline for the amount of food contributed by each animal or group of animals. The skeletal/shell mass allometry assumed that only the usable meat associated with the bone was consumed, and is therefore a conservative estimate. This is termed "Minimum Meat Weight" in the tables. The dimensional allometry method (termed "Maximum Meat Weight") assumed the consumption of all the usable meat potentially provided by each entire animal even though it may be represented by only a single fragment. This could, therefore, be an inflated estimate, especially for larger animals. All individuals recovered from site 38BU19 with estimated meat weights of over 2,000 g were each represented by only one or two bone fragments: one deer phalanx end fragment, a raccoon tooth fragment and metapodial fragment, and a single black drum tooth fragment. Tables 5-12 show how the meat weight percentages can change radically with the addition of a single fragment from a larger animal. Evidence for assuming that the whole animal may not necessarily be represented within a sample comes from various ethnographic accounts of Indians where larger game was often divided among several households and smaller game was generally kept whole. For example, while each squirrel or fish may have been consumed within a single household, one deer would have

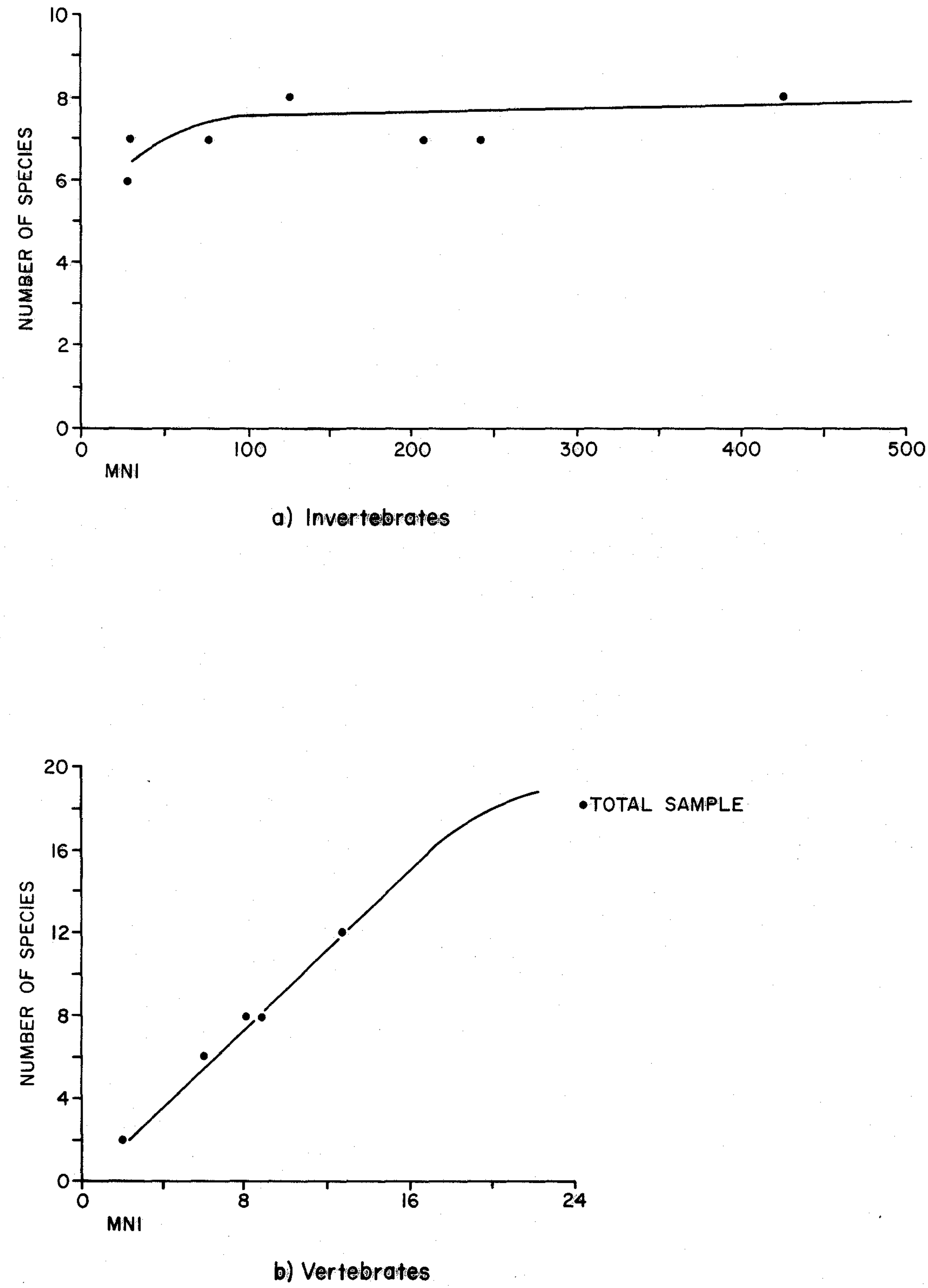

Figure 1: Relationships between number of species and minimum number of individuals for each provenience.

TABLE 5

SPECIES LIST FOR LEVEL C1, SQUARE 304N 308E

TYPE	COUNT		MNI		WEIGHT		MINIMUM MEAT WEIGHT		MAXIMUM MEAT WEIGHT	
	#	%	#	%	grams	%	grams	%	grams	%
VERTEBRATES										
U.D. Mammal	2	3.3	-	-	0.4	9.1	12.2		-	-
U.D. Large Mammal	2	3.3	1	16.7	1.2	27.3	29.9		24000.0	-
TOTAL MAMMAL	4	6.7	1	16.7	1.6	36.4	42.1	47.6	24000.0	95.6
Colubridae	2	3.3	1	16.7	0.1	2.3	1.3	1.5	100	0.4
Chondrichthyes	1	1.7	1	16.7	<0.1	-	-	-	-	-
U.D. Boney Fish	43	71.7	-	-	0.6	13.6	15.2		-	-
Siluriformes	3	5.0	-	-	0.1	2.3	1.3		-	-
Ariidae	3	5.0	-	-	0.1	2.3	1.3		-	-
Arius felis	1	1.7	1	16.7	0.2	4.5	2.6		250	
Bagre marinus	2	3.3	1	16.7	1.7	38.6	24.6		750	
Fundulus sp.	1	1.7	1	16.7	0.1	-	-	-	6	
TOTAL FISHES	54	90.0	4	66.7	2.7	61.4	45.0	50.9	1006	4.0
INVERTEBRATES										
U.D. Crab	8	2.1	1	0.4	0.2	-	*		*	
Geukensia demissa	9	2.4	6	2.5	28.2	3.6	8.8	2.6	43.2	
Crassostrea virginica	93	24.9	51	21.0	468.7	59.8	65.8	19.6	104.3	
Tagelus plebeius	123	33.0	64	26.3	112.1	14.3	205.6	61.3	1103.4	
Mercenaria sp.	0	-	1	0.4	44.8	5.7	11.4	3.4	20	
Littorina irrorata	139	37.3	119	49.0	129.2	16.5	43.5	13.0	64.3	
Ilyanassa obsoleta	1	0.3	1	0.4	1.1	0.1	0.4	0.1	0.4	
TOTAL VERTEBRATE	60	13.9	6	2.4	4.4	0.6	88.4	20.9	25106	94.9
TOTAL INVERTEBRATE	373	86.1	243	97.6	784.2	99.4	335.5	79.1	1335.6	5.1
TOTAL FAUNA	433	100.1	249	100.0	788.6	100.0	423.9	100.0	26441.6	100.0
TOTAL TERRESTRIAL	6	1.4	2	0.8	1.7	0.2	43.4	10.2	24100	91.1
TOTAL AQUATIC	427	98.6	247	99.2	786.9	99.8	380.5	89.8	2341.6	8.9
TOTAL FAUNA	433	100.0	249	100.0	788.6	100.0	423.9	100.0	26441.6	100.0

U.D. Bone = 4.5% of total bone
U.D. Shell = 31.6% of total shell

*Meat Weight data not available

TABLE 6

SPECIES LIST FOR LEVEL C2, SQUARE 304N, 308E

TYPE	COUNT		MNI		WEIGHT		MINIMUM MEAT WEIGHT		MAXIMUM MEAT WEIGHT	
	#	%	#	%	grams	%	grams	%	grams	%
VERTEBRATES										
Procyon lotor	1	1.2	1	7.7	0.1	4.0	4.0		2690	
Odocoileus virginianus	1	1.2	1	7.7	0.3	12.0	9.7		24000	
TOTAL MAMMAL	2	2.4	2	15.4	0.4	16.0	13.7	20.3	26690	90.1
U.D. Bird	1	1.2	1	7.7	<0.1	-	-	-	500	1.7
U.D. Turtle	2	2.4	1	7.7	0.1	4.0	13.1		140	
Colubridae	2	2.4	1	7.7	0.1	4.0	1.3		100	
TOTAL REPTILE	4	4.7	2	15.4	0.2	8.0	14.4	21.3	240	0.8
Chondrichthyes	1	1.2	-	-	<0.1	-	-	-	*	
Rajiformes	3	3.6	1	7.7	<0.1	-	-	-	*	
U.D. Boney Fish	51	60.0	-	-	1.0	40.0	24.0		-	-
Clupeidae	5	5.9	-	-	<0.1	-	-	-	-	-
Brevoortia sp.	4	4.7	2	15.4	0.1	4.0	3.1		113	
Siluriformes	4	4.7	1	7.7	0.3	12.0	4.0		-	-
Ariidae	4	4.7	1	7.7	0.3	12.0	4.0		100	
Fundulus sp.	1	1.2	1	7.7	<0.1	-	-	-	6	
Sparidae/Sciaenidae	1	1.2	-	-	<0.1	-	-	-	-	-
Leiostomus xanthurus	1	1.2	1	7.7	<0.1	-	-	-	85	
Micropogonias undulatus	2	2.4	1	7.7	<0.1	-	-	-	5	
Pogonias cromis	1	1.2	1	7.7	0.2	8.0	4.4		4000	
TOTAL ALL FISH	78	91.8	8	61.5	1.9	76	39.5	58.4	4199	14.2
INVERTEBRATES										
Crab	34	4.9	1	0.2	0.7	-	*		*	
Geukensia demissa	26	3.7	10	2.4	99.5	2.3	24.2	3.3	72.4	
Crassostrea virginica	176	25.3	101	23.9	1745.6	76.3	234.7	32.4	189.8	
Tagelus plebeius	254	36.5	136	32.2	216.2	9.4	393.4	54.3	1815.6	
Mercenaria sp.	0	-	1	0.2	26.0	1.1	6.8	0.9	15	
Littorina irrorata	203	29.2	170	40.3	198.6	8.7	65.1	9.0	85.7	
Nassarius sp.	1	0.1	1	0.2	<0.1	-	-	-	-	
Llyanassa obsoleta	2	0.3	2	0.5	1.3	0.1	0.5	0.1	0.5	
TOTAL VERTEBRATES	85	10.9	13	3.0	2.5	0.1	67.6	8.5	29629	93.1
TOTAL INVERTEBRATES	696	89.1	422	97.0	2287.9	99.9	724.7	91.5	2179	6.9
TOTAL FAUNA	781	100.0	435	100.0	2290.4	100.0	792.3	100.0	31808	100.0
TOTAL TERRESTRIAL	4	0.5	3	0.7	0.5	-	15.0	1.9	25290	79.9
TOTAL AQUATIC	774	99.5	430	99.3	2289.8	99.98	764.2	98.1	6378	20.1
TOTAL FAUNA	778	100.0	433	100.0	2290.3	100.0	779.2	100.0	31668	100.0

U.D. Bone = 0.5g (16.7% of total bone)
U.D. Shell = 513.6g (18.3% of total shell)

*Meat Weight data not available.

TABLE 7

SPECIES LIST FOR LEVEL D, SQUARE 304N 308E

TYPE	COUNT #	COUNT %	MNI #	MNI %	WEIGHT grams	WEIGHT %	MINIMUM MEAT WEIGHT grams	MINIMUM MEAT WEIGHT %	MAXIMUM MEAT WEIGHT grams	MAXIMUM MEAT WEIGHT %
VERTEBRATES										
U.D. Mammal	11	15.9	-	-	1.1	33.3	27.8		-	-
Procyon lotor	1	1.5	1	12.5	0.3	9.1	9.7		2690	
TOTAL MAMMAL	12	17.4	1	12.5	1.4	42.4	38.5	59.9	2690	77.4
U.D. Lizard	1	1.5	-	-	<0.1	-	-	-	-	-
Iguanidae	1	1.5	1	12.5	<0.1	-	-	-	15	
TOTAL REPTILE	2	2.9	1	12.5	<0.1	-	-	-	15	0.4
U.D. Boney Fish	35	50.7	-	-	0.3	9.1	8.2		-	-
Siluriformes	5	7.2	-	-	0.1	3.0	1.3		-	-
Ariidae	1	1.5	-	-	<0.1	-	-	-	-	-
Bagre marinus	5	7.2	1	12.5	1.0	30.3	14.1		375	
Fundulus sp.	1	1.5	1	12.5	<0.1	-	-	-	6	-
Sparidae/Sciaenidae	1	1.5	-	-	<0.1	-	-	-	-	-
Sciaenidae	2	2.9	-	-	<0.1	-	-	-	-	-
Bairdiella/Stellifer	1	1.5	1	12.5	<0.1	-	-	-	46.9	
Cynoscion sp.	1	1.5	1	12.5	0.1	3.0	2.2		325	
Micropogonias undulatus	1	1.5	1	12.5	<0.1	-	-	-	5	
Mugil sp.	2	2.9	1	12.5	<0.1	-	-	-	12.1	
TOTAL ALL FISH	55	79.7	6	75.0	1.5	45.5	25.8	40.1	770	22.2
INVERTEBRATES										
Crab	7	2.2	1	0.5	0.2	<0.1	*		*	
Geukensia demissa	3	0.9	3	1.4	34.0	3.4	10.2	2.5	21.7	
Crassostrea virginica	55	17.1	28	13.3	594.1	58.8	82.8	20.5	69.5	
Tagelus plebeius	121	37.7	62	29.4	129.3	12.8	236.8	58.6	1150.1	
Mercenaria sp.	2	0.6	2	0.9	106.9	10.6	25.8	6.4	72.6	
Littorina irrorata	132	41.1	114	54.0	145.2	14.4	48.5	12.0	63.4	
Busycon canaliculatum	1	0.3	1	0.5	0.3	<0.1	-	-	1.5	
TOTAL VERTEBRATES	69	17.7	8	3.7	2.9	0.3	64.3	13.7	3475	71.6
TOTAL INVERTEBRATES	321	82.3	211	96.3	1010.0	99.7	404.1	86.3	1378.8	28.4
TOTAL FAUNA	390	100.0	219	100.0	1012.9	100.0	468.4	100.0	4853.8	100.0

U.D. Bone = 0.4g (12.1% of total bone)
U.D. Shell = 256.9g (20.3% of total shell)

*Meat Weight data not available.

TABLE 8

SPECIES LIST FOR LEVEL D2, SQUARE 304N 308E

TYPE	COUNT #	COUNT %	MNI #	MNI %	WEIGHT grams	WEIGHT %	MINIMUM MEAT WEIGHT grams	MINIMUM MEAT WEIGHT %	MAXIMUM MEAT WEIGHT grams	MAXIMUM MEAT WEIGHT %
VERTEBRATES										
U.D. Mammal	2	5.6	-	-	0.9	9.7	23.6		-	-
U.D. Large Mammal	1	2.8	1	16.7	3.4	36.6	69.6		24000	
<u>Sciurus</u> sp.	1	2.8	1	16.7	0.1	1.1	4.0		250	
TOTAL MAMMAL	4	11.1	2	33.3	4.4	47.3	97.2	93.4	24250	97.3
U.D. Bird	2	5.6	1	16.7	0.1	1.1	2.5	2.4	500	2.0
U.D. Lizard	1	2.8	1	16.7	<0.1	-	-	-	15	0.1
U.D. Boney Fish	22	61.1	1	16.7	0.1	1.1	3.1		20.5	
Ariidae	2	5.6	1	16.7	0.1	1.1	1.3		150	
TOTAL ALL FISH	29	80.6	2	33.3	0.2	2.2	4.4	4.2	170.5	0.7
INVERTEBRATES										
Crab	23	12.3	1	0.8	0.8	0.1	*		*	
<u>Geukensia demissa</u>	7	3.7	4	3.4	11.4	1.7	4.3	2.1	28.8	
<u>Crassostrea virginica</u>	38	20.3	22	18.5	427.0	64.1	60.1	29.9	40.2	
<u>Tagelus plebeius</u>	46	24.6	23	19.3	45.7	6.9	84.8	42.1	370.0	
<u>Mercenaria</u> sp.	2	1.1	3	2.5	104.4	15.7	25.2	12.5	49.8	
<u>Littorina irrorata</u>	68	36.4	65	54.6	75.9	11.4	26.4	13.1	34.6	
<u>Nassarius</u> sp.	1	0.5	1	0.8	<0.1	-	<0.1	-	<0.1	-
<u>Ilyanassa obsoleta</u>	2	1.1	2	1.7	1.3	0.2	0.5	0.2	0.5	
TOTAL VERTEBRATES	36	16.1	6	4.8	9.3	1.4	104.1	50.6	24935.5	97.9
TOTAL INVERTEBRATES	187	83.9	119	95.2	666.5	98.6	201.3	49.4	523.9	2.1
TOTAL FAUNA	223	100.0	125	100.0	675.8	100.0	305.4	100.0	25459.4	100.0

U.D. Bone = 0.3g (17.6% of total bone)
U.D. Shell = 147.6g (18.2% of total shell)

*Meat Weight data not available.

TABLE 9

SPECIES LIST FOR FEATURE 1, SQUARE 304N 308E

TYPE	COUNT		MNI		WEIGHT		MINIMUM MEAT WEIGHT		MAXIMUM MEAT WEIGHT	
	#	%	#	%	grams	%	grams	%	grams	%
VERTEBRATES										
U.D. Small Mammal	1	1.1	1	11.1	<0.1	-	-	-	250	34.0
U.D. Lizard	1	1.1	1	11.1	<0.1	-	-	-	15	2.0
U.D. Boney Fish	64	71.1	-	-	0.7	77.8	17.4		-	-
Clupeidae	13	14.4	-	-	<0.1	-	-	-	-	-
Brevoortia sp.	1	1.1	1	11.1	<0.1	-	-	-	56.5	
Siluriformes	1	1.1	1	11.1	0.1	11.1	1.3		260.5	
Fundulus sp.	3	3.3	1	11.1	<0.1	-	-	-	6	
Leiostomas xanthurus	2	2.2	2	22.2	<0.1	-	-	-	90	
Micropogonias undulatus	1	1.1	1	11.1	0.1	11.1	2.2		45	
Mugil sp.	3	3.3	1	11.1	<0.1	-	-	-	10.2	
TOTAL ALL FISH	88	97.8	7	77.8	0.9	100.0	20.9	100.0	470.6	64.0
INVERTEBRATES										
Crab	68	57.6	2	5.6	2.3	2.5	*		*	
Geukensia demissa	1	0.8	1	2.8	3.4	3.8	1.6	3.2	7.2	
Crassostrea virginica	8	6.8	4	11.1	35.7	39.5	5.5	10.9	5.3	
Tagelus plebeius	23	19.5	12	33.3	17.7	19.6	33.2	65.7	143.9	
Mercenaria sp.	1	0.8	1	2.8	15.5	17.2	4.2	8.3	19.6	
Littorina irrorata	16	13.6	15	41.7	15.7	17.4	6.0	11.9	7.4	
Nassarius sp.	1	0.8	1	2.8	<0.1	-	-	-	-	-
TOTAL VERTEBRATES	90	43.3	9	20.0	0.9	1.0	20.9	29.3	735.6	80
TOTAL INVERTEBRATES	118	56.7	36	80.0	90.3	99.0	50.5	70.7	183.4	20.0
TOTAL FAUNA	208	100.0	45	100.0	91.2	100.0	71.4	100.0	919.0	100.0

U.D. Bone = 0.5g (35.7% of total bone)
U.D. Shell= 23.5g (20.7% of total shell)

*Meat Weight data not available.

TABLE 10

SPECIES LIST FOR FEATURE 6, SQUARE 304N 312E

TYPE	COUNT		MNI		WEIGHT		MINIMUM MEAT WEIGHT		MAXIMUM MEAT WEIGHT	
	#	%	#	%	grams	%	grams	%	grams	%
VERTEBRATES										
U.D. Mammal	1	7.7	1	50.0	0.1	50.0	4.0	56.3	250	72.9
U.D. Boney Fish	11	84.6	-	-	0.1	50.0	3.1	43.7	-	-
Siluriformes	1	7.7	1	50.0	<0.1	-	-	-	92.9	
TOTAL ALL FISH	12	92.3	1	50.0	0.1	50.0	3.1	43.7	92.9	27.1
INVERTEBRATES										
Crab	6	9.4	1	2.9	0.1	0.1	*		*	
Geukensia demissa	4	6.3	2	5.9	14.1	10.6	5.1	7.6	14.4	
Crassostrea virginica	18	28.1	8	23.5	78.5	58.9	11.7	17.5	7.7	
Tagelus plebeius	22	34.4	11	32.4	23.5	17.6	43.9	65.7	105.9	
Mercenaria sp.	1	1.6	1	2.9	5.5	4.1	1.6	2.4	3.9	
Littorina irrorata	13	20.3	11	32.4	11.5	8.6	4.5	6.7	5.4	
TOTAL VERTEBRATES	13	16.9	2	5.6	0.2	0.1	7.1	9.6	342.9	71.4
TOTAL INVERTEBRATES	64	83.1	34	94.4	133.2	99.9	66.8	90.4	137.3	28.6
TOTAL FAUNA	77	100.0	36	100.0	133.4	100.0	73.9	100.0	480.2	100.0

U.D. Bone = 0.1g (33.3% of total bone)
U.D. Shell = 38.2g (22.3% of total shell)

*Meat Weight data not available.

TABLE 11

SPECIES LIST FOR FEATURE 7, SQUARE 306N 312E

TYPE	COUNT		MNI		WEIGHT		MINIMUM MEAT WEIGHT		MAXIMUM MEAT WEIGHT	
	#	%	#	%	grams	%	grams	%	grams	%
VERTEBRATES										
U.D. Mammal	1	5.6	1	16.7	0.6	33.3	17.0	25.9	250	36.5
<u>Terrapene carolina</u>	1	5.6	1	16.7	0.8	44.4	39.4	60.1	140	20.4
U.D. Boney Fish	12	66.7	-	-	0.2	11.1	5.7		-	-
Siluriformes	1	5.6	1	16.7	0.1	5.6	1.3		194.4	
<u>Fundulus</u> sp.	1	5.6	1	16.7	<0.1	-	-	-	6	
<u>Leiostomus xanthurus</u>	1	5.6	1	16.7	<0.1	-	-	-	30	
<u>Micropogonias undulatus</u>	1	5.6	1	16.7	0.1	5.6	2.2		65	
TOTAL ALL FISH	16	88.9	4	66.7	0.4	22.2	9.2	14.0	295.4	43.1
INVERTEBRATES										
Crab	8	5.8	1	1.2	0.2	<0.1	*		*	
<u>Geukensia demissa</u>	1	0.7	1	1.2	13.5	2.9	4.9	3.8	7.2	
<u>Crassostrea virginica</u>	44	32.1	24	28.2	366.8	79.1	51.9	40.3	56.5	
<u>Tagelus plebeius</u>	41	29.9	23	27.1	28.9	6.2	53.9	41.8	330.5	
<u>Mercenaria</u> sp.	0	-	1	1.2	17.0	3.7	4.6	3.6	15	
<u>Littorina irrorata</u>	42	30.7	34	40.0	37.0	8.0	13.5	10.5	15.9	
<u>Nassarius</u> sp.	1	0.7	1	1.2	0.1	<0.1	<0.1	-	-	-
TOTAL VERTEBRATES	18	11.6	6	6.6	1.8	0.4	65.6	33.7	685.4	61.7
TOTAL INVERTEBRATES	137	88.4	85	93.4	463.5	99.6	128.9	66.3	425.1	38.3
TOTAL FAUNA	155	100.0	91	100.0	465.3	100.0	194.5	100.0	1110.5	100.0

U.D. Bone = 2.4g (57.1% of total bone)
U.D. Shell = 129.0g (21.8% of total shell)

*Meat Weight data not available.

TABLE 12

SPECIES LIST FOR 38BU19

TYPE	COUNT		MNI		WEIGHT		MINIMUM MEAT WEIGHT		MAXIMUM MEAT WEIGHT		MAXIMUM MEAT WEIGHT 2	
	#	%	#	%	grams	%	grams	%	grams	%	grams	%
VERTEBRATES												
U. D. Mammal	17	4.6	-	-	3.1	17.6	64.6	16.9	-	-	-	-
U.D. Large Mammal	3	0.8	-	-	4.6	26.1	89.0	23.3	-	-		
U.D. Small Mammal	1	0.3	-	-	<0.1	-	<0.1	-	-	-	-	-
Sciurus sp.	1	0.3	1	4.0	0.1	0.6	4.0	1.0	250	0.7	250	7.5
Procyon lotor	2	0.6	1	4.0	0.4	2.3	12.2	3.2	2690	7.7	71.2	2.1
Odocoileus virginianus	1	0.3	1	4.0	0.3	1.7	9.7	2.5	24000	68.7	93.7	2.8
TOTAL MAMMAL	25	6.8	3	12.0	8.5	48.3	179.5	47.0	26940	77.1	414.9	12.4
U.D. Bird	3	0.8	1	4.0	0.1	0.6	2.5	0.7	500	1.4	500	1.4
U.D. Turtle	2	0.6	-	-	0.1	0.6	13.1	3.4	-	-	-	-
Terrapene carolina	1	0.3	1	4.0	0.8	4.5	39.4	10.3	140	0.4	140	4.2
U.D. Lizard	3	0.8	-	-	<0.1	-	-	-	-	-	-	-
Iguanidae	1	0.3	1	4.0	<0.1	-	-	-	15	<0.1	15	0.4
Colubridae	4	1.1	1	4.0	0.2	1.1	2.5	0.7	100	0.3	100	3.0
TOTAL REPTILE	11	3.0	3	12.0	1.1	6.3	55.0	14.4	255	0.7	255	7.6
Chondrichthyes	2	0.6	-	-	<0.1	-	-	-	-	-	-	-
Rajiformes	3	0.8	1	4.0	<0.1	-	-	-	*		*	
U.D. Boney Fish	238	65.0	-	-	3.0	17.0	64.2	16.8	-	-	-	-
Clupeidae	18	4.9	-	-	<0.1	-	-	-	-	-	-	-
Brevoortia sp.	5	1.4	3	12.0	0.1	0.6	3.1	0.8	169.5	0.5	169.5	5.1
Siluriformes	15	4.1	-	-	0.7	4.0	9.7	2.5	-	-	-	-
Ariidae	10	2.7	-	-	0.5	2.8	6.8	1.8	-	-	-	-
Arius felis	1	0.3	1	4.0	0.2	1.1	2.6	0.7	250	0.7	250	7.5
Bagre marinus	7	1.9	2	8.0	2.7	15.3	39.8	10.4	1125	3.2	1125	33.7
Fundulus sp.	7	1.9	1	4.0	0.1	0.6	3.1	0.8	6	<0.1	6	0.2
Sparidae/Sciaenidae	2	0.6	-	-	<0.1	-	-	-	-	-	-	-
Sciaenidae	2	0.6	-	-	<0.1	-	-	-	-	-	-	-
Bairdiella/Stellifer	1	0.3	1	4.0	0.1	0.6	2.2	0.6	46.9	0.1	46.9	1.4
Cynoscion sp.	1	0.3	1	4.0	0.1	0.6	2.2	0.6	325	0.9	325	9.7
Leiostomus xanthurus	4	1.1	2	8.0	0.1	0.6	2.2	0.6	115	0.3	115	3.4
Micropogonias undulatus	5	1.4	4	16.0	0.2	1.1	4.4	1.2	120	0.3	120	3.6
Pogonias cromis	1	0.3	1	4.0	0.2	1.1	4.4	1.2	4000	11.4	4.4	0.1
Mugil sp.	5	1.4	1	4.0	<0.1	-	-	-	11.2	<0.1	11.2	0.3
TOTAL ALL FISH	327	89.3	18	72.0	7.9	44.9	144.7	37.9	7248.6	20.7	2173	65.0
INVERTEBRATES												
Crab	154	8.2	4	0.4	4.5	0.1	*		*		*	
Geukensia demissa	41	2.2	21	1.9	204.1	3.8	59.1	3.1	151.2	2.5	151.2	2.5
Crassostrea virginica	432	23.1	226	20.4	3716.4	68.4	512.5	26.8	452.0	7.6	452.0	7.6
Tagelus plebeius	630	33.7	327	29.5	573.4	10.6	1051.6	55.0	4970.4	83.1	4970.4	83.1
Mercenaria sp.	6	0.3	7	0.6	320.1	5.9	79.6	4.2	145.9	2.4	145.9	2.4
Littorina irrorata	598	32.0	512	46.3	613.1	11.3	207.5	10.9	256.0	4.3	256.0	4.3
Nassarius sp.	4	0.2	4	0.4	0.1	<0.1	<0.1	-	-	-	-	-
Ilyanassa obsoleta	5	0.3	5	0.5	3.6	0.1	1.4	0.1	1.4	<0.1	1.4	<0.1
Busycon canaliculatum	1	<0.1	1	0.1	0.3	<0.1	<0.1	-	1.5	<0.1	1.5	<0.1

TABLE 13

SPECIES LIST OF NON-FOOD MOLLUSCS, 38BU19

Type	Count	MNI	Weight
Balanus sp.	-	-	1.3g
Mytilidae	2	1	0.1g
cf. Astarte nana	2	-	0.1g
Astarte nana	6	4	0.1g
Urosalpinx sp.	1	1	0.1g
Mitrella lunata	1	1	0.1g
Olivella sp.	1	1	0.1g
Odostomia impressa	75	75	0.5g
Melampus bidentatus	1	1	0.1g
Land Snails	68	44	1.3g

most likely been distributed among several parts of a village. At the Kings Bay archeological site on the Georgia coast, several deer bone fragments were recovered from a very large sample area but were quite scattered across the entire site and actually amounted to only one MNI (Quitmeyer, personal communication).

The same case may apply to site 38BU19. Even if other bones of the larger animal were present in adjacent unexcavated pits, more samples taken to recover the bones of the same large individual would necessarily include several more individuals of smaller animals. It was therefore assumed that the whole individual for each large animal was not represented in such a small sample. A modified meat weight column was added to Table 12 ("Maximum Meat Weight 2"). This column is probably the most realistic of the three. The same dimensional scaling formula applies for all of the smaller animals, but meat weights for the three largest animals--deer, raccoon and black drum--were estimated by using skeletal mass allometry (to account for the unidentified mammal bone, Mammal bone weight was added to raccoon and Large Mammal bone weight was added to deer).

Results from the second Meat Weight column suggest that of the vertebrates, 65% of the usable meat came from fish, 7.6% from reptiles, and 12.4% from mammals. Of the invertebrates, 83.1% of the meat weight came from one clam species, *Tagelus plebeius*. Tagelus clam meat weights were increased dramatically from "Minimum" to "Maximum" mainly because many of its fragile shell fragments were so small they were labelled Shell and not weighed as tagelus. Therefore the maximum meat weight is probably the more realistic figure.

Because meats from different animals provide different food values, Table 14 was drawn up to convert meat weights to calories, grams of protein and milligrams of potassium. In this way both vertebrates and invertebrates can be compared together. Values for calories, protein and potassium per 100 g raw meat were taken from Watt and Merril (1963). Where values for certain animals were not listed, the value for a related animal or the average of several related animals was used and noted in the table. All taxa were evaluated for caloric values. To simplify the table, all invertebrates, but only classes within the vertebrates, were evaluated for protein and potassium levels.

Food value results varied depending on which meat weight formula was used. The formula considered most reliable in this case, the modified "Maximum Meat Weight 2," reveals that energy derived from meat sources were equally divided between vertebrates and invertebrates. Breaking this down into smaller categories, we find about 6% of the total caloric value consists of mammal, 10% bird, 3% reptile, 30% fish, 40% tagelus clams, 3% oysters and 6% other molluscs.

Discussion

First impressions of the faunal samples from site 38BU19 may lead one to believe that mulluscs were an almost exclusive meat source for the Callawassie Island Indians. The problem with molluscs is that they leave behind a bigger, unified, and perhaps more identifiable skeleton, dwarfing the smaller and fragmented skeletons of the vertebrates. Evidence provided in this report suggests the aboriginal diet consisted of about two-thirds invertebrate meat to one-third vertebrate meat by weight, or about half-and-half in terms of caloric values. Thus, while the Indians did not live exclusively on shellfish, their diet was so constructed that any study of their subsistence could not ignore the important role played by molluscs.

All the shellfish identified at site 38BU19 inhabit the intertidal areas of a marsh/estuarine environment (Abbott 1974; Emerson and Jacobson 1976). Marsh periwinkles are primarily found clinging to the marsh grass that is ubiquitous at the upper levels of the intertidal zone. Mussels can be located in the marsh grass mud. Oysters are found in great clumps on mud flats below where the marsh grass disappears. Quahog clams (like oysters) are most likely found concentrated at the mouths of tidal creeks where plenty of water flow brings many nutrients. The mud snails (*Nassarius* and its more common cousin *Ilyanassa*) are found on top of almost any intertidal mud flat. Channeled whelks can be located in the intertidal zone and shallow estuarine bay areas. The tagelus clams deserve special mention because of their major role as a food source at Callawassie Island--53% of the total meat weight (according to the modified maximum meat weight calculations) or 43% of the total caloric value.

Table 14. Site species list comparing caloric values, protein and potassium.

TYPE	Cal/ 100g	Minimum calories #	Minimum calories %	Modified Maximum calories #	Modified Maximum calories %	g Prot./ 100g	Minimum g Prot. #	Minimum g Prot. %	Modified Maximum g Prot. #	Modified Maximum g Prot. %	g K/ 100g	Minimum g K #	Minimum g K %	Modified Maximum g K #	Modified Maximum g K %
U.D. Mammal	126[1]	81.4	4.2	-	-										
U.D. Large Mammal	126	112.1	5.8	-	-										
U.D. Small Mammal	126	<0.1	-	-	-										
Sciurus sp.	126	5.0	0.3	315	3.6										
Procyon lotor	126	15.4	0.8	90	1.0										
Odocoileus virginianus	126	12.2	0.6	118	1.3										
TOTAL MAMMAL		226.1	11.7	523	5.9	21[1]	37.7	12.5	87.1	6.4	.355[7]	64	15	147	7.3
U.D. Bird	184[2]	4.6	0.2	920	10.4	23[2]	5.8	1.9	115	8.5	.315[8]	0.8	0.2	158	7.9
U.D. Turtle	89[3]	11.7	0.6	-	-										
Terrapene carolina	89	35.1	1.8	125	1.4										
U.D. Lizard	89	<0.1	-	-	-										
Iguanidae	89	<0.1	-	13	0.1										
Colubridae	89	2.2	0.1	89	1.0										
TOTAL REPTILE	89	49.0	2.5	217	2.5	20[3]	10.9	3.6	50.5	3.7		No Data			
Chondrichthyes		<0.1	-	-	-										
Rajiformes		<0.1	-	No Data											
U.D. Boney Fish	137[4]	88.0	4.6	-	-										
Clupeidae	176	<0.1	-	-	--										

Table 14 (Continued).

TYPE	Cal/ 100g	Minimum calories #	%	Modified Maximum calories #	%	g Prot./ 100g	Minimum g Prot. #	%	Modified Maximum g Prot. #	%	g K/ 100g	Minimum g K #	%	Modified Maximum g K #	%
Brevoortia sp.	176	5.5	0.3	298	3.4										
Siluriformes	103[5]	10.0	0.5	-	-										
Ariidae	103	7.0	0.4	-	-										
Arius felis	103	2.7	0.1	258	2.9										
Bagre marinus	103	41.0	2.1	1158	13.1										
Fundulus sp.	137[4]	4.2	0.2	8.2	0.1										
Bairdiella/ Stellifer	137	<0.1	-	64.3	0.7										
Cynoscion sp.	137	3.0	0.2	445	5.0										
Leiostomus xanthurus	219	4.8	0.2	252	2.9										
Micropogonias undulatus	96	4.2	0.2	115	1.3										
Pogonias cromis	137	6.0	0.3	6.0	0.1										
Mugil sp.	146	<0.1	-	16.4	0.2										
TOTAL FISH		237.1	12.3	2620.9	29.7	18	26	8.7	391	28.8	.282[4]	41	9.3	613	30.5
TOTAL BONE		516.8	26.7	4281.1	48.6		80.4	26.8	644	47.4		105.8	24	918	45.6
Geukensia demissa	95	56.1	2.3	143.6	1.6	14.4	8.5	2.8	21.8	1.6	.315	19	4.3	48	2.4
Crassostrea virginica	66	338.2	17.5	298.3	3.4	8.4	43.1	14.4	38	2.8	.121	62	14	55	2.7
Tagelus plebeius	76[6]	799.2	41.3	3777	42.9	12.6[6]	132	44.2	626	46.2	.181[6]	190	43	900	44.7
Mercenaria sp.	80	63.7	3.3	116.7	1.3	11.1	8.8	2.9	16	0.2	.311	25	5.7	45	2.2

Table 14 (Continued).

TYPE	Cal/ 100g	Minimum calories #	Minimum calories %	Modified Maximum calories #	Modified Maximum calories %	g Prot./ 100g	Minimum g Prot. #	Minimum g Prot. %	Modified Maximum g Prot. #	Modified Maximum g Prot. %	g K/ 100g	Minimum g K #	Minimum g K %	Modified Maximum g K #	Modified Maximum g K %
Littorina irrorata	76[6]	157.7	8.2	194.6	2.2	12.6[6]	26.1	8.7	32.3	0.4	.181	38	8.6	46	4.2
Ilyanassa obsoleta	76	1.1	0.1	1.1	-	12.6	0.2	0.1	0.2	-	.181	0.2	-	0.2	-
Busycon canaliculatum	76	-	-	1.1	-	12.6	-	-	0.2	-	.181	-	-	0.2	-
TOTAL SHELL		1416.0	73.3	4532.9	51.4		219.2	73.2	712.9	52.6		334	80	1094	54.4
TOTAL FAUNA		1932.8		8814.0			299.6		1356.6			440		2012.4	

[1]values for deer; used for all mammals

[2]average value of quail, duck and pheasant

[3]values for sea turtle; used for all reptiles

[4]average values for fish listed

[5]values for freshwater catfish

[6]values for "unspecified clams"

[7]value for beef (no data on wild mammals)

[8]value for turkey (no data on wild birds)

Tagelus are found intertidally in the sandy mud bottoms and banks of tidal creeks. There are usually not seen above the mud as are most of the other molluscs, but burrow tunnels underneath leaving tell-tale holes at the top. They are rather quick animals provided their tunnels hold together; collection of large quantities of these clams would require digging quickly through the mud, usually as deep as 50 cm to locate the tunnels and then the clams. Such an effort required to gather these clams shows that the island inhabitants were making a purposeful effort to collect them; tagelus gathering does not appear to be a casual undertaking or a by-product of other more important collection efforts.

The effort expended for gathering tagelus is greater than that for any of the other molluscs identified. However, tagelus has two redeeming characteristics: a high meat yield per clam and a greater ease of extracting meat from shell (as compared with the other molluscs identified). These factors probably make the gathering effort worthwhile with large concentrations of tagelus. Larson (1980) has suggested that clusters of tagelus recovered from the Pine Harbor Site, Georgia, were the result of intensive collection efforts by the Indians whenever beds of these clams were found.

The invertebrate sample from site 38BU19 does appear to be different from most coastal shell middens which are thought to consist primarily of oyster shells (Larson 1980). At least one other project has actually quantified the shells from a southeastern coastal midden. From Kings Bay, Georgia (Quitmeyer, personal communication), meat weight information is not yet available, but MNI figures reveal about the same ratio of invertebrates to vertebrates as site 38BU19. Among invertebrates, however, 80-95% were oysters and less than 1% to 10% tagelus (only one feature was exceptional in that the shell composition stood at 60% tagelus and 30% oyster). Site 38BU19 MNI figures were 30% tagelus and 20% oyster.

Several factors could contribute to the greater number of tagelus recovered from 38BU19: 1) the sample area excavated may have by chance or otherwise contained more tagelus than the rest of the site, 2) there were more tagelus clams than oysters living in the surrounding marsh, or 3) the inhabitants were purposefully selecting tagelus above other shellfish. A more detailed study of the ecosystem surrounding Callawassie Island may provide some answers as to the availability of tagelus vs. oysters. Results obtained from more excavations made in other parts of the site should tell us whether the high tagelus count is the same for the entire area.

Though just 2% of the faunal sample were vertebrates, their calculated meat weight amounted to 36% of the total. A minor portion of this came from terrestrial animals such as squirrel, raccoon, deer, bird, lizard, snake and box turtle, all relatively common inhabitants of higher land next to the marshes. Some of the bones, not counted in the tables, were identified as human. There is thus a question as to whether part of the unidentified mammal bones were also human; if so, the mammal meat contribution to the diet would have been slightly less than is shown in the tables.

Most of the vertebrates represented were fishes (72% MNI, 65% estimated meat weight); all of these can be found in estuarine or saltwater environments). Although some fish remain in the estuaries year-round, the general overall migration of fish places most out of the estuaries during the colder months (Jones, Edmunds & Associates 1981). Spring marks the increase of many juveniles, and summer is the season for the largest number of species present. Catfish and members of the drum family are most abundant in spring and summer, and rare in winter. Immature drums are particularly abundant in the spring. Although killifish and mullet inhabit the estuary year-round, they tend to move to deeper waters during the colder months.

The presence in the sample of catfish, killifish and several small, juvenile drums (*Leistomus*, *Micropogonias*) indicate a spring and/or summer fishing schedule (and probably the use of nets, baskets, or weirs to capture the smaller fish), though of course it cannot be ruled out that the Indians were fishing at other times of the year as well. Crab claws recovered in the sample also indicate spring and summer exploitation since crabs generally return to the estuary in spring and stay until fall (Jones, Edmunds & Associates 1981: 3.130).

Although most fish migrate seasonally in and out of the marsh area, there are usually some that linger behind or arrive early and others that come late or not at all. Therefore, the determination of seasonal fishing patterns by correlating faunal remains with fish migrations is often only suggestive at best. Jones, Hale and Quitmeyer (personal communication) from the Florida State Museum and the University of Florida have been developing a more precise method of determining seasonal exploitation patterns. By noting the growth lines on molluscs, particularly the hard-shelled clam (*Mercenaria* sp.), they are able to estimate the time of year in which a shell was collected (i.e., when it stopped growing). They examined nine of the *Mercenaria* valve fragments from 38BU19 and found five of them to have been collected in late spring, two in early summer, one in mid-summer and one in mid-winter. These results strengthen the argument for a concentration of fishing and gathering in the spring-summer season, though some activity may have continued at other times of the year. A larger sample of hard-shelled clams in better defined contexts could help supply a more conclusive study of seasonal procurement patterns.

Conclusions

Reliable faunal data are dependent on two important conditions: adequate recovery methods and adequate sample size. The fauna from 38BU19 were recovered using 1/16-inch mesh screen. The use of screen this size is necessary for recovering smaller fauna, especially on coastal sites where many small fishes abound. Quitmeyer and Wing (personal communication) had tested a large faunal sample from the Kings Bay archeological site on the Georgia Coast. They ran the sample through successive screens sized 1/4 inch, 1/8 inch, and 1/16 inch, and found that fish MNI increased nine times from 1/4 inch to 1/8 inch, and doubled from 1/8 inch to 1/16 inch.

Screening methods were quite adequate at site 38BU19, and certainly allowed for the recovery of some of the smaller fragments such as any from herring, killifish or lizards, otoliths from spot or very small croakers, mullet and shark/ray vertebrae, and some tagelus valve and periwinkle apex fragments. All of these were used to help determine MNI and may have been lost through a screen mesh size larger than 1/16 inch.

Some types of sample selections, as well as sample size, could be improved and expanded at site 38BU19. As stated earlier, a bone MNI count of at least a hundred is needed to predict reliable proportions of the different vertebrates in a faunal sample. An adequate sample then would require the analysis of three times more material than has been analyzed in this report. One-quarter-inch-screened material cannot be analyzed with any reliability because it would be biased toward the larger animals and in any case its results could not be compared with the results from fine-screened material.

All proveniences in this report were analyzed as a single unit not only because of inadequate vertebrate sample size, but also because of the nature of the deposits. The level samples were presumably part of the mound construction and consisted of secondary fill deposits. The burials likewise contained fill probably brought in from elsewhere. Therefore the contents of the samples could not be considered as representing specific time frames or locations. Some types of samples which do represent more distinct time frames would have to come from areas of primary deposition (such as levels from the village area, perhaps a mound "floor," or a trash pit or storage pit). Deposits such as these could be analyzed separately to provide important within-site comparisons of the faunal and other material. Hopefully, a larger faunal data base will accumulate with future excavations to lend better significance to the suggestions and estimations reached in this report.

The planned recovery and analysis of the invertebrate as well as the vertebrate material has contributed much to the understanding of the role of both types of animals as food resources at site 38BU19. The results here and at Kings Bay, Georgia, show that molluscs should no longer be overlooked or even treated lightly as a meat source in prehistoric coastal subsistence studies.

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APPENDIX IV

HUMAN REMAINS FROM 38BU19

By

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Introduction

Although an understanding of the prehistory of South Carolina is beginning to emerge from the relatively extensive excavation and survey in the state, very little is known of the physical nature of these past populations. This dearth of information stems both from the poor preservation of bone in acidic soils and the infrequent systematic search for human remains. Although a few sites in the state have yielded human burials in varying states of preservation, it has been unusual for the remains to be submitted for professional physical anthropological evaluation and analysis or adequately reported.

The human remains from 38BU19 are a pleasant exception. This is important because of the good preservation, and also because a physical anthropologist was involved in the planning phase, some aspects of the excavation, and in the restoration, preservation, analysis and reportage. Although the sample is small, it is through the accumulation of materials such as these that the larger picture of the physical and cultural mosaic can be constructed.

Archeologists have traditionally viewed human remains primarily as sources of information on migration and racial affinity, but there is a growing interest in the indirect information concerning cultural process that the bones may yield. Physical anthropologists, as well, have taken a more active role in the documentation of the interaction of environmental, biological, and cultural aspects of human life. Although this project is a tentative beginning for South Carolina, the potential for the active cooperation of archeologists and physical anthropologists in illuminating more aspects of the prehistoric and historic past is becoming more widely acknowledged (Ubelaker 1980; Rathbun 1982; Blakely 1977). The following report of the human remains excavated at 38BU19 in the spring of 1982 will, perhaps, serve as a step in the understanding of questions of population aggregation and adaptation to the coastal zone of the state during the Woodland period.

Range of Information from Human Remains

Human remains, from whatever source, deserve respect, but at the same time, the recognition of the scientific and humanistic information for the advancement of knowledge justifies their disinterment and examination in a systematic way. The invocation of the medical philosophy *Mortui viventes docent*--the dead are our teachers--seems appropriate. Skeletal remains may reflect the interaction of environmental, cultural and biological processes in direct and indirect ways. Since bone is a part of a living system, the various life processes are reflected, sometimes indirectly, in the remains.

Physical data that should be of particular importance in the study of prehistory include: demographic data (age at death, sex of individual, "racial" characters, parity of females, etc.), characteristics of growth and development, pathological or disease characters, nutritional features, and individual characters such as anomalies, stature, handedness, and individual history features.

The demographic variables have significant importance in the attempt to evaluate group size, carrying capacity of the area with a particular technology, population structure as reflected in the relative numbers of each sex dying at a particular age, and in some instances even differential access to resources and social stratification according to sex and age. Reviews of the potential, limits, and results of such analysis in relationship to archeology have been summarized (Hassan 1979, 1981; Ubelaker 1974, 1978; Weiss 1973; Swedlund and Armelagos 1976; Acsadi and Nemeskeri 1970; Blakely 1971, 1978).

Although the Callawassie skeletal remains currently are too few for a valid statistical treatment of the metric and nonmetric features, such analyses have been used in other areas to document population affinities of past populations. Key and Jantz (1981) as well as Jantz (1974) are good examples of the utility of applying osteological data to archeological problems. Berryman (1980) has also documented relationships of Late Mississippian groups in Eastern Tennessee. The metric and nonmetric characters of the skeletons from 38BU19 are summarized below in tabular form. It is important to accumulate sample sizes of at least five individuals of both sexes since it has been shown that gene flow between populations may depend upon such cultural features (Rathbun 1975). Nonmetric data have been particularly important in showing population stability through time in the Woodland period in Illinois (Buikstra 1976). Comparisons of the Callawassie metric features with preagricultural and agricultural Georgia coast groups (Larsen 1982) and with other South Carolina populations are presented in Tables 1 and 2. Extensive comparison is not possible since only postcranial remains of adults were recovered and many of the characters used for comparison are cranial.

Paleopathology, or the study of the health and disease of past populations, may illustrate some ecological features of a particular group. Since health can be taken as an indicator of ecological adjustment, the relative frequencies and types of diseases affecting a group suggest the biological response to both cultural and environmental features. The lack of disease indicators in the skeleton does not necessarily suggest health

TABLE 1

POSTCRANIAL MEASUREMENTS*
FEMALES.

VARIABLE	38BU19 F-1	38BU19 F-9	Georgia Coast Pre-Ag.	Georgia Coast Ag.	38BU9 Daw's Island	38KE12 Mulberry
FEMUR						
Head Diam.	39	39	41.1	39	40	44
Neck Vert. Diam.	27	28	27.2	25.8	--	--
Neck Horiz. Diam.	22	23	22.7	22	--	--
Max. Length	426.5	423	434	416	404	444
Midshaft Ant. Post. Diam.	23.5	24	26.7	25.2	24	28
Midshaft Transverse Diam.	25	22	24.3	23.1	22.5	27
Midshaft Circumference	74.5	73	80	76	72.5	87.5
Subtrochanteric Ant.-Post.	21	24	23.9	21.9	20.5	25
Subtroch. Transverse Diam.	28.5	30	31.7	29.3	29.17	33
Bicondylar Breadth	71	--	74.3	67.3	--	--
TIBIA						
Max. Length	--	340	367	347	321	
Midshaft Ant.-Post. Diam.	--	27	28.4	26.6	--	32
Midshaft Transverse Diam.	--	20	19.5	18.1	--	22.5
Midshaft Circumference	--	72.5	77	72	74	
FIBULA						
Max. Length	--	329	374	330	313	337
CLAVICLE						
Max. Length	--	129	141	135	132.5	--
ULNA						
Max. Length	--	241	256	247	233.25	207
RADIUS						
Max. Length	--	224	234	226	217	206
Head Diam.		20	20.3	19.1	--	--
Interosseous Crest Max.		15	15.0	14.2	--	--
Interosseous Crest Min.		10	10.0	9.6	--	--
HUMERUS						
Max. Length	--	291	306	293	277.25	296
Midshaft Max. Diam.	--	20	20.8	19.9	20	16
Midshaft Min. Diam.	--	15	14.7	14.3	15	16
Midshaft Circumference	--	58	60	57	57.25	53.75
Head Diam.	--	39.5	40.1	37.9	37.75	40
Biepicondylar Breadth		53	55.5	52.5	--	--
STATURE - centimeters	160.6	159.3	161.0	157.0	151.10	161.8

*All measurements in millimeters

since most diseases must be in a chronic state with some recovery for the bone to be affected. Highly epidemic diseases would not be reflected. Numerous models of health and disease of past and contemporary groups have been developed in medical anthropology (Wellin 1978), ecology (Armelagos et al. 1978) and for particular hypothesis testing (Hunt 1978).

TABLE 2

POSTCRANIAL MEASUREMENTS MALES

VARIABLE	38BU19 F-8	Georgia Coast Pre-Ag.	Ag.	38BU19 Daw's Island	38KE12 Mulberry
RADIUS					
Maximum Length	239	255	252	236.67	264
Head Diameter	20	22.4	21.8	--	--
Interosseous Crest Maximum	15	16.2	16.1	--	--
Interosseous Crest Minimum	12	11	11	--	--
ULNA					
Maximum Length	261	272	276	258.33	--
STATURE					
Centimeters	167.5	168.5	167.3	165.77	171.9

The major categories of diseases that frequently appear in archeologically derived samples include trauma, arthritis, infections, tumors, endocrine and nutritional deficiencies, and dental pathologies. Some pathological features cannot be linked to a specific causative agent and the correct diagnosis may remain tentative. The pathological conditions detected in the skeletons from 38BU19 are included in the individual descriptions and in the discussion of health and disease. Dietary aspects of skeletal development have received special attention by archeologists. Wing and Brown (1979) discussed the potential for reconstruction of past dietary patterns. Buikstra and Cook (1980) have given a critical evaluation of both the potential and the limitation of such factors. Huss-Ashmore et al. (1982) review the indicators and Rathbun et al. (1980), Larsen (1982) and Blakely (1980) have investigated some dietary patterns of groups in the Southeast. Although trace element analysis has potential in some areas, current techniques for strontium analysis are inappropriate since shellfish consumption invalidates the indicator of relative amounts of meat in the diet. Techniques for nitrogen analysis of skeletal remains of coastal populations are being developed (Norr 1982).

Individual characters of the skeletons are included in their individual descriptions. Although this is a small sample, a few tentative statements about muscularity and habitual body practices or work related changes are suggested.

Materials

The skeletal remains that were recovered in the spring of 1982 were first examined *in situ* at the site. This is an important step, since even with good preservation and careful excavation, some fragmentation usually occurs with archeological specimens of bone. It was especially important in this instance for the infant and child. The individual skeletons were assigned feature numbers and, hence, are reported with that designation. See the map and site plan for individual location.

Five individuals were represented by skeletal remains of varying completeness. Features 6 and 7 were complete primary inhumations, while Features 1, 8, and 9 were partial skeletons. The incomplete skeletons appear to represent some exposure and decomposition before burial with subsequent interment. This pattern of exposure and burial is consistent with the patterns of body part articulation found in other areas, especially ossuaries (Ubelaker 1974). The individual body parts, although articulated in correct anatomical position, remain in units where the ligaments, tendons and other tissues tend to hold the skeletal parts in position. This was especially evident in Features 1 and 8 where significant parts of the skeleton were missing, but the inhumation had not been disturbed. Dismemberment prior to burial would have been extremely difficult, especially since no cut marks were evident on the bone. The individual arm with the hand and wrist in correct anatomical order (Feature 8) could not have been severed from the body while it was fresh or the individual living without some cut marks at the elbow area. Feature 1, which lacked the lower limbs and the arms, also had no evident cut marks.

The inhumations represented by distinct burial pits include: Feature 1--adult female approximately 27-33 years with the skull, the lower legs and arms missing; Feature 6--an infant approximately 3 months old; Feature 7--a complete child approximately 9 years of age; Feature 8--the right arm and hand of a probable male of adult years; Feature 9--female approximately 20-25 years with portions of the skull missing.

Methods

Sex of the adults was diagnosed using a range of postcranial criteria reviewed in Stewart (1979), Ubelaker (1978), Bass (1971) and Brothwell

(1963). The innominates as well as supplementary secondary sex characters were evaluated. The male attributes of Feature 8 were primarily size and robusticity. Sex could not be determined for the subadult skeletons.

Age of adults was determined by reference to metamorphosis of the pubic symphysis (Gilbert and McKern 1973; Brooks 1955; Todd in Stewart 1979). The later stages of ephiphyseal union were also evaluated for Feature 9 (Stewart 1979; Owing et al. 1981). Age of the subadults was determined by both dental development and diaphyseal length (Ubelaker 1978; Stewart 1979).

Stature estimates of the females depended upon the formulae for Mesoamerican females by Genoves (1967) and Trotter and Gleser (1970) for Mongoloid males.

Racial criteria were significantly absent since most such features are expressed in the facial skeleton which was either missing or too fragmentary for evaluation. The morphology of the incisors, i.e. shovel-shaped, indicated Mongoloid ancestry, and the curvature and torsion of the femora were relatively marked.

The criteria for pathological conditions stem from the review by Steinbock (1976) and the new atlas by Ortner and Puschar (1981). Interpretations of the significance of the hypoplasias, Harris lines, and other nutritional indicators were based primarily on the Huss-Ashmore et al. (1982) review.

Before analysis could begin, each burial was brushed and washed with plain water. Since the bone was relatively wet when removed in the field, some fragmentation had occurred. The reconstruction and repair was time consuming, but necessary to maximize the information that could be obtained. It was fortunate that some observations such as *cribra orbitalia* had been made in the field, since the orbits and face of the child and infant had badly disintegrated. Each individual bone was then recorded and the site and feature number inscribed with water-proof ink.

Standard metric dimensions were collected from techniques described by Bass (1971), Howells (1973) and for direct comparison with Georgia coast populations from Larsen (1982). Although summaries for no other populations are available for comparisons with nonmetric traits, a series of cranial traits drawn from Berry and Berry (1967), Corruccini (1974) and Ossenberg (1976) and of postcranial traits (Finnegan 1978) were collected for comparisons as more information became available. Since much of the skeletal material in the Southeast is fragmentary, the development of the biological and genetic interpretation, as well as the standardization of recording, is important for future work.

Individual Burial Descriptions

Since not all of the inhumations were complete, individual inventories as well as the condition and characteristics are included here. Patterns of decomposition, completeness, and preservation may indicate patterns in the mortuary complex.

Feature 1

Female, age 27-32, height: 160.59 $\pm$ 3.816 cm (5'3"); right maxillary central incisor, severe attrition to top of pulp cavity, 2 hypoplasias, 1 carious lesion at crown/root juncture, and slight tartar or calculous formation. Another single rooted tooth, probably canine, was present. The hyoid body and the left greater horn was present with the cervical vertebrae. This suggests strongly that although the skull was gone, the neck was intact when the body was deposited.

The unfused manubrium of the sternum was present and the right clavicular articulation carried slight porotic lesions of possible stress origin. The posterior rim of the right articulation was also more developed and irregular which may suggest right-handedness.

Four right ribs (1 #5-10, 1 #10 or 11, and 1 #12) and the left twelfth rib were present. No pathologies were noted.

All seven cervical vertebrae were complete. The first or atlas had accessory facets for articulation with the dens. This could represent response to stress in the neck area. No cut marks were present on the vertebra for the removal of the skull. Decapitation usually involves the removal of the first two cervical vertebrae as well.

Six thoracic vertebrae are present (#1-3, 10-12). No porosity or osteophytes associated with degeneration were noted. Slight Schmorl's nodes depressions from stress were noted in the superior centra.

The complete 5 lumbar vertebrae also exhibited Schmorl's node depression on the superior and inferior centra of #1-4 which suggests marked lower back stress from bending and lifting in this age range. Small osteophytes were noted on the inferior left margins. The sacrum had sustained some damage to the lateral portions. The centrum is quite large for a female. The lumbar articulation exhibited slight degenerative lipping. The coccyx vertebrae were unfused to the sacrum.

Both innominates were present, but the left had sustained some damage to the sciatic notch area and portions of the public symphyses were missing. Female characters of the innominate include a wide sciatic notch, an elevated sacral articulation, wide sub-pubic angle, sharp ischeo-pubic ramus, and the presence of a ventral arc. Deep and irregular pre-auricular sulci, sometimes called the groove of pregnancy (Houghton 1974), and slight pubic pits suggest child bearing.

The pubic symphyses were complete enough for an evaluation of the age changes. The Gilbert-McKern standards (1973) were rated at I-2, II-13, III-2 which indicated an age of 28-32. Comparisons of the Todd standards revised by Brooks (1955) were at stage VI with an age estimate of 27-33.5 years.

Both femora were present and complete. The necks were relatively short, the shafts were curved anteriorly, and the femoral torsion was marked which suggests Mongoloid ancestry.

The lateral condyle of the distal right tibia had a number of nodules that may stem from a torn cartilage and there was also some cresting on the lateral wall of the intercondylar fossa. The left femur exhibited an area of periosteal reaction along the medial border in the upper third of the shaft just below the lesser trochanter. The reactive area was dense and smooth and elevated above the cortex to form a crest. It is likely that this is due from stress and infection to the inner thigh.

Both patellae were complete, but no remarkable conditions were noted.

Since a number of hand bones were found in a cluster in the same pit, the individual inventory was taken to determine if congruity with the rest of the skeleton could be established. The results were relatively positive, even though no articulation with the missing ulnae and radii was possible for positive association. The left hand consisted of all five metacarpals and exhibited no arthritic changes or hyperdeveloped crests like the other two adult skeletons. All eight carpals were present which suggests that the hand was fleshed when it was deposited even though no medial row phalanges were present. Number 1-3 proximal phalanges were present and the thumb distal phalanx was present. No cut marks were notable.

The first four right metacarpals were present, but no arthritis was present. The superior crests were larger than on the left, but not particularly marked in development. The second row of the carpals (lesser multangular, captate, hamate and pisiform) were present. The first four proximal row phalanges were present and unremarkable. The third medial row phalange was identified. Seven distal row phalanges of the hand were present but side could not be determined due to the absence of the medial rows for articulation. One toe phalange was also found.

Both femora were radiographed to determine if Harris lines were present which would indicate stressing of the individual from either severe nutritional deprivation or illness. Acute interruption followed by a recovery phase is necessary for the lines to form (Garn et al. 1968). No lines were present in either femur of this individual.

Feature 1 Summary

This adult female had been exposed with some decomposition before burial. Dental attrition and carious lesions at the crown root junction suggests a diet similar to hunting-gathering societies with considerable foreign material in the food. The tartar formation indicated fairly high carbohydrate content, but the calculous accumulation was not extensive. The lack of Harris lines suggests a uniform diet, rather than periodic deprivation but the hypoplasias suggest some interruption of normal growth patterns during childhood. Illness with fever would be the most probable explanation.

Childbearing is indicated by the dorsal pubic pits and the highly irregular preauricular sulcus. Considerable lower back strain, perhaps from stooping and pulling, is indicated by the Schmorl's nodes in the vertebrae centra. Some trauma had also occurred at the knee, and stress to the thigh with infection is notable. The infection was localized and does not indicate systematic involvement. Differential muscular indicators suggest that the woman was right-handed.

Feature 6

These are the complete remains of an infant who died between birth and six months and most probably around 3 months of age. The skeleton was extremely friable and considerable breakage occurred during excavation and reconstruction. Nevertheless, some information could be gleaned. The deciduous incisors exhibited the characteristic Mongoloid shovel shaping. The upper plate of the eye orbits indicated anemia at the time of death with pin point lesions or *cribra orbitalia*. An ear infection was indicated by pinpoint lesions characteristic of such infections around the ear opening. Both the anemia and the probable infection might suggest a winter birth when upper respiratory infections would be most common as well as foods for the lactating mother being deficient in iron.

Probable age at death was determined by the development of the deciduous dental crowns (Stewart 1979) and the lengths of the long bones (Ubelaker 1978; Stewart 1979). The diaphyseal lengths were in the range of 3-6 months when compared with Plains Indians and American White infants.

Although no metric or comparative data are available currently for subadults in this area, such skeletal material will be important for evaluating nutritional adequacy as well as growth rates of children during this period. Lallo and Rose (1979) have evaluated growth rates as an indicator of ecological adaptation. Ubelaker (1978) has also documented growth velocities as health indicators. The correlation of dental development with long bone length for Feature 6 suggests that the population was not unduly stressed, but no firm conclusions are possible without additional individuals. It should be stressed that it is the pattern of growth for the population, rather than individuals, that is the critical indicator. Delayed growth curves commonly have been observed in prehistoric populations, especially around the time of weaning. Some suggest that this delayed maturation may be a response to moderate under-nutrition and low nutrient availability (Huss-Ashmore et al. 1982).

Feature 7

This complete skeleton represents the remains of a child with a dental age of 8-9 years and a long bone developmental age of around 5-6 years. The difference in the two indicators suggests significant developmental stunting and growth retardation due to illness or nutritional factors, but probably from a combination of the two with illness playing the major role.

Dental age was based on the eruption and crown formation of permanent teeth as well as replacement of the deciduous teeth. The crown and root development of the permanent teeth in this individual were at a stage seen at age 8.8-9 years for modern American populations (Stewart 1979). When the development and replacement was compared with a composite American Indian developmental sequence (Ubelaker 1978), the dental age was between 8 and 9 years. The length of the diaphyses of the long bones consistently indicated 5 years of age but was in the range for 4.5-7.5 years of American Indian groups such as the Arikara and Indian Knoll, and the femur length was compatible with a late Woodland child of 7.5 years (Ubelaker 1978). The consistent shortness of the long bones indicates a general developmental retardation rather than localized interruption. Although this individual may represent a "sickly" child who obviously died quite young and may not have been typical of the population, it does document the fact that at least part of the population was subject to significant health problems. The development of the epiphyses also reflects developmental lag. The pattern of hypoplasias of the teeth reveal at least three other episodes of significant stress to the individual before age four. All permanent teeth crowns were mottled and had a marked hypoplasia at approximately three years of age. (See Buikstra and Cook 1980 for a discussion of varieties of developmental defects). The location of hypoplasias on other teeth in the Callawassie series suggests that weaning was a significant trauma to the population.

Other dental characteristics of this individual include marked shoveling to the incisors, marked calcular or tartar formation between the permanent incisors, and marked wear or attrition with dentine exposure to all the deciduous teeth, even the anterior ones.

Other pathology indicators include slight alveolar infection and porosity around the mandibular molars. The infection appears localized and no periosteal reactions of the long bones were observed. Some osteoporosis occurred on the parietals and occipital of the skull and the orbits exhibited slight *cribra orbitalia* suggestive of anemia. These characters usually are interpreted as resulting from iron deficiency anemia, particularly with groups heavily dependent on maize, but there is some evidence that phosphorous-rich shellfish and sea foods may block the normal absorption of iron available in the diet from other sources.

No comparative data are available on subadults from the coastal Southeast, but the metric and nonmetric data were collected for future comparisons. It is unfortunate that the medullary bone of the long bones had disintegrated which precluded x-ray examination of them for the evaluation of "Harris" lines and evidence of periodic stress or multiple developmental arrests. Although the teeth were worn, no caries were present.

In summary, Feature 7 was a child with marked developmental retardation who had experienced several episodes of ill health before death at approximately 8-9 years of age. Cause of death could not be determined. Dental form was definitely Mongoloid as indicated by the shovel-shaped incisors. Dental attrition was marked; no caries were present; but tartar formation was marked on the recently erupted permanent incisors. Alveolar bone infection and anemia were indicated in the skeleton as well.

Feature 8

This individual is represented by the complete right lower arm and hand except for the missing fourth middle and distal phalanges. The robusticity of the hand, ulna and radius suggests male sex and adult age. No more precise age could be determined, but the epiphyses of the long bones had united and had been so for some time. Stature estimates based on Trotter and Gleser (1970) for Mongoloid and Mexican males indicate a living height of 165-168 centimeters or approximately 5'6".

The hand and arm were articulated when they were deposited and the hand was in a contracted position. Absence of cut marks of the proximal end of the ulna and radius suggest that the arm had been detached after decomposition, but before the wrist and hand connective tissue had decomposed.

Sex was evaluated by robusticity of the bone and the muscle attachments. Since more accurate evidence for sex diagnosis was unavailable, it is possible, but not probable, that these bones represent a robust female. Although there are stress responses at the wrist and elbow, general degenerative changes associated with advanced age were not present. A probable age range is 25-35.

The most remarkable aspect of this skeleton is the robusticity that is probably associated with work activities. The olecranon fossa of the ulna has a stress rim and the radial articulation is especially marked on the inferior border. The stress pattern suggests repeated lift and pull motions rather than rotational forces. The distal posterior and lateral portions of the radius are also marked by lipping associated with physical stress. The Lister's tubercles, which separate the tendons on the back of the wrist, are marked in development. The major indicators of stress are on the back and thumb side of the hand. This interpretation is supported by the formation of rims on the navicular and lunate carpal bones which articulate between the arm and the thumb and first finger.

The first and second metacarpal bones carry distal palmar rims and nodules associated with physical stress. The second metacarpal has marked crests on the superior shaft and lateral edges. Some lipping occurs on the distal end for articulation with the proximal phalanx. All of the phalanges show robusticity, but the thumb and first finger are marked in development for the muscle insertions on the lateral borders. The distal phalanx of the first finger also has arthritic lipping on the proximal articulation. The other distal phalanges are unremarkable.

The x-ray of the radius did not reveal any Harris lines or marks of interruption of normal growth and development. The metric characters are smaller than those reported for the Georgia coast males (Larsen 1982), but are larger than females of either the agricultural or preagricultural groups. No indicators of health or disease other than physical stress to the thumb and first finger were noted.

In summary, Feature 8 is a muscular, relatively short male that habitually used the thumb and first finger with force. The pattern of stress-related change of the ulna and radius suggest lifting and pulling with the palms upward. There was no evidence of "atlatl" elbow or unilateral stress with a rotational movement.

Feature 9

The relatively complete but fragmented post-cranial skeleton and a few cranial bones with the mandible represent a female approximately 20-25 years old. Female characters include small size of the femora and humeri heads, and the pelvic morphology. Although the pubic area had deteriorated, the sciatic notch was wide, the sacral articulation was elevated, the alae or wings of the sacrum were long with the centrum relatively small, and the preauricular sulci were slightly irregular which suggests childbirth. The sulci were not as extreme as with Feature 1. The mandibular gonial angle was obtuse. The glenoid fossae of the scapulae were 31 mm long and well within the range of females (Stewart 1979).

Age was determined by the pattern of recent epiphyseal union. Although the most accurate indicator, the pubic symphysis, was missing, an upper range of 30-33 years was determined by the partial union of the medial epiphysis of the right clavicle (Owings et al. 1981). The almost complete union of the anterior iliac crest which is an upper range of 24, the recent union of the proximal epiphyses which is usually fully united by age 25, and the eruption of the 3rd mandibular molars which typically occurs around 21 years more consistently establish the probable age as between 20 and 25 years.

Stature estimates from the femur and the tibia lengths indicate a height of 156-159 cm or approximately 5'2" when the formulae for Mesoamerican females from Geneves (1967) are applied.

Since a number of the bones were in fragmentary condition from decomposition and postmortem changes, the following inventory documents what was recovered. No cut marks were evident. The relative completeness of the skeleton, as well as the position noted *in situ*, suggest primary inhumation, or at least a minimum time of exposure before burial. The presence of a few fragments of another individual (innominate fragments of a probable male) suggests some disturbance or intrusion.

The mandible lacks both condyles and has had some damage to the right gonion and the anterior right incisor area. All tooth sockets were present, but only the left first two molars and premolars and the right first two molars were recovered. The teeth are extensively worn with the dentine exposed. The first molars are cupped and the second molars have extensive attrition on the buccal cusps. The dentine is exposed on the premolars.

Although attrition may slightly alter the measurements of crown size, the mesial-distal length, the buccal-lingual breadth, and the area were measured and calculated and are presented in Table 3 with comparisons to the preagricultural and agricultural groups of the Georgia coast (Larsen 1982).

No crown caries or alveolar abscesses were noted, but the attrition may have obliterated any carious lesions of the crowns. Both first molars had small interproximal carious lesions at the crown-root juncture on the anterior surface. The alveolus around the roots of the left M2 and M3 had slightly resorbed. Slight lingual tartar was present on the left premolars. Although the teeth were extensively worn, no chipping of the crown was noted, but rather abrasion from small particles in a pasty consistency rather than large particles probably contributed to the attrition.

All of the teeth present had at least one linear enamel hypoplasia and the consistent age of occurrence was around three years. Two teeth had an additional hypoplasia that was formed around age 5. These developmental defects have been attributed to both dietary deficiencies and illness at

TABLE 3

DENTAL MEASUREMENTS FEMALES

		38BU19 F-9	Georgia Coast Pre-ag.	Georgia Coast Ag.
LM2	Length	9.6	11.0	10.9
	Breadth	8.8	10.7	10.5
	Area	84.5	118.0	114.7
LM1	Length	10.1	11.4	11.2
	Breadth	10.2	11.2	11.0
	Area	103.0	128.4	123.6
LP4	Length	6.0	6.7	6.8
	Breadth	7.2	8.2	8.3
	Area	43.2	53.4	56.4
LP3	Length	5.9	6.8	6.8
	Breadth	6.5	7.7	8.0
	Area	38.4	52.7	54.0
RM1	Length	10.2		
	Breadth	9.8		
	Area	100.0		
RM2	Length	9.8		
	Breadth	9.6		
	Area	94.1		

the time the tooth bud was forming. The formation at approximately age 3 may suggest weaning at that time with accompanying dietary reduction and increase in diarrhea and gastro-intestinal infestions (Goodman et al. 1980).

The postcranial bones were also fragmentary in some instances. The left humerus included only the proximal half and the distal trochlea. Slight porosity on the trochlea indicates some stress, but the radial insertions are slight to medium in size. The lines of epiphyseal union were still slightly visible. The right humerus was complete with medium radial insertions. The right capitulum exhibited slight porosity from stress-induced changes, but the head had no porosity or osteophyte formation.

The right ulna lacked the coronoid from postmortem breakage. Slight osteophytes occurred around the radial notch. The left ulna was complete with fibrous porosity of the radial notch. The bilateral stress indicators suggest approximately equal use of the arms. The left radius was complete with recent union of the epiphyses. The interosseous crest is marked, and the Lister's tubercles are highly developed. The head is slightly porous and lipping occurs on the ulnar notch. The radial tuberosity for muscle insertion is large and rough. The right radius lacks the distal articulation, but the interosseous crest is well developed. The distal third of both the right radius and ulna exhibit periosteal elevation and pinpoint lesions from probable infection of the posterior or back side of the lower arm.

Both clavicles are present with medium ligament development. The medial epiphyses have only partially fused. The accromial shape and the curve of the lateral shaft suggest significant pulling action of the upper arms. This is supported by the porosity in the anterior and lower portions of the glenoid fossa of the scapulae. The circumflex sulcus of the scapular body is also marked. Right-handedness is suggested by the differential rim development and beveling of the posterior border of the glenoid fossa (Stewart 1979).

The manubrium was extremely fragmentary so no changes at the clavicular articulation could be observed. The hands were represented by all the left carpal bones except for the pisiform, the first four complete metacarpals and the proximal half of the fifth. Ten proximal row phalanges, three medial row, and six distal phalanges were present, but side was not determined. The right carpals included the navicular and the greater and lesser multangulars. These wrist bones had marked lipping around the facets from physical stress. The left side was not affected. The right fifth metacarpal or little finger side of the palm was very distinctive and muscular and may have been fractured. The superior and lateral borders had marked crests for muscle attachment and tendons. This pattern is similar in degree to that for the male (Feature 8) but was on the outside of the hand rather than on the first finger. The proximal row phalanx number 2 (first finger) was robust with crests and muscle attachments.

Both innominates were present with recent and partial union of the ilium and ischio-pubic epiphyses. The upper segment of the acetabular articulations with the femur in both bones were marked with porous lesions and slight lipping on the upper border. Slightly irregular preauricular sulci suggest childbearing, but the change is not marked. The right innominate exhibits the results of trauma with bone reaction just behind and superior to the sacral articulation. The same changes were noted on the right sacral ala and last lumbar vertebra. The remodeled bone on the sacrum is highly irregular with pits and lipping in an oval elevation approximately 3 cm in diameter. This is an area for the superior posterior-sacro iliac ligament. Considerable trauma had occurred and some limitation of mobility is probable. The changes of the fifth lumbar vertebra lateral process articulate with the changes in the sacrum. No osteophyte formation had occurred at the rim of the sacral centra or on the fifth lumbar vertebra.

Both femora were present, but the left had to be reconstructed from extensive breakage. Both slightly bowed anteriorly and showed medium head and neck torsion. The left bone was unremarkable, but the right had an area of raised periosteal reaction on the medial crest of the upper third of the shaft. The reactive bone was on the posterior-medial crest and covered an area 11 x 25 mm in an elongated crest. The infection was probably from trauma to the inner part of the back of the thigh just below the buttocks. The lateral condyle of the right distal femur also exhibited porous lesions on the tibial articulation. However, no similar lesions were found on the tibia. Both patella were present and had irregular articular surfaces, but no lipping or porosity.

Both tibiae were present and the proximal epiphyseal lines were still visible. The right bone lacked the distal end from postmortem breakage. Two areas of periosteal reaction were noted. One occurs around the nutrient foramen in an oval 3 x 1.5 cm along the lateral side of the popliteal line. Another approximately circular area 1 cm in diameter was noted at the midshaft on the posterior surface. This reaction is elevated and striated. The left fibula was complete and unremarkable, and the right fibula was represented only by the midshaft.

Only five cervical vertebra were present. Numbers one and two were missing and may have been displaced with the skull. No cut marks are noted. All 12 thoracic vertebrae are present with recent union of the epiphyseal plates. Stress to the back is indicated by Schmorl's node herniation of the discs on the superior centrum of number 4, the inferior surface of number 11, and on both the superior and inferior central of number 12. The lumbar vertebrae are unusual in that there are 6 represented, or more precisely there is an extra lower back vertebrae. The vertebrae articulate precisely so no commingling is indicated. The first four have Schmorl's nodes on both surfaces, but numbers 5 and 6 lack such nodes. Number 6, which articulates with the sacrum, is unusual with a pathological condition on the right inferior transverse process. The trauma with articulation of the sacrum had produced a slight bridge and an irregular oval of remodeled bone with pits and crests approximately 2 x 1 cm in size. No osteophytes occur on the centrum of the vertebra.

All ribs from both sides are present but fragmented. No pathology or unusual features are noted.

The feet are represented by the right navicular, the left calcaneous with a double articular facet, the left cuboid, both first cuneiforms, and one left second or third cuneiform. Two proximal row and two middle row toe phalanges were present. The left talus was recovered in the fill of level A in pit 306N, 308E, along with the left third mandibular molar, portions of the sacrum and some phalanges. This area of recovery supports the interpretation of disturbance of the skull and the foot area after burial.

Besides trauma, infection, and anomalous extra lumbar vertebra, enamel hypoplasia occurred on the teeth at approximately 3-4 years of age and the distal end of the right femur, left tibia, and right radius exhibited a Harris line which formed during normal growth interruption and recovery around age 12-14. Although this individual was relatively young at death, she had experienced considerable stress of both physical and environmental origin.

Both femora, both patella, the left calcaneous, and the right fibula shaft were sacrificed for C-14 dating.

Mound Fill

Although the individual trenches, units and levels were not totally correlated, portions of at least six additional probable males, two additional females, one subadult around 12-14 years, and two other children were present (Table 4). The individual fragments could not be matched from one area to another, but the nature of the site suggests considerable mixing of the material with not much consistent deposition of the individual parts or segments. The pattern suggests idiosyncratic deposition of decomposed remains rather than disturbance of earlier buried individuals. The few pieces of charred human remains appear to have been buried after fragmentation rather than when whole or fleshed. No cut marks were noted on any of the material.

The fragmentation of the human bone found throughout the trenches at different levels makes definite conclusions impossible. Nonetheless, the patterns of biocultural features are congruent with those of the burials. Mechanical stress at the joints was noted, especially at the hip of one robust male and lower back strain was indicated by the Schmorl's nodes. The fused cervical vertebrae and the degenerative change of the tarsal phalanges were not noted in the articulated skeletons. Dental attrition was marked with one adult molar not so extensively worn as to abrade away crown and buccal caries. Some of the mandibular sockets indicated abcessing as a probable contributing factor to tooth loss. The long bone fragments appeared robust with marked muscle insertion areas and a few instances of localized infection with periosteal reaction were noted. The probable male frontals and the porosity of the outer table of the posterior skull fragments suggested the presence of slight anemia.

Summary and Conclusions

The human remains from 38BU19 provided an opportunity for a tentative start on building a cooperative bridge between archeological and physical anthropological research in South Carolina. Although both subdisciplines have emphasized their traditional interests for a long time, physical anthropologists are extending their interest from human biology and morphology to questions of the biocultural nature of these earlier peoples. Conversely, archeologists have recognized the potential for understanding cultural process through an examination of the effects of the cultural and ecological systems upon the carriers of culture; people themselves. The approach has been successfully illustrated in other areas of the Southeast (cf. Blakely 1977).

Although the sample size is small, this pivotal time at the transition of preagricultural life on the South Carolina coast provided an opportunity to examine and evaluate biocultural changes documented in other areas and times.

The demographic characters of the inhumations of Callawassie Island are comparable to those often seen in early agricultural groups. If the inhumations at Callawassie are indeed representative of the burial practices without discrimination against the inclusion of subadults, the distribution is closer to preagricultural groups than to fully agricultural ones (Larsen 1982). In the latter groups, higher infant mortality is usually the case. It should be noted that both females reflected child-bearing. The average age at death for the adults (28) is also intermediate between preagricultural groups (31 years) and agricultural groups (26 years) along the Georgia coast (Larsen 1982). Although no individuals of advanced age were found as inhumations, the survivorship at Callawassie is midway between the two groups. The skeletal collection also had a younger age at death than those at 38BU9 (Rathbun et al. 1980), a preagricultural group also on the coast of South Carolina. A more accurate base for comparison through the construction and comparison of life tables must await further excavation and an extension of the sample size for statistical manipulation and testing. No specific cause of death could be established for any of the Callawassie burials.

Metric dimensions and robusticity indicators suggest that the Callawassie population was closer in size to the agricultural groups along the Georgia coast than to earlier South Carolina coastal peoples (see Tables 1 and 2). Although the different dimensions show a trend for gracility, the muscle attachments are rather marked and reflect considerable mechanical stress, especially of the arm and hand. This stress is reflected in the degenerative changes of the joints and of the vertebrae. Edynak (1976) and Pickering (1979) as well as Larsen (1982) have attempted to show the relationship of physical changes with life styles. Preagricultural people frequently exhibit more changes associated with mechanical stress. Differences between the sexes and division of labor could not be examined since male data were extremely limited at Callawassie. It should be noted that stature estimates for F-8 (male) at Callawassie of 165-168 cm is closer to the preagricultural groups in Georgia (167-169 cm) and the females (F-1 and F-9) had a range of 156-160 cm which was closer to agricultural groups with a stature of 156-158 cm. This comparison should be considered with caution with such small samples.

Mechanical stress was evident in the Callawassie skeletons. The frequent Schmorl's node herniations of the vertebrae, especially the lumbars, reflect the considerable stress usually seen in preagricultural groups. The direct relation with shellfish gathering and perhaps net pulling remains to be empirically documented, but, logically, the stress to the backs of the hands and wrist, the changes in the vertebrae, and hypertrophy of the metacarpals is compatible with such activities. The pattern of degenerative changes at the joints for Callawassie females is also much closer to the preagricultural pattern documented along the Georgia coast. This is especially true for the lumbar vertebrae, wrist, and knees. The extreme development of the first finger of the adult male is also especially notable.

It is unfortunate that so few cranial and dental data were available. However, even the individual loose teeth, as well as the deciduous ones reflect a diet more compatible with preagriculture groups. The extreme dental attrition from fine particles, the lack of caries, and the pattern of wear are primary indicators. Nevertheless, the occurrence of tartar on the anterior teeth as well as the posterior teeth with some alveolar resortion and periodontoclasia documents some carbohydrate content in the diet, perhaps from acorns. The few dental measurements presented in Table

3 reflect very small teeth in comparison with other groups. No conclusions should be drawn from the single individual. The teeth of the children were not comparable since no other data were available and sex could not be determined. These teeth, as well as those isolated teeth and those in the mandible do, however, document a significant developmental interruption at approximately age 3. It is likely that these linear enamel hypoplasias developed from weaning difficulties. The relatively late age at weaning is also characteristic of preagricultural groups. Agricultural groups with a higher infant mortality rate frequently wean at a younger age. Childhood was not without risk as indicated by the multiple slight hypoplasias at other times, but the pattern was not of a cyclical nature and probably reflects illness of an idiosyncratic (individual-specific) nature.

Although the individuals from Callawassie were dying at a young age compared to modern standards, they appear relatively healthy but subject to mechanical stress. As mentioned above, weaning was a stressful time with probable accompanying diarrhea and gasto-intestinal infections. The parasite load cannot yet be established, but the coprolites may contain parasite remains. Hookworm has been documented for the area in prehistoric times (Rathbun et al. 1980). The evidence for slight anemia such as *cribra orbitalia* and cranial porosity would be compounded by such a parasitic load. The effect of phosphorous-rich seafood would also contribute to the anemia. It should be noted that the anemia was not severe and was nothing like that noted in Late Woodland groups heavily dependent upon maize.

Although both adult females exhibited some localized periosteal reaction from infection, the reaction appears to be from trauma and not from systemic afflictions. Most such infections arise from the Staphylocci and Streptococci groups (Steinbock 1976), and at Callawassie local trauma would account for the pattern of occurrence. Chronic infections were not indicated. Repeated acute infections or frequent nutritional deprivation was not evident. In contrast to the multiple occurrence of "Harris" lines among prehistoric California Indians (McHenry 1968), only one line occurred in the series: Feature 9 at approximately 12-14 years of age. The developmental retardation of the child in Feature 7 was probably due not to dietary insufficiency alone, but rather from the synergistic effects of illness and individual anomalous characters.

In sum, the skeletal material from 38BU19 reflects a relatively healthy, robust group that had successfully adapted to the ecological potential of the area. The biocultural conclusions to be drawn from the small sample suggest an intermediate character between diffuse hunter-gatherer societies and fully settled agricultural ones. Life was obviously shorter than in modern society and mechanical stress was significant. Childhood mortality was relatively high in this sample, but the general pattern is similar to that of other groups at this stage of cultural development. Chronic disease and repeated dietary insufficiencies are not indicated.

This essentially qualitative analysis of the human remains from Callawassie Island, South Carolina, has documented some of the biocultural aspects of the group. The conclusions must remain tentative until a sufficient sample size is developed for statistical manipulation and hypothesis testing. The material from sites such as this has great potential in developing our understanding of population, cultural and biological contact along the coastal region as well as with groups in the Midlands and Piedmont regions of the Southeast. Of particular interest would be comparisons between the health and disease status of these groups and evaluation of successful adaptations to different econiches. To successfully approach these biocultural questions, additional cranial and dental data are needed. The demographic structure can be examined with sufficient individuals to reconstruct life tables and survivorship curves. Several individuals in each five-year age category are needed. Growth curves of subadult material would also indicate growth velocity as well as the demographic structure. Questions of social stratification and labor divisions could be investigated for patterns of differential access to resources as indicated by health and nutrition features. Even stature has been used to evaluate this question. A number of techniques are being developed to gauge more accurately the adaptive responses to groups in different situations and times.

This report may contribute only one small piece to the total picture of the life of these prehistoric South Carolinians. Nonetheless, the individual pieces of the mosaic of prehistoric cultural and biological development must be developed before the image clears for fuller understanding.

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TABLE 4

HUMAN REMAINS FROM 38BU19: MOUND FILL

TRENCH A

302N 308E Level B 1.65
Right frontal fragment, adult male
8 cranial fragments: parietal and frontal
1 molar (#1), probably mandibular. One hypoplasia noted and tartar, dentine exposed.

302N 308E Level C 1.73
1 distal half of left adult humerus, end missing
1 right humerus trochlea, very weathered
2 adult cranial fragments; occipital, parietal
1 diaphysis fragment of adult femur
1 molar, maxillary M2 probable, dentine exposed
3 charred diaphysis fragments, probable femur

302N 308E Level D 1.975
1 right mastoid fragment, adult
1 adult proximal row toe phalanx
1 adult medial row finger phalanx fragment
1 subadult frontal fragment 12-14 years
1 subadult finger phalanx, medial row
1 subadult ilium fragment, 12-14 years
1 subadult femur distal epiphysis, 12-14 years

302N 308E Level E 2.21
1 adult tarsal cuboid

304N 308E Level A 1.19
23 adult cranial vault fragments
1 right adult zygomatic
4 right adult temporal fragments
1 right mandibular ascending ramus, adult, no mylohyoid bridge
3 basilar skull fragments
1 large adult right first molar from mandible. Crown has slight caries on occlusal surface and the buccal side.
1 very worn maxillary molar, crown almost entirely gone. Cannot represent same person as the other molar
1 crown and root fragment of mandibular premolar, dentine exposed
1 pisiform
2 tarsal phalanges
1 fragmentary talus
1 fragmentary tarsal navicular
1 proximal end metatarsal
1 fragmentary duboid

304N 308E Level C-1 1.35
1 adult fragmentary femur head and neck
2 adult long bone fragments

304N 308E Level C-1 1.35 (Cont.)

3 parietal fragments
1 distal carpal phalanx
1 mandibular symphysis: female?, pointed chin
1 right mandibular fragment with second molar. Crown is almost gone with marked tartar accumulation on buccal surface, lingual resortion
4 cranial fragments
1 fibular midshaft fragment
1 mandibular symphysis through the left first molar, male?, square chin. Tooth crown worn to roots, first premolar socket abscessed
1 left adult male frontal
1 right adult posterior parietal with foramen
7 cranial fragments
1 tarsal articular facet fragment
1 tarsal cuboid fragment
1 canine crown worn with dentine exposed, sub-gum line tartar

304N 308E Level C-2 1.45

1 left mandibular condyle, male?
1 left upper eye orbit, female?
1 parietal fragment
1 distal end first metatarsal, adult
2 adult parietal fragments

304N 308E Level C 1.70

1 adult femur midshaft fragment

304N 308E Level D-1 Feature 4B on top of D-2 1.755

1 adult left ischial tuberosity and lower acetabulum
1 adult right humerus midshaft and head
1 right temporal fragment
1 mandibular molar, heavy buccal tartar, lingual crown worn to root
1 thoracic articular facet
1 femur fragment: fit femur in Feature 4-A
1 right adult male mandible ascending ramus, mylo-hyoid bridge and gonial eversion
2 cranial fragments (1) occipital
1 left radius midshaft fragment
1 left rib fragment: arthritic change at facet
Both distal tibae articular surfaces
1 left distal femur medial articulation, arthritic lipping and porosity
1 cancellous bone fragment
1 lumbar centrum: osteophytes and porosity
4 thoracic articular facets
1 thoracic centrum: porotic

304N 308E Feature 4-A 1.80

3 adult occipital fragments with wormian bone, probable male, slight porotic lesions
Adult second and third cervical vertebrae, centra and articulations fused, probable trauma, produces some neck immobility
1 adult cervical vertebra, Nos. 6 or 7, no osteophytes

304N 308E (Feature 4-A 1.80 (Cont.)

1 adult thoracic centrum and articular facet fragment
1 adult lumbar centrum and articular facet: no osteophytes, but Schmorl's node is present in inferior body
1 rib fragment
1 very large left acetabulum, male, stress pit in upper articulation
19 fragments adult left and right femur shafts, no periosteal reactions
3 adult distal femur epiphysis fragments
2 adult proximal tibia articulation fragments
2 adult scapula fragments
1 charred cancellous bone fragment
All this material is probably from the same individual, an adult male.

304N 308E Level D Below Feature 2 1.89

1 left adult fifth metatarsal
1 small cranial fragment

304N 308E Level D 1.82

2 proximal row carpal phalanges, distal 2/3
1 proximal articulation of carpal proximal row phalanx
1 subadult femur distal epiphysis fragment
3 proximal row tarsal phalanges
1 right rib neck fragment
1 lumbar inferior articular facet: porotic
1 left mandible from Pml through second molar. First molar socket is abcessed. Probably male.
3 adult cranial fragments
1 metatarsal
1 right mandibular fragment: canine through M. The first premolar and molar are present: extensively worn, cupped with dentine exposed. 2 hypoplasias
1 adult thoracic articular facet
1 subadult vertebra centrum

304N 308E D-2 2.15

1 carpal navicular, cuneiform
1 metacarpal

304N 308E D-2 (N1/2) 2.11

1 cranial fragment
1 long bone fragment
1 hamate, small, female?

304N 308E Level E 2.23

1 left zygomatic bone
1 distal phalanx

304N 308E Features 1-A 2.17

1 left talus
Both first metatarsals
1 left second cuneiform
1 metatarsal
1 proximal row tarsal phalanx

304N 308E Feature 1-B 2.16
- 2 right metatarsals
- 1 distal row phalanx
- 1 left carpal navicular
- 1 canine: crown 1/2 worn to dentine, 1 hypoplasia

304N 308E Feature 1-C 2.15
- 4 left metatarsals, adult, female?
- 1 first proximal row tarsal left phalanx

304N 308E Feature 1-D 2.18
- 1 tarsal, 2nd or 3rd cuneiform
- 3 middle row carpal phalanges
- 1 proximal row carpal phalanx
- 1 distal row tarsal phalanx
- 1 right lunate
- 1 right triquetral

304N 308E Feature 1-E 2.25
- 1 carpal proximal row phalanx

304N 3038E Feature 1-F 2.13
- 1 metatarsal

306N 308E Level A .91
- 1 adult male frontal fragment: supraorbital ridges and upper eye orbits
- 1 adult male frontal fragment: supraorbital ridges and upper eye orbits, but not as robust as individual above.
- 1 adult humerus shaft fragment
- 1 adult right tibia fragment: exhibits periosteal reaction from infection
- 1 adult left maxilla fragment with sinus

306N 308E Level B .99
- 1 mandibular M3, left, fits into mandible of Feature 9, exact match with wear facets
- 1 left talus, fits left tibia of F-9
- 1 right olecranon - fits right ulna of F-9
- 3 sacral fragments, fits F-9
- 1 lumbar vertebra articular facet - fits F-9
- 1 proximal right radius, adult, not F-9
- 3 medial row phalanges, adult, carpal
- 1 distal row adult carpal phalanx
- 1 right hamate, adult, possibly F-9
- 2 cranial fragments, small adult
- 1 maxillary fragment, adult
- 1 worn right mandibular molar: Not F-9, M1 or M2 by wear facets, corn dentine exposed.

306N 308E Level C 1.28
- 1 subadult frontal fragment: probable child
- 1 right adult mandibular M1 or M2, dentine exposed - Not F-9

306N 308E Level C East Profile 1.35
1 adult male?, left ulna, distal end missing

306N 308E Level D 1.54
1 adult occipital fragment
1 frontal fragment: probable chile
1 femur distal epiphysis, subadult around 14 years
1 right adult rib fragment
1 right adult ulna, distal end missing
1 left adult proximal ulna fragment
1 medial condyle of clavicle, subadult
1 adult probable male right temporal fragment
5 adult cranial fragments
2 probable child long bone fragments
1 charred long bone fragment: probably not human

306N 308E Pit Fill 1.04 Feature 9
1 adult toe phalanx, medial row
1 left carpal navicular
1 adult distal fibular articulation
1 adult tarsal proximal phalanx
1 adult right rib fragment
1 adult thoracic articular facet

TRENCH B

304N 312E Level B 1.57
2 adult cranial fragments, outer table porotic

304N 312E Level C 1.82
1 left adult frontal fragment, orbit, probable male, slight cribra orbitalia
1 subadult right first rib, probable child
1 adult thoracic vertebra articular facet
2 adult parietal fragments, porotic
1 mandibular outer alveolus, root sockets for two molars
1 premolar crown, subadult, slight wear, around 10 years

304N 312E Level D 2.05
1 adult right lesses multangular
2 adult cranial fragments
1 proximal epiphysis or right tibia, subadult around 12-14 years

304N 312E Area A
1 deciduous maxillary molar, crown worn almost to roots, cupped out
1 subadult (child) petrous portion of temporal
5 proximal row adult tarsal phalanges, slight arthritic lipping both ends
3 distal tarsal phalanges, #1 has marked degenerative change
1 middle row tarsal phalanx

306N 312E Level A 1.17
3 cranial parietal fragments, adult
1 adult tarsal navicular
12 adult long bone fragments: femur, tibia, and fibula
4 cranial fragments, adult, porotic lesions
1 thoracic vertebra articular facet
1 humerus fragment, adult
4 adult long bone fragments: femur and fibula

306N 312E Level B 1.48
1 charred cranial fragment
1 petrous portion of temporal
2 charred humerus fragments, burned after they were broken
1 pisiform
1 left mandibular coronoid process
3 left frontal cranial fragments, adult male?, porotic lesions
2 parietal fragments
4 femur fragments: periosteal reaction, lesions and elevated, male?
1 adult humerus fragment, robust male?
2 long bone fragments

306N 312E Level C 1.60
2 subadult cranial fragments
1 subadult phalanx
1 charred adult premolar, burned after extraction
1 adult calcaneous fragment, superior articulation

306N 312E Level D 1.80
1 subadult phalanx

306N 312E ?
1 adult medial row carpal phalanx
1 subadult phalanx

306N 312E Feature 7 1.94
20 subadult metacarpals and phalanges
2 subadult epiphyses, very rudimentary
4 cranial fragments, subadult
1 adult complete proximal row tarsal phalanx, distal end exhibits degenerative changes, arthritis and trauma
1 adult right clavicle central diaphysis and partial acromial end, very robust male.

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